UNIVERSITY OF THE WESTERN CAPE

DEPARTMENT OF PHYSIOTHERAPY

CONTEXTUALIZATION OF A PHYSIOTHERAPY CLINICAL PRACTICE GUIDELINE FOR STROKE REHABILITATION IN KENYA.

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KEYWORDS

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Rehabilitation

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Contextualize

Process of care

ABSTRACT

Background

Stroke is the third leading cause of death and disability worldwide. Eighty five per cent of strokes occur in developing countries, and it is estimated that the prevalence will increase in future. Evidence based rehabilitation programs inherent in clinical practice guidelines has the potential to improves functional activities, and participation. However Kenya does not have this guideline. Most clinical guidelines are developed in the western world, and reflect developed world healthcare systems and resources that are not always appropriate to developing nations. Likewise, guidelines are costly to produce. Kenya lacks the resources and the expertise for de novo guideline development. It is therefore appropriate and cost effective to contextualise the available high quality recommendations

Aim

The aim of the research project was to develop a contextualized Physiotherapy evidence-based, clinical practice guideline for stroke rehabilitation in Kenya.

Method

The research was conducted in 3 parts and undertaken in 17 County Referral Hospitals in Kenya.

Part 1: This part of the study aimed at answering the first objective of the study. It comprised of a mixed methodology that was both qualitative and quantitative, encompassing interviews, a cross-sectional descriptive survey and a descriptive

retrospective study for contextual analysis. The study sample included 12 interviews, 112 physiotherapists took part in the survey, and record review of 150 patients files. Healthcare providers were purposively sampled for interviews and physiotherapists were conveniently sampled for the survey; while all files for 2014 for patients with stroke were considered for archival data extraction. Interview guides, questionnaires and data extraction sheets were used for data collection. Qualitative data were analyzed through a thematic content approach while descriptive statistics was used to analyze quantitative data.

Part 2: A systematic review was conducted to identify current, high-quality clinical guidelines for stroke rehabilitation. Guidelines that met the inclusion criteria were assessed using the Appraisal of Guidelines Research and Evaluation, Version II. Three guidelines qualified, from which data were extracted. Evidence-based recommendations were extracted from high-quality guidelines and synthesized for the contextualisation process. Recommendations from the three qualifies guidelines were merged, rated on level of evidence, and endorsed using Philippine Academy of Rehabilitation Medicine (PARM) writing guides. The endorsed recommendations were then considered for applicability in Kenya. A Philippine Academy of Rehabilitation Medicine framework was adopted to develop context points that enhance local service delivery. Six physiotherapists were observed to assess implementability of the contextualized guideline. Few contentious components were identified.

Part 3: This entailed the validation and contextualization of the clinical recommendations. A purposive sample of 16 experts validated the clinical recommendations to Kenyan context using a modified Delphi approach. A questionnaire

was used for data collection. Consensus was achieved at 75%. Permission to conduct the study was granted by the University of the Western Cape, research and ethic committee Kenya (ethic body in Kenya), 17 County Referral Hospitals and from all participants. Participants were not named during the process of data collection. The panel developed context points relevant to the recommendations during a consensus process.

Results:

Part 1:

Participants largely agreed on the context. The findings indicated involvement in assessment of stroke patients. This included assessment of impairment (100% motor function, 79.3% cognitive), activity limitation and social support (99.3% mobility, 98.7% ADL, 48% emotional status). However, the use of outcome measures was uncommon (39.3%). Of the 39.3% use of outcome measure, the most commonly tool used were visual analogue scale 39% and Ashworth modified scale 36%. Likewise, Impairment, activity limitation and participation restriction were the major aspects that were considered during physiotherapy management. This involved; re-education of function; management; re-education of balance; normalization of tone; re-education of functional activities; sensory function management; and provision of Orthosis

The patients' journey was explored through an interdisciplinary approach. The major physiotherapy rehabilitation areas surveyed included; timing, duration, frequency and intensity in rehabilitation, as well as involvement of the family/carer among others. This patient journey formed the foundation of the current study.

Part 2:

Three clinical guidelines on stroke rehabilitation were identified through systematic review. Three CPGs were rated as high-quality. The highest AGREE II scores were obtained for the domains of scope and purpose, stakeholder involvement, rigor of development and clarity of presentation. The lowest scores were obtained for the AGREE II domains of applicability and editorial independence. Recommendations were extracted from them. The recommendations were then synthesized, using a structured approach. The end-result was a core set of evidence-based, clinical recommendations. The recommendations were further rephrased to communicate a strong or weak recommendation as well as confirm reliability in writing. The context point factored included equipment, workforce, training, timing and organizational/systems among others.

However not all the recommendation extracted from the high quality guidelines were applicable to the Kenyan setting. Contentious recommendation included items is Assessment and Outcome Measure, Timing, Duration and Intensity, In-Patient Rehabilitation, Discharge Plan , Outpatient Rehabilitation, and Lower Extremity among others

Part 3:

Sixteen members validated the recommendations for the Kenyan context, confirming the clinical guideline to be largely applicable for the intended context. Some adjustments were incorporated to facilitate implementability of a contextualized physiotherapy

clinical practice guideline, this included; muscle power, muscle tone and range of motion assessment of stroke patients on admission, tailored repetitive practice and task-specific circuit class training to increase the amount of practice in rehabilitation. Rehabilitation of stroke patients to be done for one-hour of active practice. However, the frequency of at least five days a week was be replaced by three days a week.

With regard to a discharge plan, general ward/medical ward was be considered if ongoing rehabilitation is required. Likewise, post discharge rehabilitation be offered as needed, or at home and be based on a client-centered approach. Lastly, casting, range of motion and positioning to be considered to reduce or prevent spasticity in management of the upper extremity.

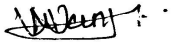
Conclusion

The study determines the processes of care for stroke patients, appraised, and contextualised high quality clinical guidelines for stroke rehabilitation. The end product of the project was a contextualized, evidence-based clinical guideline for stroke rehabilitation in Kenya. The findings indicate that modifications in practice, healthcare system organization and governance will contribute to the successful implementation of the guideline. Further research avenues include external review, the development of an implementation plan and a practical trial to investigate the feasibility of the contextualized clinical guideline within the Kenyan context.

DECLARATION

I declare that "The contextualization of clinical guidelines for stoke rehabilitation in Kenya" is my own work that has not been submitted for any degree or examination at any other university and that all the sources used or quoted have been indicated or acknowledged by means of complete references.

Naomi Wanjiru Kingau



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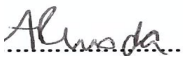

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Thank you to the Moi-Linköping collaboration for providing funding in support of this project. The support I received allowed me to focus my time and energy on the research, which made an enormous difference to me. Most importantly, thank you to my family and friends for their love, support and understanding over the past four years. Thank you for sharing in my excitement when things were going well and for listening patiently when I grumbled that they were not.

To my children's nanny Janet, you took over some of my responsibilities and made them yours so that I could finish my journey, thank you. To my children, Liz and Antoinette, thank you for motivating me to finish my journey so that I can be with you more often. To my mother, aunt, uncle, brother and cousins: thanks for your support during my

journey.

DEDICATION

For Muthoni, my mother, who gave up so much for us.

For Githui, my brother, who I respect; and for Dr. Christer Andersson, the latter my friend and colleague; who has helped me more than he realizes.

Oral Presentation based on thesis

The process of care for stroke patients in Kenya, poster presentation, World Confederation of Physical Therapist, Cape Town, 2, July 2017.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ADL	Activities of Daily Living
AHA	American Heart Association
CIMT	Constraint Induced Movement Therapy
CPG	Clinical Practice Guideline
EBP	Evidence-Based Practice
FES	Functional Electrical Stimulation
GPP	Good Practice Points
IADL	Instrumental Activities of Daily Living
ICAHE	International Centre for Allied Health Evidence, The University of South Australia
NHMRC	National Health and Medical Research Council
NICE	National Institute for Clinical Excellence
NZGG	New Zealand Guidelines Group
PARM	Philippine Academy of Rehabilitation Medicine
SIGN	Scottish Intercollegiate Guidelines Network
TIA	Transient Ischemic Attack
UE	Upper Extremity
LE	Lower Extremity
WHO	World Health Organization
ICF	International classification of function
MTRH	Moi Teaching and Referral Hospital
NSIH	National Spinal Injury Hospital
MEDLINE	Medical Literature on Line
CINAHL	Allied Health Literature

PsycINFO	Psychology Information
PubMed	Public Medline
AGREE II	Appraisal of Guidelines for Research & Evaluation II Tool
FIM	Functional Independence Measures
PICO	Population, intervention, comparison and outcome
ARAT	Action Research Arm Test
RTT	Repetitive task training
GDP	Gross Domestic Product
WCPT	World Confederation of Physiotherapy
tDCS	Transcranial Direct Current Stimulation
rTMS	Transcranial Magnetic Stimulation
RCT	Randomised Control Trial
KNGF	Dutch Guideline for stroke

LIST OF DEFINITIONS

Guidelines: broader systems, such as those found in primary care and are generally developed and used by policy-makers, service organizations, funders or regulatory authorities (Medical Dictionary, 2016).

Clinical practice guidelines: These guidelines are systematically developed recommendations that assist the practitioner and the patient in decision-making about health care for specific clinical circumstances (IOM, 2011).

Protocol: commonly used to prescribe behaviours at diplomatic and societal events. In health this has the meaning of rules or instructions about how to carry out a particular process explicitly and without error (Medical Dictionary, 2016).

Care pathways: a series of evidence-informed steps that could involve a multidisciplinary team at various care levels, which should underpin the journey of care for patients with a particular diagnosis (Gonzalez-suarez, et al., 2012).

Adapt a guideline: The use and/or modification of guideline(s) produced in one cultural or organizational setting for application in a different context. Adaptation can be used as an alternative to *de novo* guideline development or for customizing existing guidelines(s) to suit the local context (ADAPTE II Collaboration, 2009).

Adopt a guideline: The acceptance of a guideline as a whole after the assessment of its quality, currency and content. Healthcare providers (or other users of recommendations) who adopt a guideline are committed to changing their practices in accordance with the

recommendation in the guideline (ADAPTE II Collaboration, 2009).

Applicability: The ability to which users can put a recommendation into practice. Applicability is influenced by a clearly defined eligible patient population and its congruence with the population in the intended setting. External factors such as knowledge, skill, staff, time-frames, equipment and resources influence applicability (ADAPTE II Collaboration, 2009).

Consensus development: Formal consensus development methods are ways of obtaining and synthesizing views of experts, opinion leaders and stakeholders. They involve the generation of group judgments based on explicit aggregation on individual participants' judgments (Halcomb, et al.., 2008).

Contextual factors: Contextual factors include personal and environmental features of the individual. Personal factors include individual features such as gender, age, coping styles, social background, education, profession, past and current experience, overall behavior pattern and character. Whereas environmental factors comprise the physical, social, legal, external and attitudinal environment in which people live and conduct their lives; contextual factors can act as either facilitators of healthcare or barriers to such care (WHO, 2013).

Contextualize a guideline: Contextualization of a guideline for use in developing countries means retaining its current form, while using writing strategies that assist in its operationalization in the local environment. The focus is on how to best translate existing evidence statements into local practice (Gonzalez-Suarez et al.., 2012).

Evidence-based practice: The conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients; the integration of best research evidence with clinical expertise and patient values (Sackett et al., 1996).

Interdisciplinary team: A group of healthcare professionals from different disciplines that integrate care as a team; who work in a coordinated fashion toward a common goal through frequent communication (IASP, 2009b; Medical Dictionary, 2016). Key features of an interdisciplinary approach are joint problem-solving, mutual responsibility and shared decision-making (Turk et al., 2012).

Knowledge synthesis: The contextualization and integration of research findings of individual research studies within the larger body of knowledge on a topic (Canadian Institutes of Health Research, 2012).

Knowledge translation research: The scientific study of the determinants of knowledge use and the methods to promote the uptake of research findings by healthcare providers, policymakers and patients. This is also known as implementation research and quality improvement research (Eccles, Grimshaw, Walker, Johnston & Pitts, 2005).

Level of evidence: A hierarchical system that classifies evidence according to different individual study designs (Hillier, et al., 2011).

Multi-disciplinary team: A team of professionals including representatives of different disciplines who coordinate the contributions of each profession, which are not considered

to overlap, in order to improve patient care (Medical Dictionary, 2016).

Quality of evidence: The body of evidence. The quality of evidence reflects the extent to which confidence in an estimate of the effect is adequate to support recommendations (Guyatt, Oxman, Vist, Kunz, Falck-Ytter & Schünemann, 2008). The evidence base (i.e. number, level and risk of bias in included studies, which forms the body of evidence) (Hillier et al., 2011).

Recommendations: Evidence-based statements that promote or advocate a particular course of action in clinical practice (Misso, Pitt, Jones, Barnes, Piterman & Green, 2008).

Rehabilitation: A goal-orientated and time-limited process aimed at enabling impaired persons to reach an optimum mental, physical or social functional level (National Department of Health, 2015).

Strength of the recommendation: The extent to which one can be confident that the desirable effects of an intervention outweigh the undesirable effects (Guyatt, Oxman, Kunz, Falck-Ytter, Vist, Liberati & Schünemann, 2008a).

CHAPTER ONE:

1.1. INTRODUCTION

In this chapter, the rationale of the study highlights the prevalence and growing incidence of stroke. This chapter further documents the importance of rehabilitation and clinical guidelines. Furthermore, this chapter highlights guideline acquisition. In addition, the purpose of this study is elucidated and the particular aims and objectives are charted. This chapter concludes with meaning of terminologies used, as well as a summary of the chapters.

1.2. BACKGROUND

Stroke is the third primary cause of death globally (American Heart Association, 2011; Begg, Vos, Baker, Stevenson, Stanley & Lopez, 2007). Approximately 6 million deaths are recorded globally resulting from stroke (Gonzalez Suarez, et al. 2012), while in the U.S, stroke was found to be the fourth leading cause of death in 2009 and 2010 (Roger et al., 2012; Kochanek, Xu, & Murphy, 2011; Murphy et al., 2010). In the year 2000, stroke accounted for 7% of all deaths in Canada and it is estimated that every seven minutes, a Canadian dies of heart disease or stroke (Roger et al., 2012). In a similar study, it was reported that each year in the United States, approximately 140,000 people die of the same (English & Hillier, 2010). In a recent multinational assessment, stroke ranked as the second or third cause of death in Hong Kong, South Korea and Singapore (Daroh & Mina, 2014). Japan, Taiwan and China are said to have the highest stroke

mortality rate in Asia (Daroh & Mina, 2014). Similarly, the World Health Organization (2012) asserts that 5 million people die of stroke worldwide each year.

In Africa, stroke accounts for 3 million deaths every year. This figure is expected to rise to 5 million by 2020 (Walker, et al., 2012; Connor, Mondi, & Warlow, 2008). In Ghana, for example, stroke is the leading cause of death while in South Africa stroke accounts for 7 % of all deaths (Mbewu & Mbanya, 2006). In Malawi, which is one of a number of countries that have a high incidence of HIV, stroke has been reported to be the primary complication thereof, as well as the leading cause of death (Mahawish & Heikinheimo, 2010). Unfortunately similar statistics are not available for Kenya, due to a paucity of literature.

Stroke prevalence varies worldwide. Studies have shown that the prevalence of stroke in America, European countries and China, per 1000 people, range from 42-72 in people over 64 years, and 4.2 to 11.7 in people below 54 years. Table 1.1 shows findings on prevalence of stroke.

Table 1.1: Prevalence of strokes (percent of total population)

Reference	Frequency
Zhang, Chapman, Plested, Jackson, & Purroy, 2012	Italy: 1.5% United Kingdom: 3%
Hsieh & Chiou, 2014	Taiwan: 6%
Sridharan et al. (2009)	10.1%; subarachnoid haemorrhage 4.2%. 98
Benamer & Grosset (2009)	Arab countries (Kuwait, Saudi Arabia, Qatar, Bahrain, Libya, Iraq): Ischaemic stroke 80%; haemorrhagic stroke 20%
Li et al. (2008)	China: Ischaemic stroke 68.7%; intra-cerebral haemorrhage 31.3%.
Banerjee & Das (2006)	India: 2.21 ischaemic strokes for haemorrhagic stroke (Type of stroke)
Saposnik & Brutto (2003)	South American countries: Ischemic stroke 54-74%; haemorrhagic stroke 26-46%.
Sokrab, Sid-Ahmed, & Idris (2002)	Sudan: Ischaemic stroke 58.3%, haemorrhagic stroke 41.6%.

Eighty five per cent of strokes occur in developing countries and it is estimated that by 2020, the prevalence of stroke may rise by 50% (Mahawish & Heikinheimo, 2010). Jowi and Mativo (2008) showed a hospital audit report on stroke admissions in Nairobi, Kenya, revealing a prevalence of 3042 per 100,000. The prevalence of stroke in urban Nigeria, is estimated to be at 1.14 per 1,000 (Danes, Okubadejo, & Ojini, 2007) while a study by Walker et al., (2012) on stroke in Tanzania found stroke incidence to be at 94.5 per 100,000.

The prevalence of stroke vary with population. In a study by the American Heart Association (2010) in 2006, the incidence of stroke of the Veteran American was 5766 per 100,000. Likewise and incidence of 5920 was identified in 2007. About 600,000 of these cases were first attacks, while 195,000 were recurrent attacks. Every year, nearly 110,000, 11,000 and 4,000 people in England, Wales and Northern Ireland respectively have a first or recurrent stroke.

Approximately 16 million people are disabled secondary to stroke (American Heart Association, 2011a). In Australia, the United Kingdom and the United States of America, stroke is among the top 10 causes of long-term physical disability (Hall, Levant & Defrances, 2012; Begg et al., 2007). A study by the National Clinical Guideline Centre (2013) found that in England more than 900,000 people live with disability secondary to stroke. In 2005, the World Health Organization asserted that 5 million people are permanently disabled each year due to stroke while Zhang, Chapman, Plested, Jackson and Purroy (2012) showed that stroke is a cause of serious, long-term disability in the United States. In Japan, Taiwan and China, most stroke patients survive a first stroke,

though often have significant disability (Daroh & Mina, 2014). In South Africa, Bertram, Katzenellenbogen, Vos, Bradshaw and Hofman, (2013) found that the burden of disease due to stroke was 564 000 disability-adjusted life years (DALYs). Of this, 17% was contributed by years lost to disability (YLD).

Disability post stroke can lead to impairment, activity limitation and participation restriction. The main impairments are motor-related (compromised muscle tone, coordination, sensation, poor balance, poor bladder control) affecting movement and suppleness (McKevitt et al., 2011). Additional functions compromised after stroke include consciousness, orientation, mental functions and memory functions (Geyh et al., 2004). Stroke- related structural impairment eventually leads to physiological and psychological abnormalities that would affect almost every aspect of life (Miller et al., 2010).

Stroke related impairment is depicted by the decrease or loss of ability to perform activities (McKevitt et al., 2011; Miller et al., 2010). The challenges are related with activities of daily living, both basic (e.g. dressing, feeding) and instrumental (e.g. domestic skills, leisure). A study conducted in Sweden by Medin, Windahl, Von Arbin and Wedling (2011), which focused on eating habits after stroke, revealed that 81.7% of stroke patients had one or more difficulties with eating. The commonest eating problems revealed were that 66.3% of the patients battled with managing food on the plate while eating; 54.8% battled with managing food consumption and sitting position as a preparation for eating. It was also noted that as many as 45.2% of people affected by stroke were unable to dress independently. In a study by Swann (2011), who focused on

the challenges of being able to dress after a stroke, he concluded that physical motor loss, loss of cognitive function and loss of perpetual abilities were most likely to be responsible for loss of independent dressing after a stroke. In a similar study, Welmer, Holmqvist and Sommerfeld (2008) found that 70% of stroke patients had difficulties with hand's fine motor control first week after stroke.

Long-term challenges resulting from the effects of these impairments and activity limitations can result in the inability to return to work as well as decreased social participation (Urimubenshi, 2015). Stroke also causes social segregation and prevention of person's involvement in many areas, particularly for community occasions such as regular leisure and work (Miller, et al., 2010). The authors' cite stroke impact on involvement as a setback that prevents the patient from recovering or starting a societal life. When stroke survivors are unable to continue with their livelihoods, issues of family burden and dependency arise (English & Hillier, 2010; Shenhar et al., 2008).

Owolabi and Platz (2008) in Nigeria, found that stroke impairs all facets of health-related quality of life (HRQOL), particularly domains in the physical sphere. Carwwod, Visagie and Mji (2016) in the Western Cape similarly found that stroke survivors experienced activity limitations. Furthermore, a study by Rhoda, Mpofu, & De Weerdt (2011) on gross motor functions, showed that unsupported sitting was the activity that the majority of stroke patients were able to perform independently. However, as a study by Mudzi, Stewart, & Musenge (2013) has shown, 12 months post discharge post stroke survivors still experience complete difficulty when undertaking single and multiple tasks without help. Pertinently the authors' highlighted that patients struggled with the preparation of

meals, household work, interpersonal interaction, as well as difficulty with community life and partaking in recreation and leisure activities.

Management of impairment secondary to stroke is imperative for functional recovery (English & Hillier, 2010; Yang et al., 2006). To this end, patients are taken through a sequence of rehabilitation process implemented by healthcare professionals. Studies have presented a standard care pathway from admission through to discharge (Gonzalez-suarez, et al., 2012). This care pathway is illustrated in Figure 1.1.

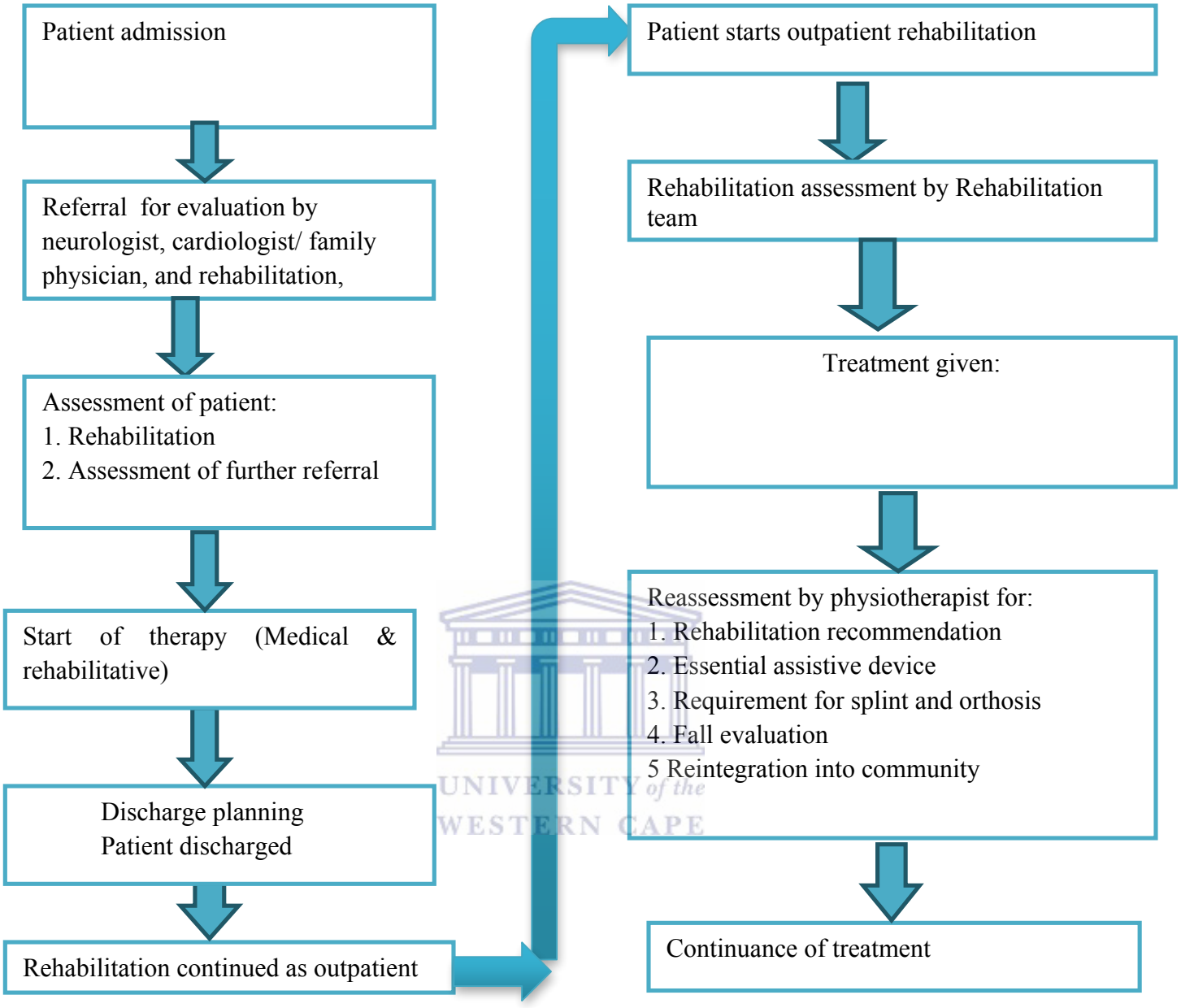

Figure 1.1: Stroke Patient Journey

Acute strokes are cogitated as an emergency. They should be managed in a hospital setting, where the early rehabilitation occurs in a specialized stroke unit or general medical ward (Centers for Disease Control and Prevention, 2007). Stroke survivors' need effective rehabilitation services at acute and post acute level (Miller, et al., 2010). Rehabilitation involves services that endeavor to decrease impairment while enhancing recuperation and adaptation to residue disabilities (Putaman et al., 2010). The three major rehabilitation services are physiotherapy, occupational therapy and speech therapy (Dancan, et al. 2005). As asserted by Putaman, et al. (2010), rehabilitation is a continuous course that includes identification of challenges and needs. Significantly, the authors indicated that International Classification of Functions (ICF) can be utilized to supervise rehabilitation from hospital to community reintegration. The course also encompasses the identification of individual and community obstacles in addition to the administration of rehabilitation interventions, to measure the efficiency of interventions.

Putaman et al. (2010) suggest that mobilization exercises, selective movement balance exercises, sitting, standing, sensory education, transfers, domestic ADL, leisure and work activities as well as assorted techniques are among the domains that physiotherapists use during stroke rehabilitation.

In the current study, rehabilitation will be considered as services offered by physiotherapists, occupational therapists, and speech therapists among other healthcare disciplines, in order to restore pre-morbid functions.

Rehabilitation of stroke patient differs in developing and developed countries. Rhoda, Smith, Mpofu, DeWeerdt, & DeWit (2014), in a comparative study on motor and

functional recovery of stroke survivors in Germany against stroke patients on rehabilitation in South Africa, found distinct recovery arrays for patients in developed against developing countries. The results demonstrated a substantial variance in favor of the German participants, for gross motor and upper limb recovery. Pertinently, two and six months post stroke, levels of arm function and performance in activity of daily living remained meaningfully higher for German sample, with the South African sample showing comparatively lower rates of recovery. An exhaustive examination of the factors to which this variance in recovery patterns could be attributed to, was beyond the scope of the study.

Rehabilitation enhances functional activities, participation and thus improved quality of life (French et al., 2007). The result thereof is improved productivity, which contributes positively to a country's Gross Domestic Product (GDP). Certainly the economic burden of stroke is significant. Increased cost calls for provision of evidence-based rehabilitation that is cost effective. Components of stroke rehabilitation programs have proven to aid in functional recovery. These constituents include patient involvement and motivation; early ambulation; amount and timing of physiotherapy; and inherent in clinical practice guidelines (English & Hillier, 2010).

Clinical practice guidelines are systematically developed statements derived from the current best-evidenced based practice (Gonzalez-Suarez, et al., 2012). Clinical guidelines assist the service provider as well as the patient to make decisions about suitable healthcare for specific clinical circumstances (Gonzalez-Suarez et al., 2012; National Stroke Foundation, 2010). Guidelines help to widen the scope of services, optimize

treatment and assist practitioners in improving the quality of the care they provide (National Institute for Health and Care Excellence, 2013). The use of evidence to chaperon clinical practice has been a confront globally for nearly all health authorities (Grol & Grimshaw, 2003). These challenges are amplified in third world countries such as Kenya, with scarce resources and, on occasion, outdated practices are exacerbating factors (Agarwal, Kalita & Misra, 2008).

Guidelines can be acquired through three strategies: development, adaptation and contextualization. Development refers to the formulation of guidelines through a rigorous process of a systematic appraisal of available evidence (Groot, Hommersom, & Lucas, 2002). De novo clinical guideline development involves establishing answerable question(s) relevant to purpose, scope, end-users, context; Setting PICO/ PECOT for each question, specifying the evidence sources and search strategies, deliberating on the resultant literature in terms of evidence dimensions, making evidence summaries for each question, and providing answers to each question (recommendations); on the basis of the strength of the best currently available evidence. Developing a de novo CPG is expensive, time-consuming and often unrewarding as a focus on implementation is lacking. The decision to develop de novo CPGs needs to be supported only when a paucity of results emerge from comprehensive searches for, and evaluation of, currently available CPGs.

Adaptation is the methodical approach to considering the use of guidelines developed in certain culture or organization, for use in a completely different environment (The

ADAPTE Collaboration, 2009). Adaptation involves identifying recommendations that cannot be adopted locally because they cannot be implemented, even with contextualization. Additional evidence is therefore required in Tier 1 to provide locally acceptable care alternatives.

The process ensures that the guidelines not only addresses specific health questions relevant to target setting, but is also appropriate for the need, priorities, legislation, policies and resources in the targeted setting (The ADAPTE Collaboration, 2009). The Adapte process is appropriate to meet the needs of different user groups such as guideline developers, healthcare providers and policy makers at local, national and international level. It similarly addresses groups with lesser and greater resources, who are interested in adapting or implementing guidelines. Adapte Collaboration provides a structure for systematically adapting guidelines using three phases. Table 1.2 below illustrates the adaptation process:

Table 1.2: Adaptation process (ADAPTE II Collaboration, 2010).

Phase	Responsibilities	Accompanying Modules
Set up phase	Formulate adaptation framework	Preparation
Adaptation	Define health questions	Scope and purpose
	Explore and screen guidelines	Search and screen
	Evaluate guidelines	Assessment
	Agree and select	Decision and selection
	Outline guideline report	Customization
Final phase	External evaluation	External review
	Plan for future review and update	After care planning
	Produce final guideline	Final production

The adaptation process takes a shorter period of time than developing guidelines. It is particularly important when dealing with high profile health questions, and the recommendations reflect circumstances in the targeted setting that may include health needs and resources (ADAPTE II Collaboration, 2010).

Adaptation requires less technical skills and financial resources, as a full search and review of literature is not required. However, in using the adaptation method, there is a danger that more up to date information may be excluded. In consequence thereto clinical questions that are important within a local context may not have been covered in the original guideline. Significantly too, the adaptation method does not involve all stakeholders in the process, leading to barriers to implementation. There are also times when no suitable guidelines can be found or when existing guidelines are not evidence based (ADAPTE II Collaboration, 2010)

Contextualization of CPG involves retaining the original product, while using writing strategies to assist in the operationalization of the guideline recommendations within a

different context. In this way, recommendations from one or more relevant CPGs are put into context within another setting; with no changes to recommendations, but with additional information to assist local uptake (Gonzales-Suarez et al., 2012).

Contextualization entails several processes. These processes include the guideline search, critical appraisal, extraction of relevant data for care pathway, contextualization, endorsement, filling in the gap and public consultation and implementation plan (Gonzales-Suarez et al., 2012). Contextualization steps informed the objectives of the current study. Figure 1.3 shows a summary of the contextualisation process while table 1.2 shows the difference between the various approaches of guideline acquisition.

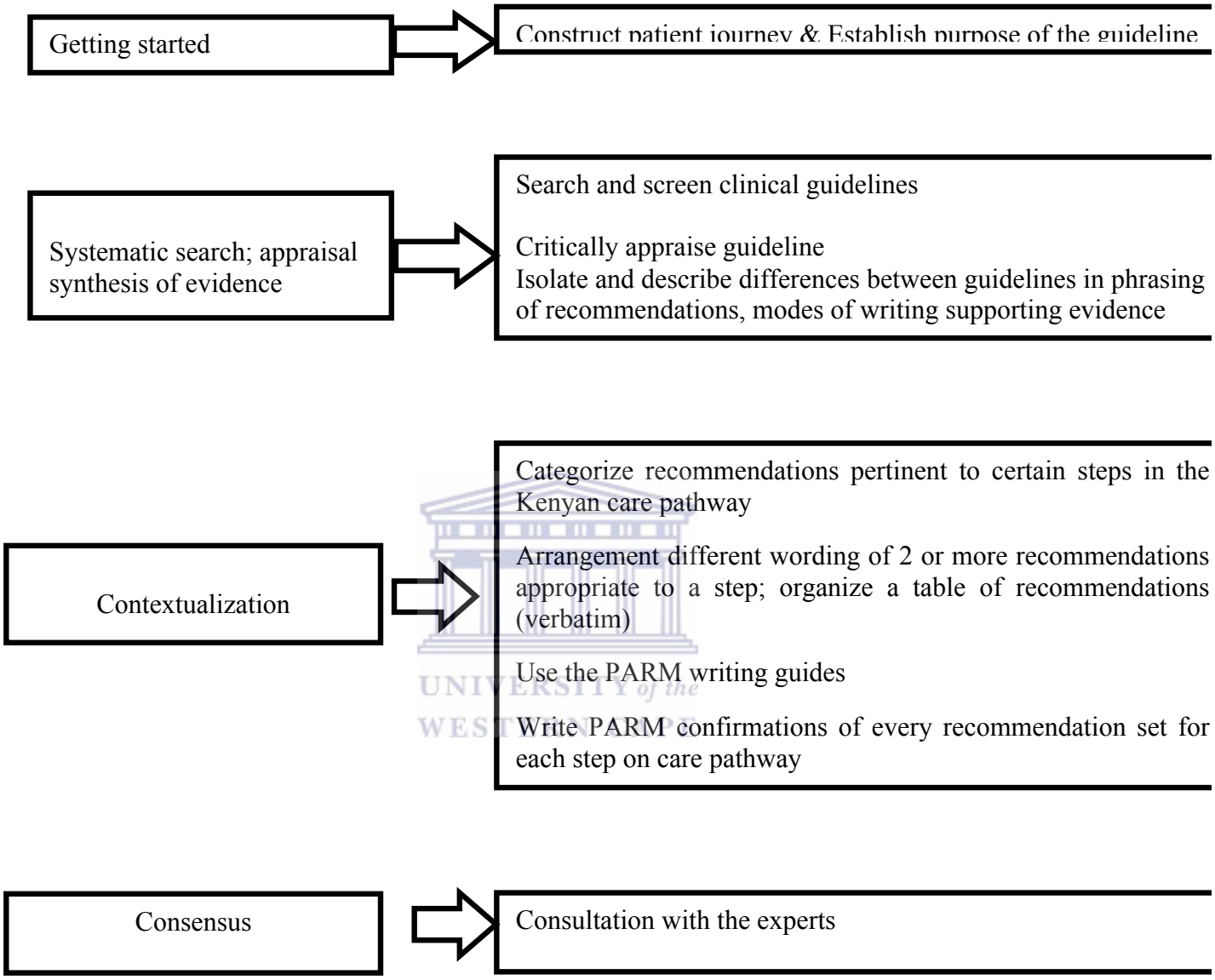

Figure 1.2: Contextualization process

Table 1.3. The difference between guideline development, adapting guideline and contextualizing guideline

De novo guideline development	Adapting guideline	Contextualizing guideline
• Specifies the evidence sources. • Deliberates on the resultant literature. • Makes evidence-based summaries. • Provides answers to each question. • De novo CPG is expensive, • Time-consuming, • Not focused on implementation.	• Identifies recommendations that cannot be adopted locally • Additional evidence in Tier 1 • Ensures appropriateness for the need, priorities, legislation, policies and resources in the targeted setting. • Addresses groups with lesser and greater resources. • Takes shorter time. • Requires less technical skills, and financial resources.	• Retains original product and uses writing strategies to assist in operationalization. • Takes recommendations from one or more relevant CPGs and puts them into context within another setting. • No changes to recommendations, • Additional information to assist local uptake.

The impact of stroke in developing and developed countries is equally devastating. According to Jowi and Mativo (2008), the occurrence of stroke in Kenya is on the rise in recent years, thus causing a huge burden on the Kenyan healthcare system.

This burden should be considered against the framework of Kenya as a developing sub-Saharan country, with inadequate health resources within its financial plan to cater for the population needs (Kenya National Bureau of Statistics, 2011). Kenya has a total area of 582,650 square kilometers (224,962 square miles) inhabited by a population of approximately 44.2 million people (Kenya National Bureau of Statistics, 2011). In 2011 the Kenyan government health expenditure was approximately 2.71% of the Gross

Domestic Product with US$77.08 per year expenditure on health per capita (Kenya National Bureau of Statistics, 2011). In contrast, in Australia, the fraction of government expenditure in 2011 was nearly 8.3% of their Gross Domestic Product (ABS, 2013), with total annual spending on health per capita ranging between US$3200-4400 (Health at a Glance Indicators, 2011). Given the high burden of disease and costs of stroke rehabilitation, high priority should be given to providing effectual rehabilitation services. It is therefore important that scarce resources are used wisely in order to obtain optimal and equitable health outcome.

Owing to the low social-economic standing of many Kenyans, most stroke patients are under pressure to go back to work for livelihood (Jowi & Mativo, 2008). Evidence-based practices in Kenya are not very well established. This is mainly so in terms of acquisition of guidelines and use of guidelines in decision-making apropos patients' care (McDonald et al., 2010). Regrettably, there has not been any attempt by the rehabilitation associations in the recent years to come up with guidelines for stroke rehabilitation in Kenya. Lack of clinical guidelines affects rehabilitation as outdated management is utilized (Gonzales-Suarez et al., 2012). This has had the undesirable result of patients ending up with deleterious disability following rehabilitation (Gonzales-Suarez et al., 2012).

In addition to the challenges of limited resources and time, Kenya lacks local expertise. Consequently there is no intention to adapt the existing guideline recommendations, but use the existing evidence by contextualizing the evidence-based clinical guidelines to the

Kenyan patient's care process; using the conceptual framework of the Philippine Academy of Rehabilitation Medicine (PARM)

1.3. PROBLEM STATEMENT

Studies have shown that the prevalence of stroke is on the rise in developing countries, among low to middle income earners (Feigin et al., 2010). Kenya has a prevalence rate of 3042/100,000 (Jowi and Mativo (2008). This figure is increasing daily, affecting younger population and creating a huge liability on the Kenyan healthcare system.

Low to middle income earners form the largest population in Kenya and are to some extent the backbone of this developing nation. Researchers have shown that approximately 30% of stroke survivors become permanently disabled, while 58% become dependent on their families and society (American Heart Association, 2011). However, evidence-based practice has shown that rehabilitation can increase independency in activities of daily living and promote early return to work for stroke survivors (Akinbo et al., 2009). Clinical practice guidelines ensure the correct management programme for the individual patient, taking into account timing and location, while using appropriate guidelines.

Studies have shown that the quality of patient care is noticeably improved when evidence is used in management (Akinbo et al., 2009). On the contrary, poor rehabilitation can result in complex debilitating social and economic outcomes on individuals, households and communities (Sherlock, 2009). This is caused by direct costs of treatment, opportunity costs of lost employment and the costs of informal care-provision within the

household (Sherlock, 2009). Poor rehabilitation results from outdated practices that are not evidence-based (Gonzales-Suarez et al., 2012). Often, evidence-based practices are engrained in the clinical guideline that steers rehabilitation (National Institute for Health and Care Excellence, 2013).

Guidelines formulated in the western world are not directly relevant or generalizable to developing countries. In Canada, for example, the government-run health insurance system covers the entire population and is complemented by a well defined medical benefits package. Therefore they formulate relevant policies and ensure proper implementation of these policies. In most of the sub-Saharan countries, patients pay out of pocket for health care services. This negatively affects healthcare services uptake due to lack of resources. Likewise, in the United States, the physical therapist to patient ratio is 1:7. This is contrary to African countries where there is a perennial shortage of healthcare providers. One physiotherapist may treat more than 15 patients a day, which ultimately affects the quality of service offered.

Guidelines are costly to produce. Guideline development requires huge resources (both financial and intellectual). Healthcare guidelines are produced by many organizations which include; national agencies, inter-governmental organizations, specialist medical societies, external organizational experts who are consulted in the process, external review groups as well as patients. The team holds consultative meetings from time to time over a period of 2–3 years and huge resources are used for evidence search e.g. systematic reviews, evidence synthesis and assessment, writing meetings, editing and layout of the document (Gonzalez-suarez, et al., 2012).

Kenya is a developing country that lacks evidenced based clinical guidelines for stroke rehabilitation. This affects the efficiency of rehabilitation hence poor health outcomes. It is therefore appropriate and cost effective to contextualize the available high quality recommendations (Gonzalez-Suarez et al., 2012).

1.4. RESEARCH QUESTIONS

What does a contextualized clinical guideline for stroke rehabilitation for Physiotherapy in Kenya entail?

1.5. AIM

The aim of the study is to contextualize a physiotherapy clinical guideline for stroke rehabilitation for Physiotherapy in Kenya.

1.6. OBJECTIVES

1. To determine the current rehabilitation practices and processes of stroke in Kenya.
2. To determine the quality of the clinical guidelines for stroke rehabilitation.
3. To contextualize a clinical guideline for Kenya using the Delphi study.

1.7. SIGNIFICANCE OF THE STUDY

The aim of stroke rehabilitation is to prevent activity limitation, while improving functionality and participation amongst stroke survivors. The current study will be of great importance to the patient by providing a guide for delivery of effective rehabilitation services. This will facilitate early return to work, improved productivity

and consequently improved quality of life. Significantly, the results of this study may facilitate an increased awareness of evidence- based clinical practice amongst the service providers and the policy makers in Kenya. Similarly, the results may be used in all physiotherapy-training institutions to shed light on areas that need attention in stroke rehabilitation and in the field of neurology. This will ensure that the graduates of these institutions have the right knowledge, skills and attitude for stroke rehabilitation. Finally, the results could be of value to researchers intending to take up additional studies on stroke rehabilitation, particularly within the context of a developing country like Kenya.

1.8. SUMMARY OF CHAPTERS

Chapter One

This chapter outlines the problem that the study aims to tackle, this being that stroke prevalence is a huge challenge globally. The chapter highlights the impact of a stroke, within the conceptual framework of the ICF, resulting in a huge social economic burden. Management of stroke survivors is brought forth as a multifaceted and dynamic course that necessitates a multidisciplinary approach. Furthermore, the need for a clinical guideline and various way of acquiring a clinical guideline are explored. Research questions, aims and objectives are also presented. The problem statement is considered and lastly, the significance of the study is described.

Chapter Two

Chapter two explains the all-encompassing research methods that were utilized as governing frameworks across the study, and the different methods that were executed in

every part of the process. Every chapter in the dissertation characterizes one element of the study. Chapter Two elucidates the methods in detail.

Chapter Three

Chapter three describes the results of interviews, archival study and a survey that were used to determine the process of care in Kenya. Literature suggests that evidence-based practice is vital in clinical practice for cost-effective and effectual management. However, if evidence-based practice is to be incorporated into the management of stroke in a way that is contextually appropriate, then the current stroke care pathway is a crucial feature to be considered. This is particularly imperative in a third world country like Kenya, where physiotherapists lack the resources and epistemological access to evidence as part of their practice.

This aspect of the study used interview guides for interviews with healthcare providers, patients and caregivers of stroke survivors, a data capturing sheet for archival data extraction and a self-developed questionnaire for the survey with physiotherapists working in 17 County Referral Hospitals. The questionnaire and data-capturing sheets were piloted and reliability and validity established. The key result was that physiotherapists rehabilitate stroke patient in the in-patient, out-patient and community based settings. This study used the outcome measure tool for baseline data collection prior to commencement of rehabilitation, physiotherapy management and finally re-assessment. Timing, duration, frequency and intensity of therapy also formed part of the process. Therefore, for evidence to be integrated in physiotherapy stroke rehabilitation

with the aim of improving the outcomes, evidence needs to be embedded within the existing care pathway in Kenya.

Chapter Four

Chapter four elucidates a systematic review of clinical guidelines that was done. The chapter briefly explains the process that was used to facilitate contextualization of a physiotherapy clinical practice guideline, to improve stroke rehabilitation in Kenya, and place this within a global context. The methodologies of steering systematic review and contextualization process are described, in addition to the finding of the study.

Chapter Five

This chapter depicts a comprehensive content analysis of the recommendations obtained from quality CPGs attained from a systematic review (Chapter 4). The chapter presents the procedure of synthesizing recommendations from various CPGs, in a stepwise process of integrating the wording and level/quality of the supporting evidence. Lastly the chapter presents a ratified core set of recommendations.

Chapter Six

Chapter Six presents final stages of contextualization of recommendations. A panel of experts assessed and endorsed the recommendations produced for the applicability and feasibility of the recommendations for the envisioned setting, by the Delphi process. The endorsed recommendations with their context points were structured into an accurate patient journey, which was constructed using the results from Chapter Three.

Chapter Seven

Chapter Seven presents the amalgamation phase of the study in the formulation of a guideline. The chapter describes the deductions of the study, by summarizing the outcomes of each aspect of the larger research project. A clinical practice guideline is presented that provides a framework for physiotherapists to rehabilitate stroke survivors. Figure 1.3 shows a brief overview of the overarching methodology and dissertation structure.

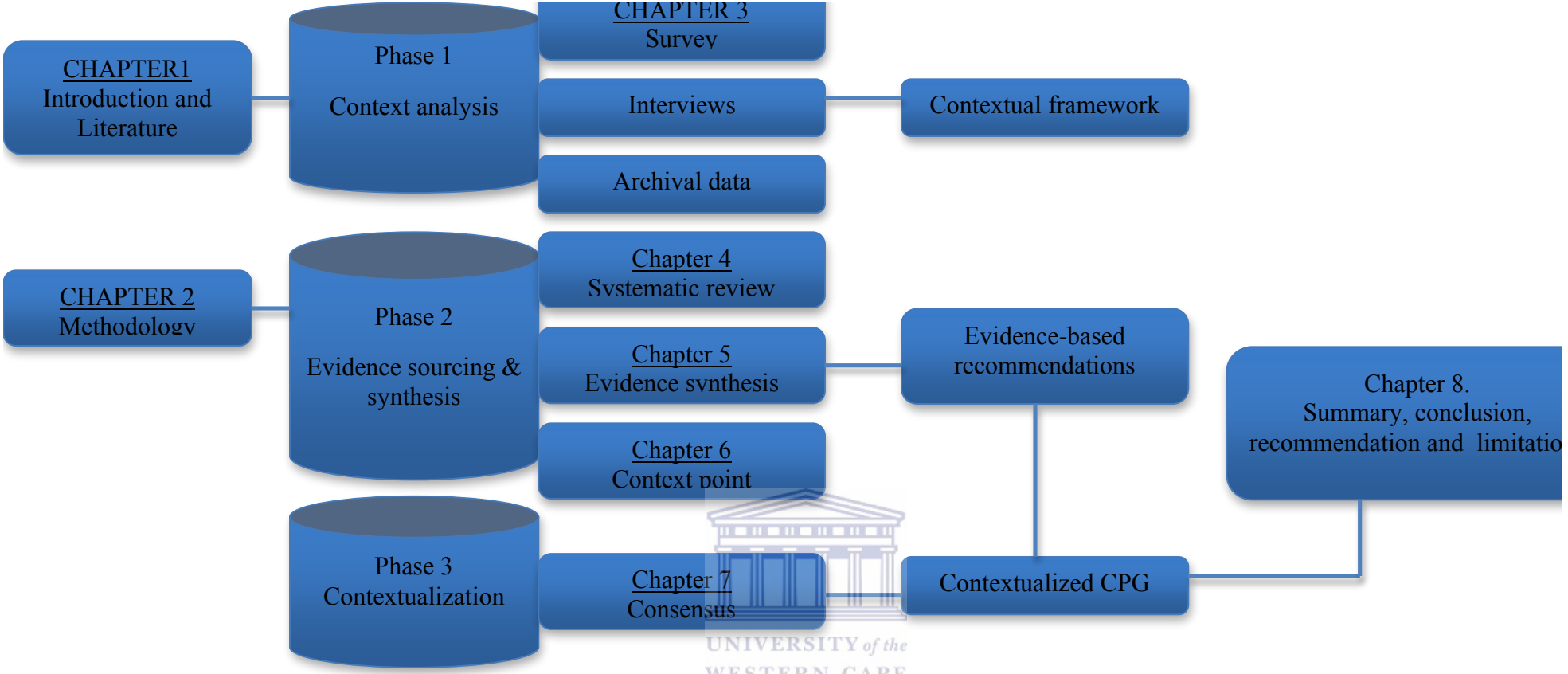

Figure 1.3: Brief overview of overarching methodology and dissertation structure

CHAPTER TWO: METHODOLOGY

2.1: INTRODUCTION

In order to tackle the research question, this study is in three phases. This chapter offers the theoretical basis for the approaches used in the various phases of the study. Phase One is a discussion on the mixed method approach; Phase Two is a systematic appraisal of clinical guidelines, wherein the steps involved in the contextualization of clinical guideline are explained. In Phase Three a consensus process on contentious recommendations is explained. The chapter ends with the ethical considerations adhered to, during the application of the study.

2.2: CONCEPTUAL FRAMEWORK

Figure 2.1 shows the research framework used throughout the study. The research framework served as a leading approach and describes the procedures used to address the research objectives. These methods include the mixed method (Phase One). The mixed method approach included a survey, archival data and interviews. Phase Two involved a systematic review of clinical guidelines and contextualization, while Phase Three included a Delphi study. Each of these procedures had a significant influence on the contextualization of guidelines as the end product. Figure 2.1 shows the research framework.

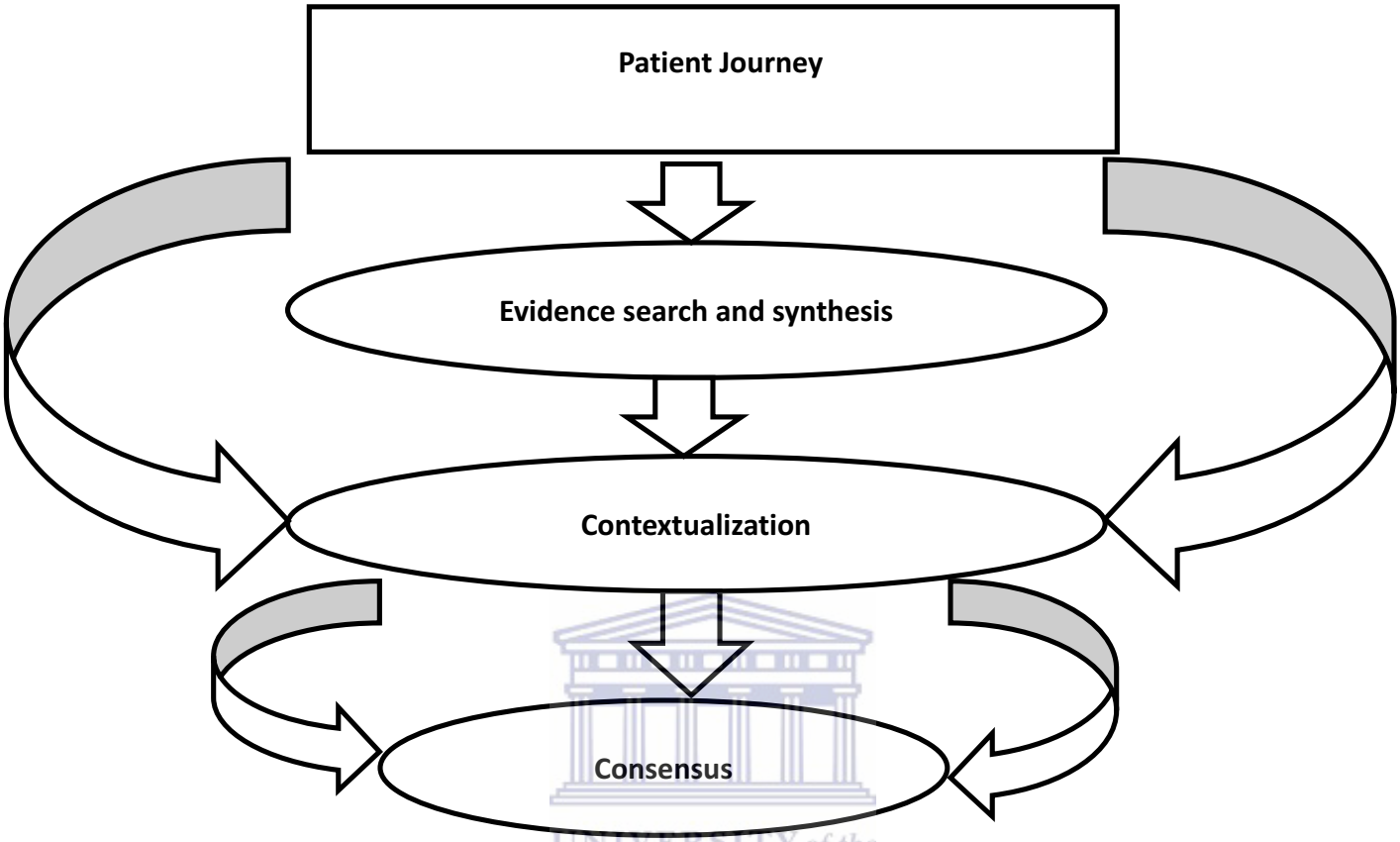

Figure 2.1: Research framework

2.3: STUDY PARADIGM

The current study employed a mixed methods approach and a concurrent triangulation design within the post-modernist paradigm. Postmodernists support a pluralistic epistemology, knowledge and images portray the perspective of a precise culture. Therefore the researcher was able to deconstruct text from different sources to uncover the intended meanings and discourse. (Creswell, 2012; Creswell, Klassen, Plano, Clark & Smith, 2011).

2.4. PHASE ONE: UNDERSTANDING THE CONTEXT: MIXED METHOD APPROACH (CHAPTER THREE)

Phase One of this dissertation is a mixed study using one qualitative and two quantitative studies to investigate contextual factors influencing stroke rehabilitation experienced by a sample of stroke survivors, caregivers and healthcare experts taking care of the patients with stroke (Chapter Three).

The International Classification of Function (ICF), (WHO, 2013); depicts functioning and disability as products of relations between the health state and contextual influences affecting an individual. Contextual influences include individual and the surroundings influences. Personal factors include individualistic features e.g. sex, age, coping styles, societal background, education, occupation, past and current proficiency, overall behavior patterns and character (Creswell, 2003). The environmental factors are explained as the bodily, societal, lawful, exterior and attitudinal environment in which people live and conduct their lives (WHO, 2001). In this study, knowledge about the contextual factors was imperative in endeavoring to ascertain the interaction between the individual, the expert, the healthcare sector and the societal background that could effect rehabilitation of stroke (Kagee, 2004).

2.4.1. DEFINITION AND PURPOSE OF THE MIXED METHOD APPROACH

Mixed method research is a methodology for conducting research that involves collecting, analyzing and integrating quantitative (experiments, surveys) and qualitative (focus groups, interviews) research (Moran-Ellis et al., 2006). This approach aims to answer a topical research question/clinical challenge. Recognizing that all methods have

limitations, the biases inherent in a single method neutralize the biases of other methods. Triangulating data sources seeks convergence across qualitative and quantitative methods and helps develop or inform the other method (Onwuegbuzie & Johnson, 2006). Alternatively, one method can be nested within another method to provide insight into different levels of analysis (Tashakkori & Teddlie, 2010).

2.4.2. RESEARCH DESIGN

The mixed approach involves five design strategies (Creswell, 2012; Terrell, 2012; Creswell, et al., 2011). (See figure 2.2.).

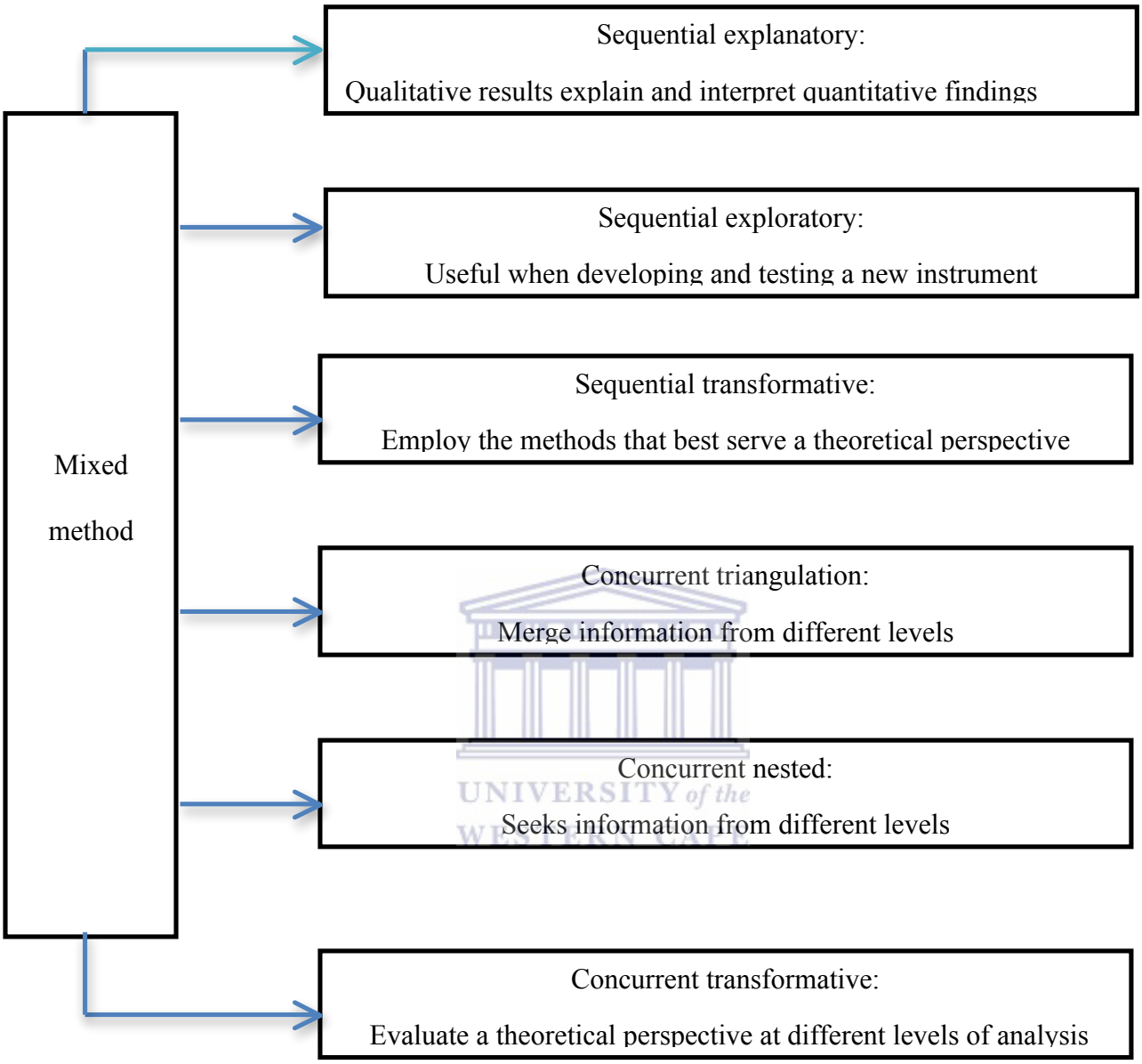

Figure 2.2. Mixed design strategies

Strength of concurrent triangulation

Concurrent triangulation was used in the current study. This strategy has shorter data collection time when compared to sequential methods (Terrell, 2012). The design makes

intuitive sense and is efficient (Terrell, 2012). Both types of data are collected and analyzed independently and separately, using techniques traditionally associated with each data type.

Challenges of concurrent triangulation

This design requires a great deal of expertise and effort to study the phenomenon under investigation using two different methods (Creswell et al., 2011). It is difficult to compare two types of data as well as resolve discrepancies if they arise (Terrell, 2012).

2.4.3. STUDY POPULATION AND SAMPLING

Sampling involves selecting units from a population of interest. There are different types of sampling: these include probability and non-probability sampling.

2.4.3.1. Phase One: Section One: Non-probability sampling

Non-probability sampling is the methodical technique where the researcher chooses subjects (Lewis-Beck, Bryman & Liao 2004). Every participant of a population has an indefinite and unequal chance of being chosen. In this case, the aim is not to determine a representative sample for the purposes of generality, but to allow the sampling technique to be cognizant of extraneous factors such as access and availability; logistics; guaranteeing an increased degree of involvement and hardly focuses on specific inclusion criteria for samples (Babbie, 2007).

There are different types of non-probability sampling. These include convenience sampling, quota sampling, dimensional sampling, purposive sampling and snowball sampling. In guardianship with the aim of the study, precisely Phase One Section One,

purposive sampling was utilized to guarantee that productive members were enrolled for partaking. The contribution of these members would mirror a high level of participation and the kind of their input would also be projected to be of a superior quality, which would enhance the significance of the study (Babbie, 2007). These phases focused exclusively on patients, caregivers and healthcare providers

Purposive sampling:

A purposive sample, also typically called a judgmental sample, is one that is preferred founded on the understanding of a population and the purpose of the study (Babbie, 2007). The participants are selected because of a specific characteristic. The individual features are preferred in a manner that answers necessary questions about a certain matter (Creswell & Miller, 2000). The worth of this approach of sampling relates to when a researcher needs to study a small subsection of a larger population in which numerous members of the subset are easily recognized, but the listing of all is nearly impossible (Babbie, 1990).

Advantages of purposive sampling

This technique does not need underlying theories or a set number of participants. The researcher sets out to find participants by virtue of knowledge or experience (Bernard, (2002). The research uses information-rich cases that are proficient and well informed with a phenomenon of interest for proper utilization of available resources (Creswell & Plano Clark, 2011). The researcher identifies diverse characteristics of the target population and then selects a sample of subjects who match the characteristics deemed relevant for the research (Marshall, 1996).

2.4.3.2. Section 2: (Probability sampling)

This is a technique that allows for each qualified individual to have an equal opportunity of being chosen for the study (Fowler, 2009). This is vital in instituting a representative sample that can objectively and accurately replicate the parameters of the population studied (Bless, Higson-Smith & Sithole, 2006)

Probability sampling includes random sampling, stratified sampling, systematic sampling, cluster random sampling and multi-stage random sampling (Gall, Borg & Gall, 2003).

Phase One of the study used probability sampling since the aim was to gain an understanding of the stroke rehabilitation journey.

2.4.4. DATA COLLECTION TOOLS

2.4.4.1. Section One: (The Interview guide)

The interview guide is a set of wide-ranging questions that steer the interview (Lee, 2008). The guide is done to guarantee that essentially the same knowledge is obtained from every subject (McNamara, 2009). This ensures good use of controlled interview time; makes interviews more orderly and all-inclusive and helps keep the interactions concentrated. To this end it differs from the conversational approach (McNamara, 2009). Significantly it allows a degree of liberty and flexibility in getting information from subjects (Pelto & Pelto, 1997). Interview guides can be compiled based on literature (Lofland, Snow, Anderson & Lofland, 2001).

2.4.4.2. Section Two: (Data capturing sheet)

The data capturing sheet is a tool used to collect data from past records (Weingera, Slaglec, Jaind, & Ordonez, 2003). It is normally compiled based on the research aim and literature review. Lists of variables included on the data-capturing sheet are developed based on the study objectives. Validity and reliability of data capturing sheet should be tested.

2.4.4.3. Section Three: (Questionnaire)

This is a research instrument comprising a series of questions and prompts, designed for data collection from respondents (Brown, 2009). Questionnaires are inexpensive, require less effort from the questioner as spoken or telephone surveys and normally have homogeneous answers that make it modest to compile data. Questionnaires are constricted by the fact that participants must be able to read the questions and answer. Thus for some demographic groups, managing a survey by questionnaire may not be real (Brown, 2009). Questionnaires can be adopted or formulated. For the current study, the questionnaire was formulated based on the study aims and objective. Validity and reliability of the questionnaire was tested.

Validity of the instrument

Validity indicates that an instrument should measure precisely the same characteristic every time it is used. Validity includes internal validity (correctness of the measures attained from the research relative to what it was designed to measure) (Rothman, Greenland, & Lash, 2008; Wong, Ong, & Kuek, 2012) and external validity (accuracy of

the measures found from the study sample in describing the reference population from which the study sample was drawn (Wong, Ong, & Kuek, 2012).

Face validity

This is established when an authority on the research topic reviews the questionnaire and settles that it measures the qualities of research interest (Bölenius, Brulin, Grankvist, Lindkvist, & Söderberg, 2012). Face validity embroils the authority looking at the items in the questionnaire and agreeing that the test is an acceptable measure of the concept that is being measured just on the face of it (Sangoseni, Hellman & Hill, 2013).

Content validity

This signifies the level to which the tool fully measures the construct of concern (Sangoseni, Hellman & Hill, 2013; DeVon et al., 2007).

Reliability

The reliability of tool is its capability to yield consistent findings every time it is administered to distinctive groups of respondents (Polit & Beck, 2006).

Pilot Study

A pilot study is a feasibility study that includes testing adequacy of research instruments such as questionnaires or data collection sheets and to measure the practicality of the real study (Van Teijlingen, Rennie, Hundley & Graham, 2001). Pilot studies fulfill a range of important functions and can provide valuable insights for other researchers (Polit& Beck ,2006).

Trustworthiness

This is the truthfulness of a qualitative study (Baumgartner, Strong & Hensley, 2002). The purpose of trustworthiness is to sustain the reason that the results are significance to paying attention to (Creswell & Miller, 2000). This is measured through credibility, transferability, dependability and confirmability.

Credibility

This denotes to assurance on how well data and procedures of analysis tackle the intended focus of the research (Polit & Hungler, 1999). This is achieved by a sample that is representative of the whole population (Brink, 1999), gathering information to saturation, use of field notes, member checking (Lincoln & Guba,1985) and peer review (Woods & Catanzaro, 1988).

Transferability

This refers to the scope to which the results can be repeated to other situations or groups. It is achieved through a detailed description of the research methodology (Marshall & Rossman, 2006).

Dependability

This is the stability or consistency of the inquiry processes. Dependability is achieved through providing adequate information about participants and rigorous audit of all data sources (Miles, Huberman & Saldaña, 1994).

Confirmability

Confirmability signifies that data is sincere and reliable (Polit & Hungler, 1995). This is achieved through face-to-face interviews and data triangulation (Patton, 2002).

2.4.5. DATA ANALYSIS

2.4.5.1. Section 1: (Qualitative data analysis)

Bernard (2002) proposes numerous methods to data analysis. This includes hermeneutics or interpretive analysis, descriptive and presentation analysis, discourse analysis, grounded theory analysis, content analysis, thematic analysis and cross- cultural analysis. In hermeneutics or interpretive analysis, the researcher constantly construes the written word of those texts to grasp their sense. The center of narrative analysis is to determine reiterated resemblances in peoples' stories. Discourse analysis includes looking closely at how people relate with each other. Bernard (2002) defines grounded theory as a set of methods for finding categories and perceptions that arises from the text and connecting the text into fundamental and formal theory. Content analysis presents an approach to data analysis by creating codes, applying the codes to text and creating codes into a matrix of units for analysis. Cross-cultural analysis emphasizes the application of codes derived from the human relation.

Qualitative data analysis involves identifying codes and categorizing patterns (commonalities, contrasts) in the content of data (Creswell & Miller, 2000; Richie & Spencer, 1993).

In the current study data was subjected to thematic content analysis (Creswell & Miller, 2000; Richie & Spencer, 1993). The transcripts are read for correctness and then reread to detect the developing themes and possible inconsistencies (Thomas, 2006; Graneheim & Lundman, 2004). Codes are generated based on issues identified from the data. The codes are then applied to the data (Thomas, 2006; Graneheim & Lundman, 2004). Categories are developed for organizing codes into significant groups. Codes and categories are then collapsed into emergent themes (Ulin et al., 2005).

2.4.5.2. Section Two: Quantitative data analysis

This involves the techniques through which the researcher converts data into numerical form, subjecting the data to statistical analysis (Babbie,2010). Descriptive statistics describe the basic features of the data, provides simple sample summaries and summarizes data in a meaningful way to show, patterns that might emerge. Descriptive statistics allow us to properly describe data through statistics and graphs.

Inferential statistics allows a sample to make generalizations about the populations from which the samples were drawn. It is therefore important that the sample accurately represents the population. A range of software packages are used for data capturing and analysis. These include the Statistical Package for Social Science (SPSS), STATA, and Statistical Analysis System

2.5. PHASE TWO: SYSTEMATIC APPRAISAL OF CLINICAL GUIDELINES (SACG) (CHAPTER FOUR)

Systematic appraisal of clinical guidelines is a structured and comprehensive process of identifying, evaluating and interpreting all available guidelines relevant to the research question (Cochrane Collaboration, 2013; Green et al., 2008). It employs critical analysis of the methodologies and recommendations of preceding guidelines in order to answer a topical clinical challenge/question in the field or topic of interest. The methodology of reviewing guidelines follows a systematic pattern, in order to minimize bias in pooling evidence and drawing out conclusions.

2.5.1. PROPERTIES AND COMPONENTS OF A SYSTEMATIC APPRAISAL OF CLINICAL GUIDELINES

A good systematic appraisal of clinical guidelines should have the following basic properties:

2.5.1.1. Purpose and scope

Clearly establishing the intended purpose of the appraisal such as improving the outcome measures of stroke patients (agility, activities of daily living [ADL], return to work).

The guideline appraisal should also indicate the extent of cover in relation to the research question. In stroke rehabilitation for example, it may cover all-inclusive rehabilitation suitable for various stages of stroke recovery from the hospital setting to its execution at home and in the community.

2.5.1.2. Comprehensive

The coverage of systematic appraisal should be broad enough in such a way that it

minimizes the likelihood of missing out on important guidelines in the field.

2.5.1.3. Selective

The guidelines to be incorporated in the investigation should be chosen through rigorous inclusion and exclusion criteria to certify significance of the recommendation with regard to the research question.

2.5.1.4. Synthesis

The systematic appraisal of clinical guidelines should create new thoughts or viewpoints from the documented recommendations. The new recommendation may be supportive of preceding recommendation or occasionally it may be conflicting with the preceding information and understanding.

2.5.1.5. Critical

Reviewers should assess the recommendations of preceding guidelines founded on the methodological accuracy of the research conducted.

2.5.2. GUIDELINE SEARCH STRATEGY

The types of guidelines for a systematic appraisal of clinical guidelines (SACG) are generally categorized into principal guidelines and grey guidelines (NHMRC, 2000). Principal guidelines include published peer-reviewed guidelines, while the grey guidelines include unpublished guidelines.

Search strategy involves the use of electronic databases of guideline clearinghouses. This may include the US National Guideline Clearinghouse (US NGC); the Agency for Healthcare Research and Quality (AHRQ); the Guidelines International Network (G-I-

N); the Scottish Intercollegiate Guidelines (SIGN); New Zealand Guidelines Group (NZGG), National Health and Research Medical Council (NHRMC), the United Kingdom's National Institute for Health and Clinical Excellence (NICE); the WHO guidelines; the TRIP database; the National Institutes of Health (NIH); the Monash University Centre for Clinical Effectiveness; Australia's National Health, Guidelines Infobase, and the Institute for Clinical Systems Improvement (ICSI). In addition the following online databases were searched to include those guidelines that were peer reviewed and published in journals, namely the Allied Health Literature (CINAHL), PEDro; PubMed, EBSCO host, Science Direct, Medical Literature on Line (MEDLINE), Google scholar, Master File Premier, Psychology Information (PsycINFO), Health Source-Consumer Edition, Embase, ERIC, and ASSIA.

2.5.3. PROCEDURE OF MANAGING SACG

The procedure of conducting a SACG is thorough and intricate, encompassing numerous steps. Systematic appraisal of clinical guidelines commences with identification of the purpose, scope and choice of a topic. The selection of a topic is mindful of prevalence of the condition, the health and socio-economic bearing on patients and society or the morbidity and/or mortality.

Once the topic is formulated, the reviewer then devises a research question. The succeeding step includes identification of the key search terms from the clinical question and picking of topic-relevant databases. Key search terms are informed by study objectives and literature. This is charted by development of a search strategy, which

integrates the several key search terms, based on the review question, associated terms and synonyms.

The real search activity then follows and assortment of appropriate guidelines from the search findings is done using distinct inclusion criterion which is grounded on the aim of the review (Wright, Brand, Dunn & Spindler, 2007). The guidelines that qualify for inclusion, are further subjected to critical appraisal using harmonized criteria. The procedure of critical appraisal involves evaluation of the quality of the methodology of the included guidelines. The aim is to ensure only guidelines that were guided by acceptable protocols were included for review.

When conducting critical appraisal of the included guidelines, reviewers always focus on the following specific items; overall aim of the guideline, the specific health questions, target population, extent to which the guideline was developed by the appropriate stakeholders, views of its intended users, the process used to gather and synthesize the evidence, the methods used to formulate the recommendations, update, language, structure, format, barriers and facilitators to implementation, strategies to improve uptake, and resource implications of applying the guideline (Brouwers et al., 2010).

Lastly, data retrieval from qualified guidelines is done. This is followed by evaluation and writing up the review results (Green, Higgins, Alderson, Clarke, Mulrow & Oxman, 2008: Wright, Brand, Dunn & Spindler, 2007). Figure 2.3 below demonstrates the main steps followed in planning, executing and writing up a SACG.

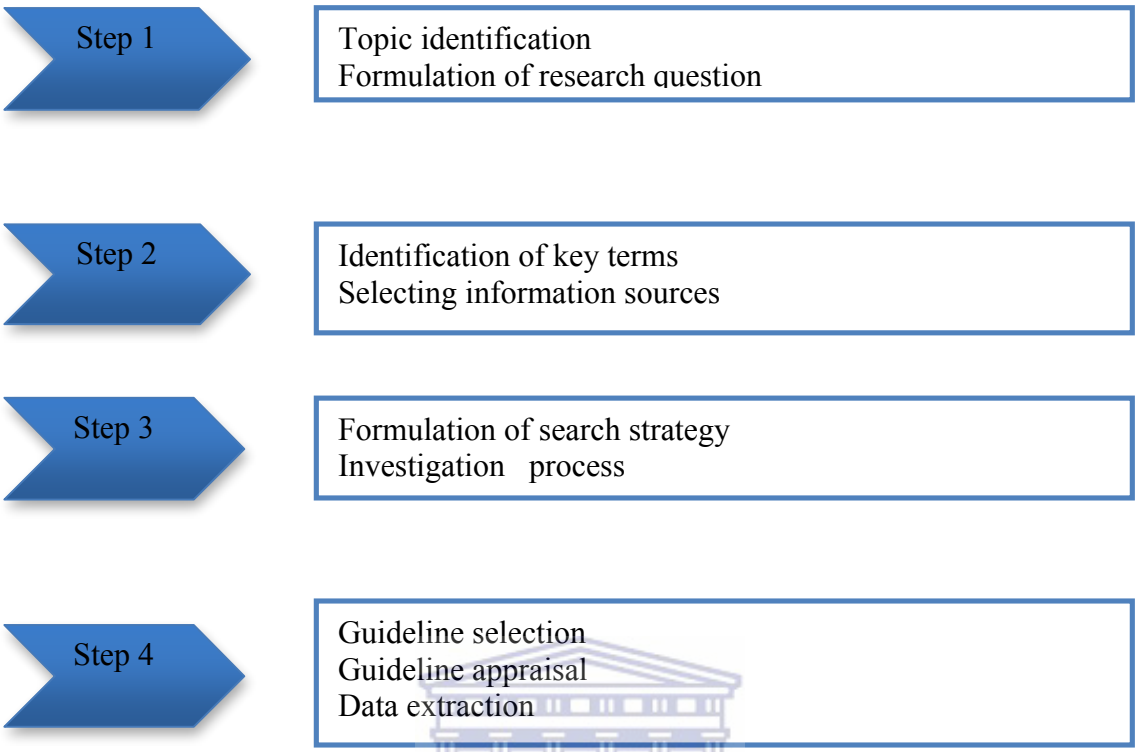

Figure 2.3: SACG procedure (Gonzalez-Suarez, et al., 2012)

2.5.4. STEPS IN CONTEXTUALIZATION

This was done using the Philippine Academy of Rehabilitation Medicine (PARM) framework. This framework assesses the generalizability and applicability of the included recommendations (Hillier et al., 2011). Contextualization concentrates on whether the PARM endorsement is adequate to lead practice or whether context points are essential to contextualize the approved recommendations within the patient journey (Gonzalez-Suarez, et al., 2012).

To aid in standardizing the guideline contextualization process, a PARM writing guide is used (Appendix M). This guide creates a constant framework for summarizing

differently-worded recommendations and differently-reported strengths of the body of evidence for recommendations obtained from the included guidelines; appropriate to a certain position in the patient journey. Every incorporated recommendation set is additionally rated according to the PARM guide for evidence rating (outlined in Appendix P).

2.5.5. ENDORSEMENTS

The Philippine Academy of Rehabilitation Medicine guide provides identical wording with which to ratify recommendations founded on the level of evidence (Appendix R). These similes range from clear assertions about efficacy for those with strong evidence (strongly endorses) to those with contradictory evidence of efficacy (suggests).

2.5.6. PARM CONTEXT POINTS

The recommendation alongside the patient journey, for which PARM marks an endorsement statement, is then deliberated for generalizability and applicability using a PARM Context Point. PARM Context Point utilizes superior framework (Structure, Process, Outcome) in order to outline the vital components of service delivery supporting evidence-based care (Donabedian, 1988). This takes into account concerns such as training of healthcare providers to observe recommendations; handiness of, and access to, trained healthcare providers; availability of resources and what to do when resources are unobtainable (Hoffmann et al., 2010).

To assist with writing the Context Points, a standard framework is used (PARM Context Points). The framework outlines the essentials that need to be in place for least best-practice care and additional standard care of practice. This offers direction to clinicians

anywhere they may practice, concerning necessary equipment, standards and resources, training and workforce, in order to deliver evidence-based care.

Therefore, for the purposes of this research, a systematic appraisal of clinical guidelines and contextualization was done to establish firstly, evidence-based clinical guidelines for stroke rehabilitation; and secondly, to contextualize the recommendation. The systematic appraisal and contextualization addressed the study objectives: *i) To Appraise clinical guidelines for stroke rehabilitation. ii) To contextualize a clinical guideline.*

The review was conducted using the Philippine Academy of Rehabilitation Medicine (PARM) protocol (Gonzalez-Suarez, et al., 2012). The PARM procedure was selected in this study since it offers direction on the structure and composition of a systematic appraisal of guideline and contextualization. The procedure likewise offers instructions on the course and criteria of evaluating the methodological quality of all incorporated guidelines together with investigative techniques. The reviewer adopted PICO (population, intervention comparison and outcome) and AGREE II for question formulation and assessment of guidelines

The methodology and results of the systematic appraisal of clinical guidelines and contextualization are described in detail in Chapters Four and Five of this thesis. Figure 2.4 illustrates contextualisation process.

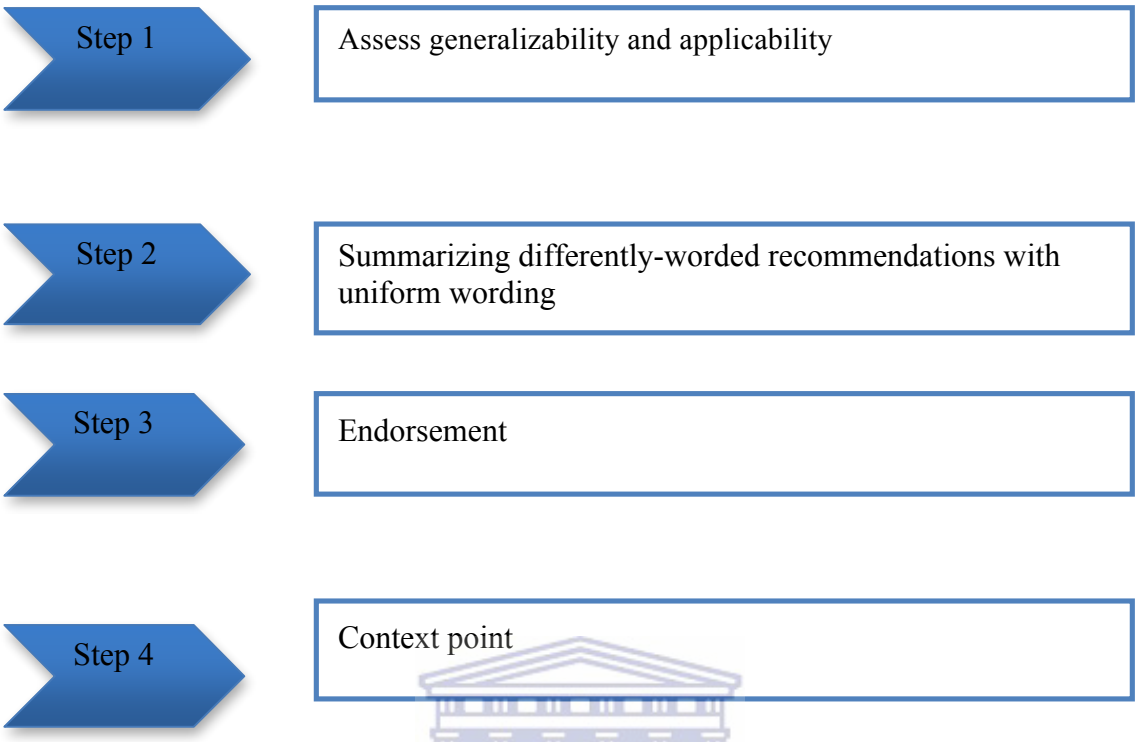

Figure 2.4: Contextualisation procedure (Gonzalez-Suarez, et al., 2012).

2.5.7. ASSESSING IMPLEMENTABILITY

This involves confirming whether the contextualized recommendations mapped within the stroke patient's journey is contextually practical. Service providers who are conversant with the patient journey should confirm the practicality of the recommendation.

2.6. PHASE THREE: DELPHI STUDY (CHAPTER FIVE)

The Delphi technique is a manifold iteration method ordinarily meant to be unidentified; the purpose of which is to refine the professional view and arrive at a consensual position (Helmer & Rescher, 1959). The Rand Corporation planned the original Delphi method in

the 1950s. Over the past 55 years the technique has been developed, improved and new expertise has developed that has paved way for it to be employed through diverse mediums. The elementary practice has, however, persisted and the principles continue to guide present-day research. The Delphi technique permits for uniform input from each chosen expert and decreases the unjustified influence of a single perspective.

In Health Sciences, the Delphi method is used to offer real guidelines and to create unanimity via expert opinion (Falzarano & Zipp, 2013). Delphi practice is a method used to reach unanimity on something that is unknown or to acquire verdict about a subject (Keeney, Hasson & McKenna, 2006). To this end a sequences of questions are presented in an effort to obtain coordinated feedback, in order to reach the most consistent unanimity among a group of experts in a specified area (Linstone & Turoff, 2002).

2.6.1. PROPERTIES AND COMPONENTS OF A DELPHI STUDY

2.6.1.1. Number of rounds

One of the characteristics of a Delphi study is the response procedure that permits the participants to reconsider their original judgments; thus the practice of different rounds is encouraged (Hsu and Sandford, 2007); Dalkey and Helmer, 1962), while working for the Rand Corporation, used a four or five-round procedure. In the current study it was envisaged that three rounds would be used to gain expert judgment concerning the implementation of the contextualized clinical guideline.

2.6.1.2. Panel of experts

A Delphi panel of experts is comprised of three tiers (1) stakeholders who may be directly affected by the topic under discussion (2) experts who have applicable specialty

in the area under discussion, and (3) implementers who are expert in clarifying, consolidating, integrating or stimulating, because they are at the energy face of executing such interventions (Linstone & Turoff, 2002). The participants in this study constituted a combination of the suggested panel criteria.

2.6.2. DATA ANALYSIS

A Delphi study involves both qualitative and quantitative data. The main statistics utilized in quantitative Delphi studies are measures of central tendency (mean, median and mode) and levels of dispersion (standard deviation and inter-quartile range) (Hasson, Keeney & McKenna, 2000).

Grouping data under specific questions and then classifying them into themes analyzes the qualitative data. Quotes substantiate the themes, allowing the researcher to interpret the quotes in line with the research question.

2.7. METHODOLOGICAL TRIANGULATION

This consists of data triangulation that creates a picture of what is happening. Data triangulation reveals atypical data and identifies similar patterns, thus increasing the credibility of the data (Thurmond, 2001). In addition, different types of data may yield different kinds of insight into the research questions, while the combination yields a stronger knowledge base, from which conclusions can be drawn. In this study the data was obtained from patients, service providers, caregivers of the patients, literature and experts, allowing the researcher to obtain opinions and views from different sources about the same topic.

2.8. SCHEMATIC PRESENTATION SUMMARY OF CHAPTER

The primary aim is to bring out the process of contextualization of a guideline by displaying the procedure followed in regard of each objective for the study. This ends the concise summary of the main methodology. Figure 2.5 below mirrors the phases and their particular methodological elements. Chapters Three to Five will account on the certain methods of data collection and analysis used in each phase, with the findings and recommendations for the next phase. The figure additionally shows how the chapters were allocated.

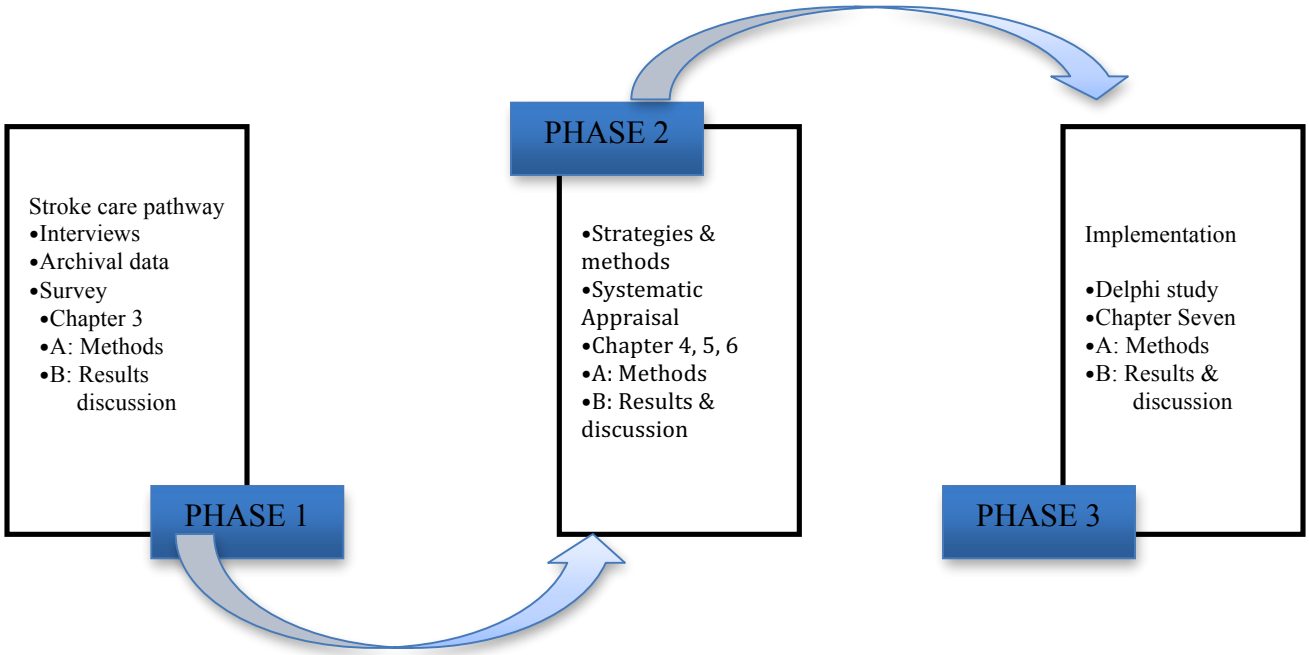

Figure 2.5: Brief overview of methodology

2.9. ETHICS

Permission was gained from the Research Grant and Study Leave Committee of the University of the Western Cape (Registration number: (14/7/7 Appendix 1), the Institutional Research and Ethics Committee, Kenya Appendix 2), and the County Directors of Health in 17 County Referral Hospitals, facility managers, and participants. The subjects were well-versed that their involvement would be completely voluntary and that they could withdraw participation at any time without giving a reason. Clients were also guaranteed that retreat would not affect their treatment in any way, while service providers were guaranteed this would not affect their employment in any way. Anonymity and confidentiality was upheld by not declaring any participants' or facilities' names during the data collection. The participants were also guaranteed that the

information would be kept locked in a cupboard after the data collection. The purpose of the study was rationalized to the participants; consent forms (Appendices 3) were given to them for the interviews and survey, so that they could sign them, showing their readiness to participate in the study. In addition, an information sheet (Appendices 4) concerning the study was provided for clarity on questions that the participants had. Consent to being audiotaped was also obtained from the participants during structured interviews. The commitment was given that the results of the study would be made available to all stakeholders at the 17 County Referral Hospital and to the County Directors of Health, in Kenya. The undertaking was also given that where participants showed signs of emotional distress during interviews; they would be referred to a counselor to tackle the sources of the problem. Luckily, there were no instances of participants showing signs of emotional distress.

CHAPTER THREE: PATIENT JOURNEY

STROKE REHABILITATION CARE PATHWAY IN KENYA

3.1: BACKGROUND AND LITERATURE

Rehabilitation refers to "all measures aimed at reducing the impact of disability for an individual, enabling the patient to achieve independence, social integration, better quality of life, and self actualization" (Hellander, 1999). A definition suggests that rehabilitation is a strategy of retraining patients to increase their sability, which ultimately permits performance of tasks that are important, and assists patients in becoming contributing members of the society (Staines, McIlroy & Brooks, 2009). Rehabilitation is a multidimensional practice that is aimed to facilitate restitution of, or adaptation to, the loss of physiological or psychological functions when reversal of the underlying pathological process is incomplete (National Clinical Guideline Centre, 2013).

The health services framework of structure, process and outcome encapsulate rehabilitation (Donabedian, 1988). Structure involves facilities of care while process involves interaction of the patient with the facility's system of care. The framework indicates that structure influences process, which ultimately impacts on outcomes (Donabedian, 1998). The interaction between stroke survivors and a variety of factors such as co-morbidities, personal behavior, coping ability, staffing expertise, support of family members and technological complexity is multifaceted and exceedingly specific, with each factor having a possible impact on a patient's outcome.

The high level of complexity associated with rehabilitation is evident in its role to address the outcomes that are important to the service provider and the patient. In order to counter the vast effect of any neurological condition, rehabilitation needs to be varied in its processes and interventions. Rehabilitation also needs to be distinct and vigorous in the ways that it is delivered (Helander, 1999). The process of rehabilitation as discussed in the structure, process and outcome (SPO) model (Donabedian, 1988) involves rehabilitative services, length of hospital stay and discharge destinations.

3.1.1: Rehabilitative services

Several studies have highlighted the result of rehabilitation services on the areas of stroke outcome (impairment, function and participation). A huge body of evidence indicates that a well-organized, multidisciplinary method to sub-acute rehabilitation after stroke produces better outcomes (Mayr, Kofler, Quirbach, Matzak, Fröhlich, and Saltuari, 2007)

Stroke rehabilitation includes a dedicated stroke rehabilitation environment with multidisciplinary team (American Heart Association, 2011a). The team should have the knowledge, skills and temperament to work in partnership with stroke survivors, their families and carers; in order to manage the changes experienced as a result of a stroke (American Heart Association, 2011a). Stroke rehabilitation units are organized as a single team of staff with specialist knowledge and experience on stroke and neurological rehabilitation (Intercollagiate Working Party, 2012). A prospective study done by Evans, Harraf, Donaldson and Kalra (2002) showed that rehabilitation unit care was seen to be more favorable to patients' outcomes than typical care. Systematic research additionally rationalizes that structured multidisciplinary care and rehabilitation units decrease patient

mortality and increases independency. In addition this reduces the length of hospital stay, which in turn reduces health costs (Tan, Heng, Chua, & Chan, 2009)

In rehabilitation centers, physiotherapists and occupational therapists form a essential part of a formidable multidisciplinary or interdisciplinary team (Slade et al., 2002) This is apparent in the findings of a randomized-controlled trial, which confirmed that physiotherapy and occupational therapy services alone resulted in improved functional outcomes as measured by the Barthel Index, with a two week decrease in hospitalization (Slade et al., 2002).

Far-reaching evidence on most of the practices in physiotherapy rehabilitation is found in the guidelines, as well as evidence-based practice reviews. Teasell et al. (2009). Evidence-based reviews on stroke rehabilitation strategies, practices and approaches, provided evidence-based recommendations on many stroke rehabilitation practices. The results indicate that there is strong evidence for task-specific training and treadmill training to improve gait. Cardiovascular training is deliberated to improve fitness and physical performance, Transcutaneous Electrical Nerve Stimulation (TENS) is recommended to lessen spasticity and functional electrical stimulation with gait training to improve gait and strength. Electro somatosensory stimulation improves hand function and mental imagery improves function in ADL. Constraint-Induced Movement Therapy is cogitated useful for patients, assisting with hand and wrist movement. Robotic devices used as sensory motor training improves elbow and hand function. Likewise, functional electrical stimulation (FES) improves upper extremity function.

Teasell et al. (2009) also suggest that there is moderate evidence for motor learning approaches in reducing length of stay, ankle orthosis with posterior tibial nerve denervation improving gait and virtual reality improving motor function.

3.1.2: Start of rehabilitation

Mayr, et al. (2007) in a systematic review determined that early commencement of rehabilitation is one of the predictors of improved stroke rehabilitation outcome. Hu, Hsu, Yip, Jeng and Wang (2010) reviewed the effect of early, intensive rehabilitation on the projection of functional outcome in stroke patients admitted to intensive care units. They found that initiation time of rehabilitation and intensity of treatment was predictors of better Barthel Index outcome after adjustment for severity and age. The authors strongly recommended early intensive therapy for people with new strokes. Similarly, a study on factors predicting better outcome, Chen et al. (2006) emphasized the predictive worth of timely commencement of rehabilitation for stroke outcome.

Cifu and Stewart (1999), in a review of medical literature from 1950 – 1998, showed a strong association between improved functional ability and early commencement of rehabilitation in stroke patients. Van de Port et al. (2006) reviewed mobility and outcome of stroke in 217 patients and found that the time between stroke onset and commencement of the rehabilitation process to be a strong predictor of positive outcome, and correlation between late commencement of rehabilitation and negative outcome of stroke.

3.1.3: Length of hospital stay

Organizational policies on the length of hospital stay (LOHS) for stroke patients vary significantly across studies. One study related the mean length of stay in rehabilitation centers to be 97.1 days (Yavuzer, Küçükdeveci, Arasil & Elhan, 2001), whereas a study done by Jette et al. (2005) in the United States, showed that the mean length of stay in rehabilitation hospitals was 18.7 days. Similar results demonstrating a reduced LOHS were showed in a systematic review carried out by Kengne and Anderson, which found the length of hospital stay (LOHS) to be 21 days.

The early discharge patterns from rehabilitation hospitals could be due to help of patients in their home environment (Jette et al., 2005) in the form of home-based care and rehabilitation. Apart from the policies and strategies, literature suggests that certain courses of rehabilitation and certain patient features could serve as predictors of LOHS. A randomized single-blind controlled trial showed that an intensity of 67% more physiotherapy for the experimental group, deciphered in a 14-day reduction in length of stay ($p<0.01$) (Slade et al., 2002).

It is imperative to have understanding of the factors that reduces the LOHS in order to lower cost of hospitalization. However, it is likewise vital to be cognizant of factors hindering discharge. A recent observational cohort study with a sample of 200 patients found that medical complications and functional dependency on admission lengthen hospital stay (Saxena, Koh, Ng, Fong & Yong, 2007).

Bode, Heinemann, Semik and Mallinson (2004) learned the effect of longer stay at a rehabilitation institution and the influence of more intense rehabilitation on general

outcome of first ever stroke patients. They found that improvements in self-care are well foreseen by longer stay and additional intense function-focused occupational therapy. Jette, Warren and Wirtalla (2005) examined the association between intensity of therapy, length of stay, and improvement of independence in mobility and ADLs. They found that higher intensity therapy was associated with shorter LOS and better functional outcomes.

Length of hospital stay is associated with financial implications and bed occupancy (Feachem et al., 2002). A study conducted by Feachem et al. (2002) found that hospital-bed occupancy is the most expensive component of any healthcare system. This finding demands the need to ascertain the organizational practices and processes of care needed to optimize recovery and reduce length of hospital stay.

3.1.4: Intensity of treatment

Hesse, Welz, Werner, Quentin and Wissel (2011) related two groups of intermittent home-based intensive rehabilitation with constant low intensity home-based rehabilitation (96 sessions vs. 104 sessions respectively) over a year. The finding indicated that patients in both groups to have equal functional improvement over time. The intermittent high-intensity and continuous low-intensity therapies were equivalently effective.

In a prospective study on 50 patients, Keren et al. (2004) evaluated the intensity of the in-patient rehabilitation and functional outcome at discharge. Likewise Saxena, Ng, Yong, Fong and Koh (2006) studied influences that predict dependency in ADL and effect of therapy intensity on the outcome of stroke rehabilitation. Dependency on ADL was 54% at admission, which decreased to 19% at discharge. The key predictors were cognitive impairment dependency at admission, severe neurological impairment at admission, and

recurrent stroke. After adjusting all these variables, every hour of therapy positively and significantly affected the ADL dependency.

3.1.5: Discharge destination

The objective of rehabilitation is to reinstate normal function and incorporate stroke survivors back into their societal sphere, earlier residence and workplace (Duncan et al., 2005). The discharge destination could serve as a program assessment with regards to the relevant influences that need to be addressed during rehabilitation, and to guarantee safe and efficient functioning of patients in their home environment (Somerford, Lee & Yau, 2004). Patients are usually discharged to the community, other hospital and nursing home among others (Tooth, Mckenna, Goh & Varghese, 2005).

A coordinated comparison between two stroke units, following different rehabilitation methods (theoretically driven versus pragmatic driven), showed that 70% of patients were discharged home, while the remaining 30% were discharged to step-down institutions (Patel et al., 1998). An interpretation was made that regardless of the method to rehabilitation, the discharge rate to primary residence remained the same. Another study found related results for discharging of patients with stroke back into their community and nursing homes (Tooth et al., 2005).

A extensive retrospective study indicated that females (12.8%) were more likely to be discharged to a nursing home than males (7.8%), and that males (69.8%) were more likely than females (62.4%) to be discharged home (Somerford et al., 2004). In the same study, the older patients were more likely to be discharged to nursing homes, whereas the younger patients were more likely to be discharged home. Apart from the influences

discussed above, it is imperative to recognize the factors that could lengthen hospital stay in order to develop approaches and suitable rehabilitation to manage the length of hospital stay and the cost of hospitalization (Somerford et al., 2004).

Rehabilitation services, incorporating physiotherapy, are based on a viewpoint that interdisciplinary teamwork and a holistic, client-centered approach are keys to efficacious outcomes in stroke rehabilitation (McPherson et al., 2002).

In developed countries the process, organization and delivery of stroke rehabilitation is clear and well documented (American Clinical Practice Guideline, 2010). However, this is uncommon in the developing world. In Kenya, the process and delivery of stroke rehabilitation, is not clearly understood and remains a concern. The actual challenge of the health system in Kenya is to provide a guideline that ensures delivery of standardized quality care to all stroke survivors. The results of Chapter Three will provide a contextual analysis, which is the forerunner to the contextualization process.

3.2: METHODOLOGY

The current study design will be presented in three parts fitting into the phase of the study. Phase One is a qualitative study; Phase Two is a descriptive retrospective study (Wisher, 2002), while Phase Three utilized a cross-sectional descriptive survey (Hicks, 2004).

INTEGRATION

Integration of findings in mixed methods can take multiple forms. The current study utilized transformative approach. The qualitative and the quantitative design served a

common ideological purpose (Greene, 2007). Transformative approach involved integrating conclusions that were drawn from interviews, a survey, and archival data. The researcher found that the results from the independent analyses of the qualitative and quantitative data provided both corresponding and different aspects of stroke rehabilitation journey. For example, three themes associated with stroke care pathway; Assessment of stroke patients, management of stroke patients, and inter-multidisciplinary team member were supported by the interviews, survey, and archival data. General descriptions of these care process from the generic survey, and archival data were enriched by contextually rich accounts of the themes from the interviews. The results from the interviews data also provided new insights into understanding the characteristics of health care system in Kenya.

3.3. PATIENT JOURNEY

3.3.1: RESEARCH DESIGN

This section employed an explorative research approach, using structured interviews to explore the process of stroke rehabilitation. The main purpose was to clarify experience as it was lived by the participants (Howitt, 2010; Knox & Burkard, 2009).

3.3.2: RESEARCH SETTINGS

This section of the study was a hospital-based that was conducted in 17 County Referral Hospitals in the Republic of Kenya. Kenya is a country situated in the eastern part of Africa and is considered amongst the developing countries in sub-Saharan Africa. The country has a multi-ethnic population of nearly 44.2 million people, the majority of

whom are black Africans while a minority are Asians, Europeans and Arabs (Kenya National Bureau of Statistics, 2015). The official languages of communication in Kenya are English and Kiswahili, which are spoken across the country.

The healthcare system in Kenya is organized within the government administrative structure. Kenya is divided into 47 counties with 17 County Referral Hospitals. The Kenyan healthcare system is organized in five levels namely; Level Six, Level Five, Level Four, Level Three and Level Two, as shown in table 2.1 (United State Agency for International Development, 2010).

Level Two and Three facilities (community healthcare facilities) offer mostly promotive and preventative healthcare services while Level Four facilities offer primary healthcare services. Levels Five and Six are the regional and national healthcare facilities. These are the secondary and tertiary facilities, which offer specialized healthcare services together with other hospitals in the private sector.

Participants (patients, caregivers, and healthcare providers) in Phase One of the study were drawn from public healthcare facilities at 17 county referral hospitals. The hospitals have bed capacity ranging from 200-1200. All County Referral Hospitals have well-established departments of pediatrics, gynecology & obstetrics, surgery, orthopedics, internal medicine, casualty and out-patients, as well as established physiotherapy departments within the concept multidisciplinary rehabilitation approach.

The rehabilitation of stroke patients in Kenya takes place at several levels of healthcare and through an array of institutions. These institutions represent different levels of

healthcare and serve populations that reside in different catchment areas. Stroke patients are commonly managed in medical wards in the 15 County Referral Hospitals, with an exception being the National Spinal Injury Hospital (NSIH) and Moi Teaching and Referral Hospital (MTRH). The two facilities have a specialized neurological unit. Table 3.1 illustrates levels of healthcare facilities in Kenya.

Table 3.1: Kenya health Facilities

Health Facility	Level where service is Provided
Level Six	Tertiary hospital
Level Five	Secondary/county hospital
Level Four	District Sub-county hospital
Level Three	Health center
Level Two	Dispensary/Clinics

Interviews were conducted in eight County Referral Hospitals. Interviews with the physiotherapists, the patients, and the caregivers were conducted at the physiotherapy departments. Stroke patients that have been admitted receive physiotherapy services in the wards, while patients discharged from the wards receive physiotherapy services. The latter are mainly followed-up at physiotherapy out-patient departments. Caregivers bring stroke survivors to the hospital either for physiotherapy or for follow up visits, or when they notice any abnormal change in the patients' condition. Out-patient physiotherapy

departments manage patients coming from many parts of the country from Monday through Friday.

Interviews with the doctor, nurse and the counselor took place in the wards. Interviews with the doctor also took place at the Moi Teaching and Referral Hospital. The Moi Teaching and Referral Hospital (MTRH) is the country's second biggest referral hospital in Kenya, situated approximately 500 meters east of the city center of Uasin-gishu. Besides being the national referral hospital, MTRH also offers sixth level health care services (explained in Table 2.1). This hospital also acts as the major training institution for health and associated disciplines. The total bed capacity of MTRH is about 1500. Of these, 30 are in the neurological unit. The neurological unit is divided into two sections, namely the "male- section" and "female-section".

The interview with the nurse was conducted in Nakuru provincial general hospital medical ward (block A). Nakuru county referral hospital is the county largest referral hospital in Nakuru County. The hospital is situated approximately 1 kilometer north of Nakuru city centre. Nakuru county referral hospital provides fifth level healthcare services (explained in Table 2.1). This hospital also acts as the principal training institution for allied disciplines. The facility has a total bed capacity of 670. Of these 95 are in the medical wing. At the facility, stroke patients are managed in the medical wing. The medical department is divided into two blocks, namely the "A- block" and "B-block". The "A-block" is the main wing and includes the admission section and in-patient wards. The "B-block" has three sections: intensive care unit, high dependent unit and renal unit.

The interview with the counselor was conducted in the Machakos Level Five hospital. This is the county referral hospital for Machakos County and is situated approximately 56 kilometers east of the capital city Nairobi. It provides fifth level healthcare services. This hospital also acts as the principal training institution for allied disciplines. The total bed capacity of Machakos Level Five hospital is about 460 and of these, 54 are in the medical unit. The medical unit is divided into two wards, namely the "Female" and "Male" wards. Counseling offices are located in the female medical unit.

3.3.3: POPULATION AND SAMPLING METHODS

The population for this study involved all stroke patients, caregivers and healthcare providers involved in stroke management. Kenya was previously divided into eight provinces, (had eight provincial hospitals) which were later divided into 47 counties (the eight provincial hospitals later became county referral hospital). The researcher chose eight hospitals; each representing the earlier province in order to ensure the study sample was representative of the country's population. A sample of 12 participants was selected from the population of patients, caregivers and service providers, (De Vos, Fouche, & Delport, 2005). Convenient sampling was used due to the erratic availability of patient, and caregivers while purposive sampling was used on the healthcare providers based in the inclusion and exclusion criteria.

Inclusion criteria

Patient

1. Stroke patients that had been on physiotherapy management in the eight hospitals and who would be willing to share their journey through rehabilitation.
2. The patients needed to be able to communicate in English or Swahili.

Caregiver

1. A caregiver who had been actively involved in taking care of a stroke patient.
2. The caregiver needed to have been drawn from one of the eight hospitals and to be willing to share the patient's journey through rehabilitation.
3. The ability to communicate in English or Swahili.

Service providers (Doctors, Nurses, Physiotherapists, and Counselors)

1. The healthcare provider involved in stroke management at the time of data collection.
2. At least 2 years experience managing stroke patients.

Exclusion criteria

Patient

1. Patients with stroke who had other medical conditions that would affect rehabilitation.
2. Patients with stroke who had cognitive impairments.

In order to ensure that all the eight provinces were represented in the sample, the researcher interviewed one or two participants from each province. The eight provinces involved in this study were Nairobi, Rift Valley, Western, Nyanza, Eastern, North Easter, Coast and Central province

A total of 12 participants were interviewed, with four provinces having two participants each, due to the big catchment area. These ensured diversity in the responses (Polkinghorne, 2005).

Table 3.2, 3.3, 3.4, and 3.5 presents the distribution of participants and their province of origin.

Table 3.2: County Referral Hospitals and Province of origin

Province of origin	County referral hospital
Nairobi	Mama Lucy Hospital
Central	Nyeri County Referral Hospital
Rift valley	Moi Teaching and Referral Hospital (MTRH)
Eastern	Embu County Referral Hospital
North Eastern	Garissa County Referral Hospital
Western	Kakamega County Referral Hospital
Coast	Coast general County Referral Hospital
Nyanza	Jaramogi Oginga County Referral Hospital

The number of stroke patients admitted during the study period, and the number of patients interviewed for the study from different provinces.

Table 3.3: Stroke patients admitted and stroke patients interviewed

Province of origin	Stroke patients admitted (n)	Stroke patients interviewed (n)
Nairobi	13	1
Central	11	1
Rift valley	15	1
Total	39	3

The table below shows the number of caregivers available during study period, and the number of caregivers interviewed for the study from different provinces

Table 3.4: Caregivers available and caregivers interviewed

Province of origin	Stroke patients admitted (n)	Stroke patients interviewed (n)
Eastern	8	1
North Eastern	7	1
Western	12	1
Total	27	3

The table below shows the number of service providers interviewed for the study from different provinces

Table 3.5: Number of service providers interviewed

Province of origin	Doctors (n)	Nurses (n)	Physiotherapists (n)	Counselors (n)
Rift valley	1		1	
North Eastern		1		
Nyanza			1	1
Coast			1	
Total	1	1	3	1

3.3.4: DATA COLLECTION METHODS

Four independent interview guides were used (Appendix 5, 6, 7, 8) (Lee, 2008). The researcher used semi-structured questions and probes (Pelto & Pelto, 1997). Interviews ensured good use of limited time. The researcher ensured that the interviews were more systematic; kept the interactions focused and controlled the line of questioning (McNamara, 2009; Rubin & Rubin, 1995). The interview guides were informed by literature and the study objectives (Lofland, Snow, Anderson & Lofland, 2001).

3.3.5: PROCEDURE

Ethical clearance to conduct the study was obtained from the Institutional Research & Ethics Committee (Appendix 1, 2). Access to the participants was gained through the facility managers of the selected hospitals. The physiotherapist in charge as well as the

facility managers, provided the patients, caregivers and the service providers with information about the study, and asked of their willingness to take part in the research project. Patients and caregivers were invited separately every time they attended the clinics. The service providers were provided with the information on the research project and requested to participate. Twelve participants were purposefully chosen for the qualitative component of the big study, based on the inclusion criteria. The participants were all given an information sheet (Appendix 4) about the study, and clarity on the study was orally provided to the participants. Written, informed consent (Appendix 3) was gotten from all participants. The anonymity of all participants was ensured and participants were given code numbers for identification purposes. The right to withdraw from the study was stated as an choice and it was elucidated that they would not be disadvantaged if they did so. The researcher scheduled the interviews at a time and place convenient to the participants.

Twelve participants were interviewed. Each interview, lasting between 45 minutes and 1 hour, was audio-recorded. Saturation (point in data collection when no new or relevant information emerges) was reached with the eleventh participant. However, the twelfth participant was interviewed as a prior appointment had been made and the interviews were included in the study.

Three interviews were conducted every week. After every interview the audiotapes were played back to the participant to confirm whether this was a true reflection of the interview and to make clarifications if required. The tape-listening was also useful in ensuring that the recorded information was clear and of good quality. Any changes that

arose were made on a notepad and this extra information was later combined into the transcripts. In areas where the researcher wanted more explanation on any topic, she made further telephone calls. Data from tapes were verbatim and no interpretation was needed. The interviews were conducted in English. A copy of a summary of analytic categories and subcategories as well as verbal explanation by the researcher of interpretations and preliminary conclusions were made. This was presented to two patients, two caregivers and two service providers. They were in agreement that the items were reflective of the interviews.

3.3.6: DATA ANALYSIS

Data was subjected to thematic content analysis, which involved identifying codes and categorizing patterns (Creswell & Miller, 2000; Richie & Spencer, 1993). Following transcription, each interview was firstly read for accuracy and then reread to identify the predetermined themes and possible inconsistencies (Thomas, 2006; Graneheim & Lundman, 2004). On conclusion of all the interviews, the entire sets of transcripts were read to gain a sense of the whole, as well as to produce a coding system based on issues identified from the data. The codes were then applied to the data to refine the coding development and to determine potential categories (Thomas, 2006; Graneheim & Lundman, 2004). Thereafter, categories were established and they aided to consolidate codes into meaningful clusters. Codes and categories were collapsed to evaluate emerging patterns and themes until the point was reached where no new information pertaining to the study question was generated (Ulin et al., 2005). Participants' transcripts were then reviewed to determine the proportion of participants whose answers

corresponded to the major codes. Trustworthiness was achieved through the processes mentioned above. Arbitrary initials were used to distinguish the participants whilst ensuring confidentiality.

3.3.7: RESULTS

Among the 12 participants, the mean age was 42 years, within 2nd interquartile range. Of the total, 7 of the participants were female and 5 were male. Table 3.6 below presents a summary of the demographic data of the patients and the caregivers, while Table 3.7 presents the demographic data of the healthcare providers.

Table 3.6: Socio-demographic profiles of the patients and the caregivers

Participants	County of origin	Age	Occupation	Gender	Marital status	Education level
P4	Nyeri	57	Patient	Male	Married	College
P5	Kitui	48	Patient	Male	Married	University
P6	Kericho	38	Patient	Male	Married	High School
P7	Bungoma	35	Caregiver	Female	Married	College
P8	Kitale	40	Caregiver	Female	Single	High School
P9	Kifili	48	Caregiver	Female	Married	High school

Table 3.7: Socio-demographic profiles of the Service providers

Participants	County of origin	Age	Occupation	Gender	Education level	Years of experience with stroke
P1	Garisa	42	Physiotherapist	Male	College	8
P2	Uasingishu	52	Physiotherapist	Female	University	12
P3	Kisii	37	Physiotherapist	Female	College	4
P10	Lamu	32	Doctor	Female	University	4
P11	Nakuru	28	Nurse	Female	College	3
P12	Machakos	45	Counselor	Male	College	7

The result of the qualitative part of the study produced 4 themes. The themes will be presented in Table 3.8.

Table 3.8: Emerging themes and subthemes

THEME	CATEGORIES
Referral	-Setting from where patient was referred from
Assessment of stroke patients	- Outcome measuring tool - Time of assessment - Reassessment
Management of stroke patients	Settings Interventions Start of physiotherapy Frequency Intensity and duration Discharge destination
Inter-multidisciplinary team members	-Medical officers -Allied professionals -Nurses

3.3.7.1: Referral

Questions posed to the service providers on where the stroke patients came from, were met with various responses but with many similarities. The participants reported that most of the patients were referred from clinics within the city; homes; other hospitals; and from wards within the same facilities. This was expressed in the following speech marks.

"When patients come to this department, they are definitely referred from other departments; clinics, other hospitals or are discharged from the ward through physiotherapy" (P1)

"We also get patients from home. This being a referral hospital, patients come directly after getting ill" (P11)

Additionally, referrals from home and work places were also reported by the patients and caregivers. One patient reported that he was taken to the hospital from home after getting ill. Another patient reported being taken to the hospital while on his way home from his work place, when he realized he had survived a stroke. This is expressed in the following quotes:

"I was at home in the evening when I developed severe headache and I was taken to the hospital, but by them I was unconscious" (P5)

"After a short while I realized that my right hand and leg were not moving. The matatu (Taxi) had to take me to Mama Lucy the hospital" (P6)

The caregivers also affirmed the referrals from other health facilities and work places. This was epitomized in the following speech marks

"I was called by his colleagues[and told] that he had collapsed in his room, and they rushed him to the hospital" (P8)

"He still continued complaining of the same headache then we decided to go to the nearest dispensary. By that time he looked very sick and was also becoming weak. At the

dispensary, we were referred to MTRH as an emergency and that's when I learned he had [had a] stroke"(P7)

3.3.7.2: Assessment of Stroke Patient

All the service providers concurred that assessment of patients prior to commencement of a management is vital. The question "how do you go about the assessment of stroke patient" received various responses. These could best be classified in three categories; namely outcome measure, assessment and re-assessment.

Outcome Measure Tool

It was noted that few of the physiotherapists used the outcome measure tool for assessment. However, the majority of the participants reported that the use of the outcome measure tool provided accurate measures for baseline data, and served as a point of reference during review. The physiotherapists commented:

> *"....you know, the use of outcome measure gives us the best baseline data; based on this data, we can be able to formulate our treatment plan" (P1)*

> *"...outcome measure also become[s] a point of reference for the therapist during the review, and we can be able to measure the progress of the patient" (P3)*

However, it was also reported that physiotherapists in Kenya had various levels of qualifications, which was seen to be a major determinant on the use of the outcome measure tool. Participants reported that the physiotherapists that had a bachelors and masters degree in physiotherapy were conversant with the use of the outcome measure tool as expressed in the following speech mark:

"Physiotherapists that have the Bachelors qualification use outcome measure tool for their assessment while the diploma guys just do the traditional assessment…So when I am assessing my stroke patient I use outcome measure tools"(P1)

"There is also a measure for spasticity, but [I] personally am not very conversant with it. Most of the physiotherapists that use these tools are the guys that have done the BsC"(P2)

ICF Assessment

Participants reported that a patient had to go through a thorough assessment in the context of ICF. The participants narrated evaluation of several areas, which included motor function, sensation, bed mobility, walking, and functional activities such as holding a cup. The quotes below highlight some of participants' sentiments with regards to assessment:

"There are various types of assessment that we carry out on the patients, this includes assessment for muscle power, sensation, bed mobility, transfers, posture, range of motion, neglect, coordination and balance, among others" (P1)

"There are many things we assess as physiotherapists in terms of impairments; joint range of motion, muscle tone, muscle power, posture, and cognitive function such as memory, gait, execution of activities of daily living and so many more."(P2)

On the contrary, there were other areas that were reported to be of interest to a physiotherapist, but were not factored in, during management. Some of these areas included assessment of communication and cognitive functions. The therapist reported that these areas were imperative in informing physiotherapy management. The following statements epitomized this:

> *"We also assess cognitive level of the patient which informs physiotherapy management" (P3)*

> *"We do assess communication, if the patient has aphasia as well as the cognitive function. In as much as we do not rehabilitate aphasia, they play a lot in our rehabilitation and we are able to set realistic goals" (P1)*

Re-Assessment

When asked about re-assessment, the majority of the participants were not certain of when re-assessment of the patient should be done. The physiotherapists reported inconsistencies with regards to re-assessment.

> *"Am not sure about re-assessment, I think different physiotherapists do it at different times" (P2)*

> *"Well, I cannot be able to give a concrete answer because different physiotherapists re-assess their patients after different periods of time. Some do after a week and other do after a month" (P3)*

One of the participants reported that assessment was done monthly, contrary to the majority who were not certain.

> *"So what we usually do is to assess the patient before the start of rehabilitation, and after every month, but I think ideally we are supposed to assess the patient weekly or at most two weeks" (P1)*

Participants reported that there were challenges surrounding re-assessment. One of the challenges identified in reassessment of the patient was the fact that some of the patients were discharged early, as soon as they became stable. Re-assessment thus becomes an issue. On the contrary, a few participants reported that re-assessment for out-patients were done on a weekly basis or at most after every two weeks.

> *"For the outpatient, the patients are mostly re-assessed on [a] weekly basis or after every two weeks" (P3)*

> *"For the therapist to have progression in the exercises, they used to re-evaluate me after every two weeks" (P6)*

3.3.7.3: Settings for Stroke Rehabilitation

The study elicited some informative first-hand insights on setting for rehabilitation. The understandings brought forth the establishments of stroke rehabilitation.

Institutional based rehabilitation

As the participants responded to the question on what type of the facilities stroke patients are rehabilitated in, it was obvious that stroke patients are rehabilitated as in-patients during hospital stay.

> *"After admission, we do a physiotherapy assessment and start rehabilitation, if the patient is stable" (P1)*

> *"Rehabilitation is done throughout hospital stay for all stroke patient[s]"(P3)*

Likewise the service providers reported that patients are referred to outpatient facilities during discharge and continue with physiotherapy. This was epitomized in the following speech marks:

> *"In most cases we discharge our patient[s] through physiotherapy outpatient[s]..."(P1)*

> *"Most of the times, stroke patient are discharged through physiotherapy outpatient… So we sent them to physiotherapy as outpatient cases" (10)*

However, a minority of the participants reported rehabilitation in step down institutions such as nursing homes:

> *"Some patient[s] are discharge[d] home, but the relatives prefer taking them to nursing homes for rehabilitation"(P11)*

> *"We also discharge through nursing homes, to continue with rehabilitation"(P10)*

Community based rehabilitation

The service providers reported stroke cases that are discharged to continue with physiotherapy at the community-based rehabilitation. Such referrals were prompted by the fact that some of the patients live very far from health facilities that offer out-patient physiotherapy service. The presence of Association of Physically Disabled of Kenya (APDK) clinics in such areas encouraged such referral. The Association for the Physically Disabled of Kenya is a non-governmental organization that offers mobile community-based rehabilitation services in Kenya.

> *"However, there are cases that we refer to community based rehabilitation. These are cases that live very far from any facilities that offer physiotherapy service"(P3)*

> *"There are other cases where we refer patient to community based rehabilitation. Okay, this happens especially in areas that are attended to by APDK clinics" (P2)*

It was also noted that there were situations when patients were discharged through physiotherapy, but the family were not able to take the patient to a physiotherapy outpatient clinic. In cases such as these, families were advised to get a physiotherapist to rehabilitate the patient at home.

> *"...there are patients that prefer to have a physiotherapist go to their home and do rehabilitation of the patient at their homes"(P10)*

> *"...there are other families that request for the patient to be discharged then they can get their own personal physiotherapist to see the patients at home"(P3)*

3.3.7.4: Management of Stroke Patient

Rehabilitation of stroke patients' elicited three categories, these categories include; duration, intensity and frequency. The following are the three categories and the supportive quotes from the interviews.

(a) Frequency rehabilitation

In answer to questions framed to get an understanding of how often the patients receive physiotherapy services, the participants reported that patients were managed every day for five days in a week during hospital stay. Two participants responded as follows:

> *"Well, for the patients that are admitted, we see them daily for five days in a week. For stroke patients that are in intensive care unit, they are seen four time a day for 7day in a week"(P3)*

> *"The therapist used to come every morning and do some exercises on my arm and leg"(P5)*

However, two participants asserted that rehabilitation was supposed to be offered on daily basis, but due to a shortage of staff, daily patient-care was not always possible in some of the busy wards. One service provider stated:

> *"Ideally, the patients are supposed to be seen at least five times in a week, but unfortunately for some hospital[s] it is not possible"(P1)*

Another service provider stated:

"[I] am not very sure about the frequency, but I see my patient at least three times a week. There are times I see them even four times in a week, especially the critically ill patient"(P2)

Additionally, it was reported that stroke survivors seen as outpatients were rehabilitated for, at most, three times a week.

"When I was in the ward, I used to be seen by the physiotherapist every day, but when it came to out-patients, I could not come over every day. It was very difficult to come to the hospital even two times in a week"(P5)

"The frequency of services in out-patients is at most three times a week. Most of the stroke cases come only once a week"(P2)

(b) Duration of therapy

When asked a question concerning the duration of the physiotherapy session, the participants reported that the patients had different capabilities and could take exercises for different periods of time:

"Stroke patients have different capability, you at times find patients that are very weak and can only endure therapy for a few minute[s] before they get fatigue. Some other patient[s] have mild stroke and can do exercises for more than one hour" (P2)

"I may not be able to tell you the exact time, but I think the period could be like an hour or so. This is because there are a lot of exercises that are done, from the trunk to the toes"(P6)

(c) Intensity of therapy

The intensity of physiotherapy was reported to increase with improvement on outcome. However, some participants reported that the intensity of exercises was taken care of by the duration of rehabilitation and the frequency. This was expressed through the following responses:

"The physiotherapist used to increase my exercises the moment I was able to do the first exercises without any help"(P5)

"At times we look at intensity in terms of increasing the amount of exercises. When a patient is able to do some exercises without challenge, we add some harder exercises in order to improve on strength"(P1)

3.3.7.5: Discharge Plan

The participants held that it was imperative for the patient to be discharged as soon as the underlying condition had been stabilized. It was reported that early discharge would ensure that the patient had no chances of contracting infection from the ward as well as giving the patients an opportunity to get rehabilitation from outpatient and other facilities: Participant expressed:

"We usually ensure that our patients are discharged as soon as they get stable, to avoid the risk of infection which might affect rehabilitation"(P10)

"As soon as the patient is stable, we discharge [the patient] home to continue with physiotherapy as an out-patient"(P11)

Additionally, the participants reported that during discharge, there were cases where patients would not be able to access out-patient physiotherapy services in county hospitals. In such cases, patients were referred for community-based rehabilitation, which is provided for by the Association of Physically Disabled of Kenya (APDK).These services are available in most part of the country. This was represented in the following quotes:

"...but at times we can refer them for community based rehabilitation especially in areas where APDK do the CBR"(P1)

"There are other cases where we refer patient[s] to community based rehabilitation. Okay, this happens especially in areas that are attended by APDK clinics. However CBR referrals are not many" (P2)

3.3.7.6: Physiotherapy Management

Participants were approached to explain the process of physiotherapy. The main aim of rehabilitation was said to be re-education of functional loss.

"...so our aims includes; re-educate upper and lower limb function, sensory function, normalize tone, re-educate functional activities, re-education balance, management of pain, management of oedema, patient and carer education, training on orthotics use, and others" (P2)

"...The therapist used to first put me on the couch and do several exercises himself. These exercises were both for the right arm and leg. After the exercises were done by the therapist, I would be taken to some parallel bars stuck on the wall, where they would tie my right hand to one of the bars. I would then continue with the exercises of the arm"(P6)

When asked about the issue concerning methods used for stroke rehabilitation, the informants held that there were no specific methods used by the physiotherapists. Participants emphasized that the aim of physiotherapy rehabilitation was to attain functional recovery, which was done via functional oriented activities. The participants elicited the following:

"Well, about the method of rehabilitation, I wouldn't say that we have a specific method or approach that we use in stroke rehabilitation"(P1)

"Well, we don't have a specific method that we use for stroke rehabilitation; the only thing we concentrate on is exercises that facilitate the recovery of functional activities"(P3

3.3.7.7: Physiotherapy Content.

The therapist provided the content of physiotherapy. A probe on what entailed physiotherapy management was faced with a wide range of responses. The responses can be categorized into three categories, namely upper extremity therapy, lower extremity therapy and activity of daily living training.

Upper Extremity Therapy

Participants reported that management of the upper extremity involved taking care of the shoulder pain, shoulder subluxation, muscle strength of the affected arm, range of motion and spasticity, depending on the recovery stage.

> *"We have to make sure that we take care of pain of the shoulder if it is there and also ensure that it does not dislocate. You know the shoulder joint is a muscular joint, with weakness of these muscle it is likely to dislocate" "(P1)*

> *"So we do soft tissue manipulation and mild exercises, but we avoid overhead exercises. We also advise the patient on using a sling, or putting the hand in the pocket to avoid gravitational pull" (P3)*

Another participant added that:

> *"There other times you get a patient with spasticity. In such cases, we do joint range of motion and at times we can do anti-spastic positioning or casting"(P2)*

Contractures were reported to be a common phenomenon, particularly with stroke patients who had been mismanaged or did not adhere to treatment regime. Participants reported that stretching, splinting and casting were the most common approaches used in contracture management.

> *"At times you see patients that have not been on physiotherapy for like six months; so we do a lot of stretching, splinting and casting" (P3)*

"We manage contractures with splinting and casting, but they are not that easy to manage" (P2)

The healthcare providers further added that muscle strength was an important component of management. The participant emphasized on the importance of improving the muscle strength as it was seen as an antecedent to resumption of activities of the upper extremity.

"We have to work on the muscle strength. We give active assisted, free active exercises and also resisted exercise for patients that can manage these levels" (P1)

"For patients with flaccid paralysis, we initiate a contraction with the aid of neuromuscular nerve stimulation"(P2)

Lower extremity therapy

The participants reported treating the lower extremity. It became evident that the involvement of the physiotherapy in management of the lower extremity was to do with mobilization.

"A lot of what we do in treating the lower limb is mobilization. This is usually done with the help of a therapist and the use of an ambulatory aid" (P3)

"We ambulated the patient using ground walking" (P1)

Ambulation was reported to be accompanied by use of orthosis:

"During ambulation, we also advise the patient on the use of orthosis on the affected limb. Orthosis are(sic) very important especially due to foot drop that comes with stroke. It facilitates easier toe off of the gait cycle"(P1)

"We also get the foot ankle orthosis from the orthopedic department for use by the patients" (P3)

Likewise the participants reported that some of the patients present with oedema of the lower limb. The physiotherapists reported that they manage this impairment using soft tissue manipulation, elevation as well as use of a compression stocking.

"Some patients also present with oedema, especially patients who sit for long[er than an] hour. So we can do soft tissue manipulation, elevation of the affected limb, and we also advise on the use of a compression stocking"(P3)

"We advise the patient of limb elevation in cases of swelling of the legs" (P2)

Activities of daily living

Activities of daily living was reported as one of the components that involve the physiotherapist; however, the participants were very clear that it involved the occupational therapist more than the physiotherapist.

"We try to teach patients on resumption of thing[s] like managing food on the table, but basically it is mostly done by the occupational therapist" (P1)

"Occupational therapist[s] deal with fine motor rehabilitation, so retraining activities of daily living is more their role that the physiotherapist" (P2)

3.3.7.8: Interdisciplinary Team In Stroke Rehabilitation

There were several health care providers who reported involvement in stroke rehabilitation. Most of the facilities were seen to embrace the multidisciplinary approach in patient management, which involves various medical disciplines. Each of these disciplines was said to be responsible for a certain aspect in the patients' recovery. The informants held that for recovery of the patient, the services of a nurse were vital. Nurses are said to be the first contact with the patient. This was drawn from the following quotes:

> *"There were the doctors and the nurses. These were the first people that handled him"(P7)*

> *"Nurses are very important; they are with the patients all through admission until discharge"(P2)*

Nurses were identified to ensure that the patients received medication; that their vital signs are within the normal range and also ensure the hygiene of the patient. The participants elicited the following:

> *"...there were nurses that used to take my blood pressure every morning, give me a bath, medication, do the bed and feed me since I was not able to sit on my own"(P4)*

> *"...we have the nurses who have the major responsibility of the patients while in the wards. They ensure that the prescribed medication is given as well as taking care of the vitals and many other things" (P11)*

Doctors were reported to play a very vital role in stroke patients. The doctors were said to be responsible for assessment and medical management of stroke patients.

> *"...Later I was seen by a doctor. He is also the one that admitted me in the ward"(P5)*

> *"We do ask for the investigation and ensure that we prescribe medication for the underlying cause"(P10)*

The service provider reported that after the patient is admitted, the doctors review the patients and often is prescribes CT scan and other investigations for diagnostic purposes. As a result, the role or the radiology department is very essential to guide in diagnosis. This was apparent in the following quotes:

> *"I was done an MRI"(P5)*

> *"...we then order a CT Scan. This will help us to possibly rule out if it is stroke. We ensure that almost all the stroke cases are done; the CT scan or the MRI. (P10)"*

After the investigations are done and reviewed by the doctor, the participants reported that stroke patients are put on various medications, depending on the patient's condition. In addition, often time stroke survivors are prescribed physiotherapy, occupational therapy, speech therapy in cases of speech impairment, counseling and orthotics. Stroke survivors are then referred to a nutritionist for guidance.

Participants reported that the physiotherapist played a major role in management of motor impairment and re-education of the lost functional activities. This is expressed in the following statement:

> *"In such cases we come in as physiotherapists and provide a treatment/exercise regime that will re-educate upper and lower limb function. We try to re-educate functional activities such as sitting, standing, making a step, and so forth" (P2)*

> *"So at first we started with only two steps. And even doing the two steps was very difficulty coz the foot could hardly lift itself, so I jus' to drag it which made walking very difficult" (P4)*

Additionally, there was the involvement of the occupational therapist. It was reported that occupational therapists work with clients to optimize participation and independence for all daily occupations (including self-care, leisure and productivity).

> *"The occupational therapist came and put some hard gadget on my sick arm which he was calling splints" (P4)*

> *"The occupational therapists are involved a lot in fine motor rehabilitation, which the physiotherapists are responsible for - the gross motor" (P3)*

During rehabilitation, most of the service providers 'reported that stroke patients sink into depression'. Consequently, counselors were crucial in ensuring that stroke survivors come to terms with reality, and were positive about rehabilitation. This discipline was said to be responsible for patients' psychotherapy. Stroke being a disabling disease, it

was realized that patients go into depression which hinders rehabilitation. The role of counselors was seen as educed in the following quotes:

> *"We also had the counselor...she was a very helpful person and helped us understand our predicament. She helped my husband in the sense that, at first he was getting depressed" (P6)*

> *"The ward round[s] are composed of all the health service providers, which include, nurses, medical doctors, counselor..."(P2)*

The orthopedic technologist were said to provide assistive devices and ambulatory aids. This was expressed in the following statement:

> *"...there was the orthopedic technologist that brought the wheelchair, occupational therapist, the nutritionist who advised me on the right food for my husband" (P6)*

Stroke is often related to lifestyle diseases. Therefore the service providers' emphasized the need for nutritional guidance to stroke patients to avoid a recurrence. The nutritionist provided advice on diet as mentioned in the following quotes:

> *"My husband was also under the care of the nutritionist. Being hypertensive, we were taken through the best diet for a hypertensive patient. And also while in the ward, the nutritionist was always there to advise the catering department on what the patient needed" (P7)*

"There were the nutritionists that are involved with the food. They advised my family in the most appropriate food and also on salt intake."(P6)

The social workers played a significant role. Social workers were actively involved in the management of stroke patients. The main aim was to ensure that stroke survivors were integrated back to the community and enabled to live as near normal lives as possible. This was articulated in the following speech mark:

"There was also the social worker who came over while I was in the ward and also accompanied my daughter and I during discharge to help us with the adjustment of the house in order to fit the wheelchair movement" (P6)

"Included in the ward round was the social worked that facilitated my going home"(P4)

3.4: PATIENT JOURNEY

3.4.1: STUDY DESIGN

A descriptive, quantitative study design, using retrospective data was applied in this section. The purpose of this research design was to document the past, in order to make decisions in the present based on past information (Wisher, 2000). The use of patients' medical records from the clinical files was appropriate to answer the first and second research objectives in the current study.

3.4.2: SETTING

The study was conducted in the medical registry of 17 County Referral Hospitals in Kenya. The files of the patients are kept in medical registry often located in medical health records departments in all County Referral Hospitals. Most of the medical registries in the 17 County Referral Hospitals have systems that are used to collect, analyze, retain, retrieve and evaluate health information.

3.4.3: POPULATION AND SAMPLING

Files of stroke patients admitted in medical and neurological wards from 1st January to 31st December 2014, and patients that were receiving physiotherapy as outpatient, were consulted.

The sample size obtained from the admission register represented a population of 227 stroke patients admitted in 2014. The available medical records sample size was 219, while the sample that met the inclusion criteria was 150. According to the records clerks, when the patients are discharged, relatives or caregivers take the patients' hospital files to

enable them to book follow up visits at the neurology clinic and physiotherapy. Occasionally, some of the files are left in those departments and may take time to be brought back to medical registry.

Kuklinski and Koduri (2008) confirm that when the records accessible are not the absolute set of all probable records, it is a cause of bias and the researcher is opined to address the question of representativeness of the obtainable records. The researcher endeavored to do this by incorporating the information that was available from the admission register for the eight stroke patients whose files could not be located. According to Worster (2004) and Babbie and Mouton (2001), the sample is said to be representative of the population if certain collective features or variables are almost similar to that of the population. In this case when the results from the sample size of 150 whose medical records found were linked with the missing files, the results indicating county of residence and management plan were similar. This suggests that by using only the 150 files that met the inclusion criteria and were available, the results would not have been significantly different from using the eight missing files.

Inclusion criteria

- All stroke patients who were admitted or re-admitted during the stated period.

Exclusion criteria:

- Stroke patients who had other medical conditions.

3.4.4: DATA COLLECTION METHOD AND ANALYSIS

Piloting of the data-capturing sheet (Appendix 9) was done on 10 hospital files for stroke patients from MTRH, and only included those for 2013 since they were not part of the study population. Information that was found missing from the data sheet was added ahead of the study commencement. This process aided the researcher in selection of all the records of stroke patients and not leaving out information needed from the records. The data was entered and cleansed by two data capturers using SPSS version 22 and Microsoft Excel. A double entry system was used for quality assurance. Descriptive statistics data analysis was performed in order to convert independent variables into frequencies and percentages. Descriptive data analysis was presented in figures and tables.

3.4.5: RESULTS

Record review had more males than females. A large number of male files 63.5% (n=95) compared to female 36.5 % (n=55) files formed part of the study. The ages ranged from 20 years to 103 years. The mean age was 61.7 years and the median was 65 years. The standard deviation was 16.688 and IQR 65.

The number of files differed from one health facility to another. Table 3.9 below reflects the health facilities and the number of patient folders. It is noticeable that the large majority of patients (n=30, 20%) came from MTRH, while Kitale had only 5 files (3.7%).

Table 3.9: Files and facilities of origin (n=150)

	Frequency	%
MTRH	30	20.0%
Kakamega	7	4.7%
Bungoma	5	3.7%
Nyeri	8	5.3%
Kiambu	8	5.3%
Thika	9	6.0%
Kisumu	10	6.7%
Kisii	6	4%
Garisa	5	3.7%
Coast	8	5.3%
Malindi	5	3.7%
Embu	9	6.0%
Machakos	10	6.7%
Meru	7	4.7%
Nakuru	13	8.7%
Kericho	5	3.7%
Kitale	5	3.7%

3.4.5.1 Assessment

(a) Use of outcome measure tools

Of the 150 files reviewed, 39.3% (n=59) recorded use of outcome measure tools, while 60.7% (n=91) had no evidence use of outcome measure as summarized in Figure 3.1.

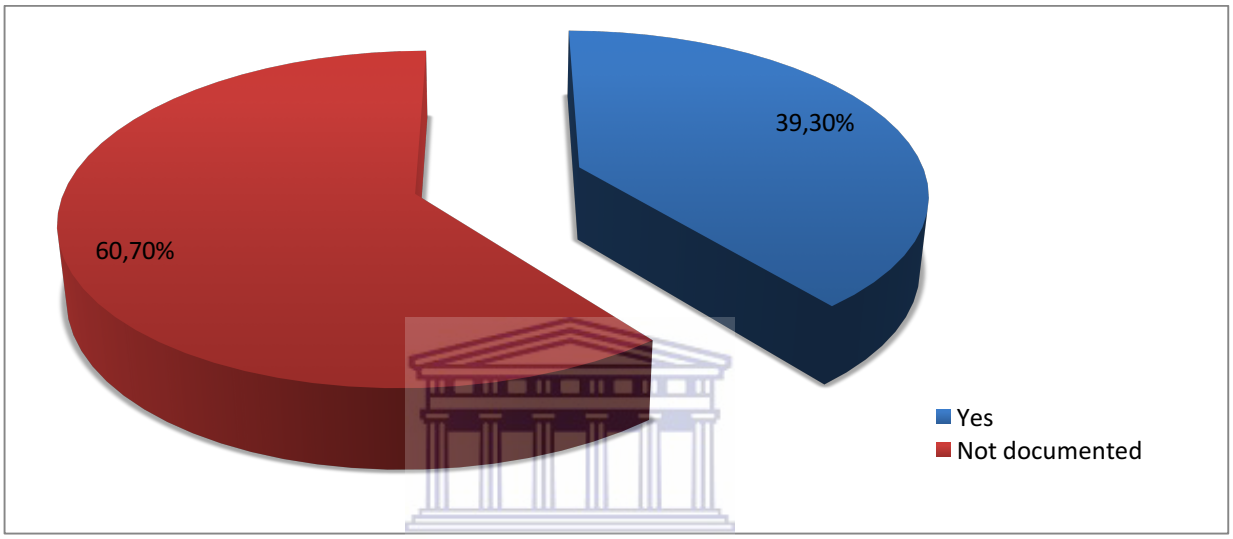

Figure 3.1: Use of outcome measure use (n=150)

Furthermore, the study identified the types of outcome measure tools used by physiotherapists during assessment. The most commonly outcome measure included visual analogue scale 39% and Ashworth modified scale 36%, as shown in figure 3.2

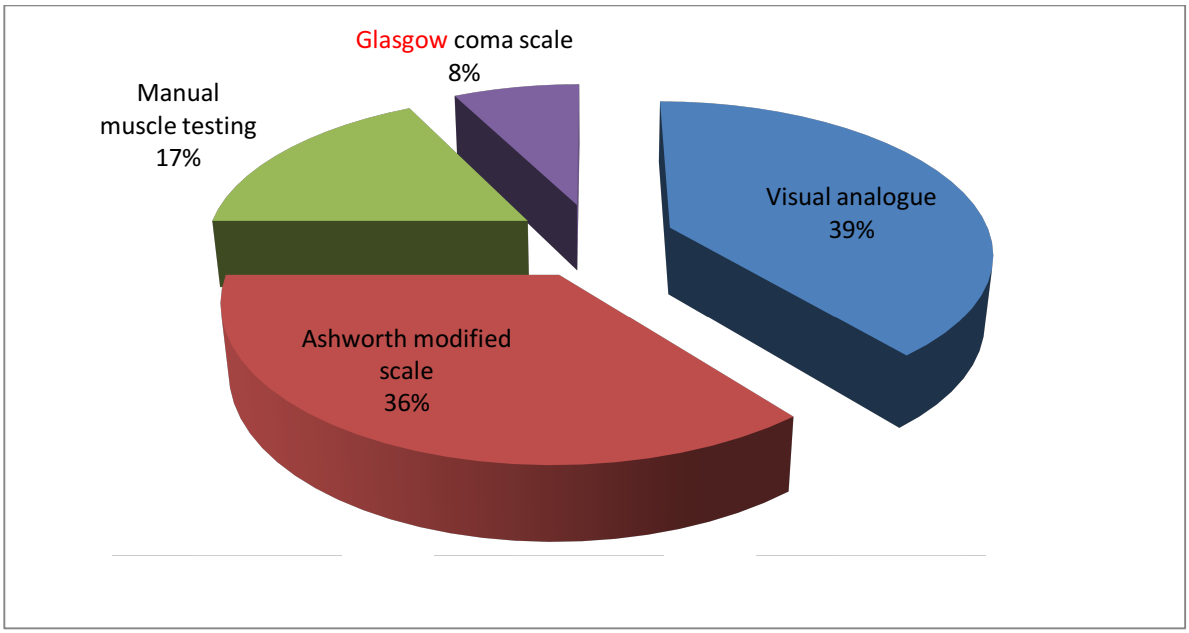

Figure 3.2 Outcome measure tool (n=59)

Post stroke assessment was done in the context of ICF. This involved assessment of impairment, activity limitation and participation.

(b) Impairment assessment

Record review indicated various types of impairments assessed during baseline evaluation. One hundred percent (n=150) were assessed for motor function, while 79.3% (n=119) were assessed for cognitive. The results are represented in Figure 3.3.

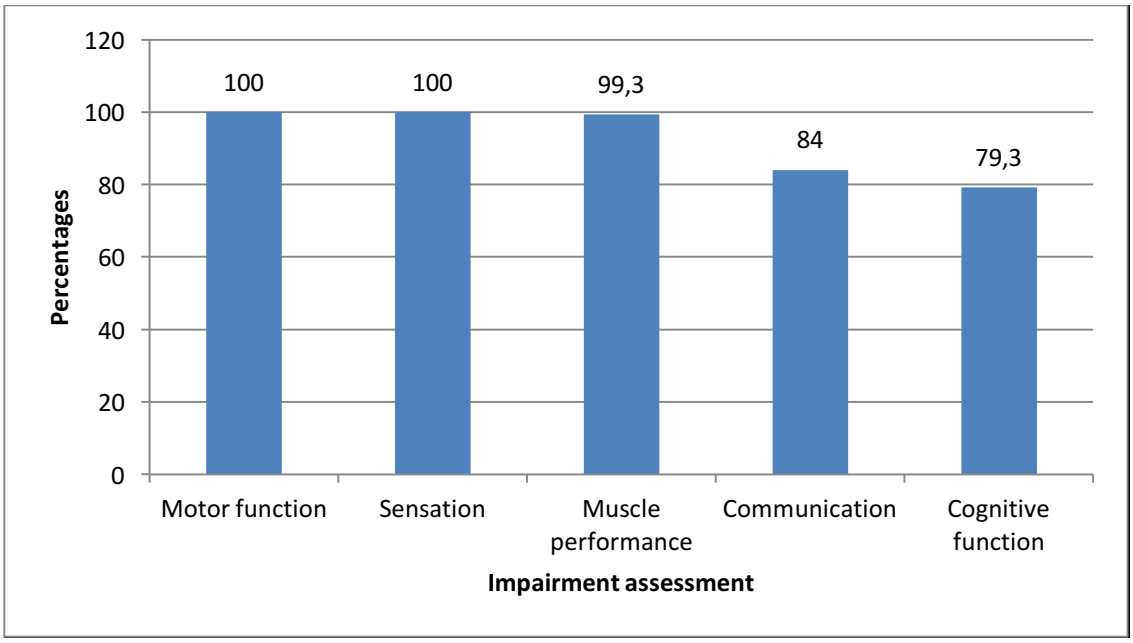

Figure 3.3 Impairment Assessment

(c) Activity limitation assessment and social support

Activity limitation assessment included 98.7% (n=148) assessment of activities of daily living, while 48% (n=72) were assessed for emotional status (see Figure 3.4).

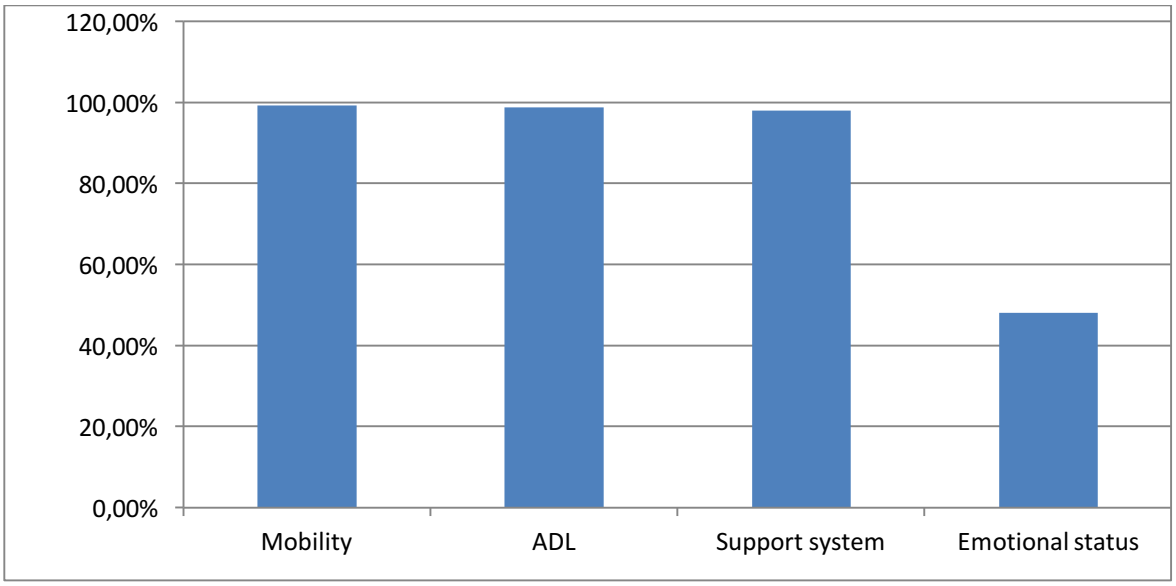

Figure 3.4: Activity limitation assessments

3.4.5.2: Re-Assessment

Review of medical records indicated that re-assessment took place at different times. Thirty eight percent (38%) reviewed patients after one month, while (9%) were not sure of the review time (see Figure 3.5).

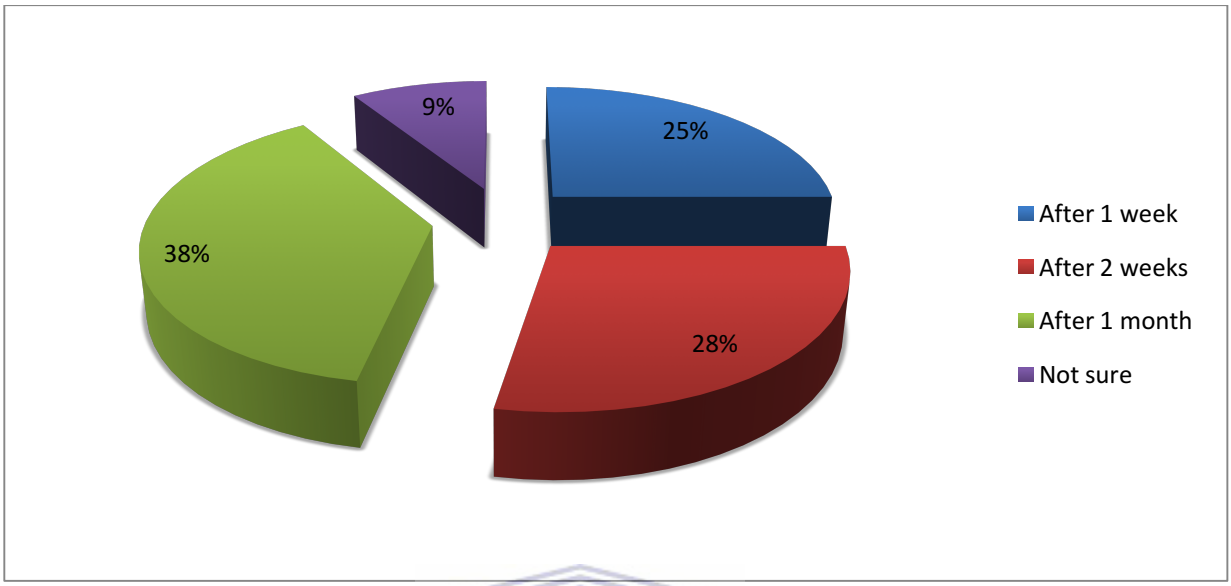

Figure 3.5: Re-assessment

3.4.5.3. Multidisciplinary Management

Disciplines that had a role in the management of stroke patients were documented in the patients' files and were evaluated during the current study. There were (100%) involvement of nurses, and a mere (1.3%) involvement of speech therapists. Figure 3.6 summarizes the multidisciplinary team.

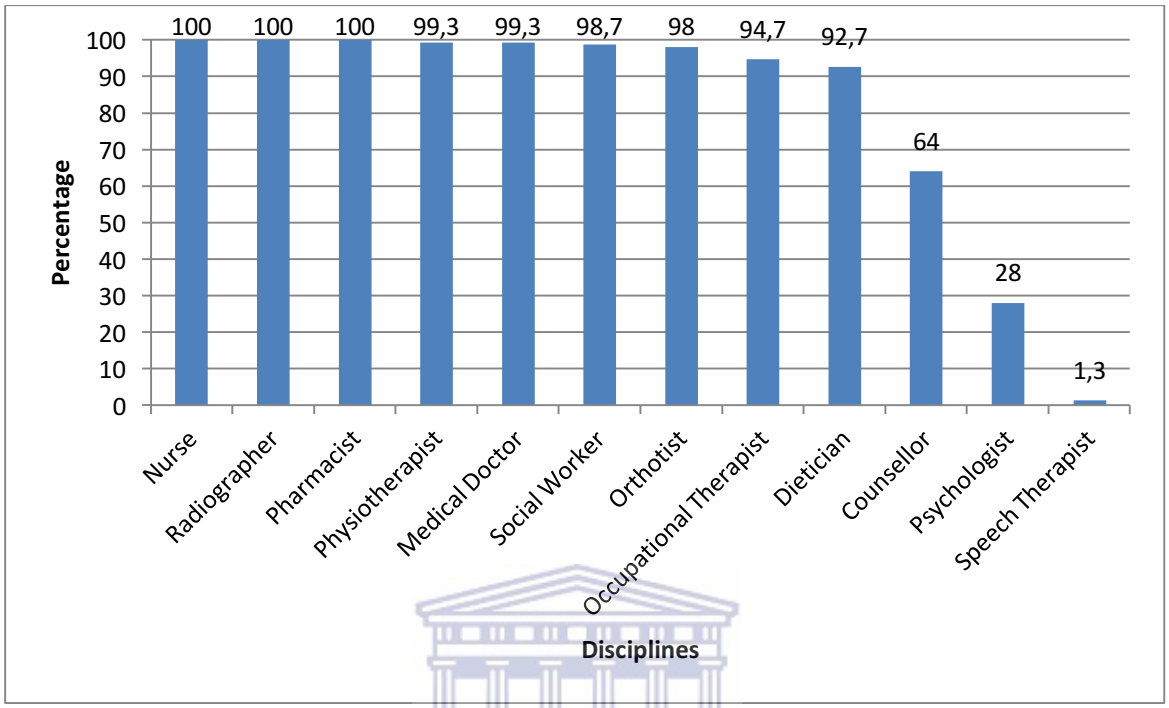

Figure 3.6: Service Providers Involved in Stroke Management .

3.4.5.4. In-Patient Stroke Rehabilitation

Following the acute phase of stroke care, the focus of care turns to recovery of physical and cognitive deficits, as well as components of residue impairments.

(a) Component of physiotherapy management

One hundred percent (100%) of the patients received re-education of upper limb function, while 31.5% had provision of orthotics and assistive devices (see Figure 3.7).

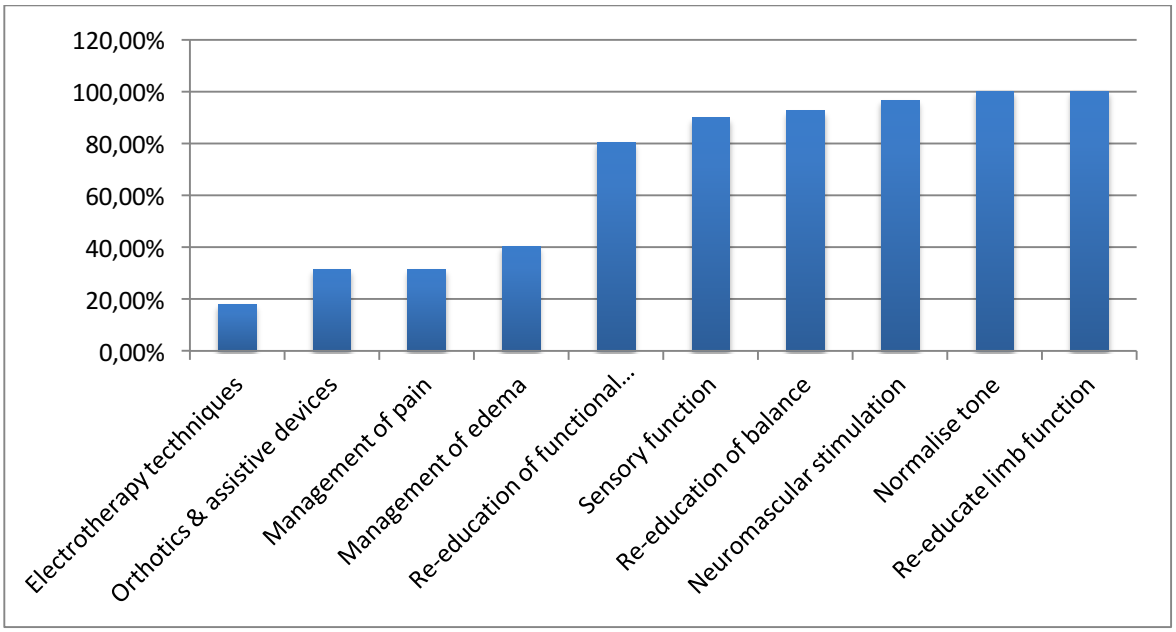

Figure 3.7: Content of Management of physiotherapy

(b) Timing of rehabilitation

The majority (92.7%) of the stroke survivors who were admitted at the hospitals were started on physiotherapy within the first one week.

(c) Frequency of rehabilitation

In terms of the number of treatment sessions in a week during in-patient care, 42.7% of the patients had four session of treatment in a week, while 2% of the patients had one session of treatment in a week. These results are demonstrated in Table 3.10.

Table 3.10: Number of in-patient physiotherapy treatment sessions in a week (n=150)

Number of sessions in a week	Frequency	Percent
1	3	2.0%
2	20	13.3%
3	32	21.3%
4	64	42.7%
>5	22	14.7%

(d) Caregiver education

The patient, family member and caregivers were given information and provided with the opportunity to learn the causes and consequences of stroke, potential complication and prognosis of rehabilitation. There was (95.2%) intervention on family/community support and (1.4%) intervention on psychosocial need/resources (see Figure 3.8 below).

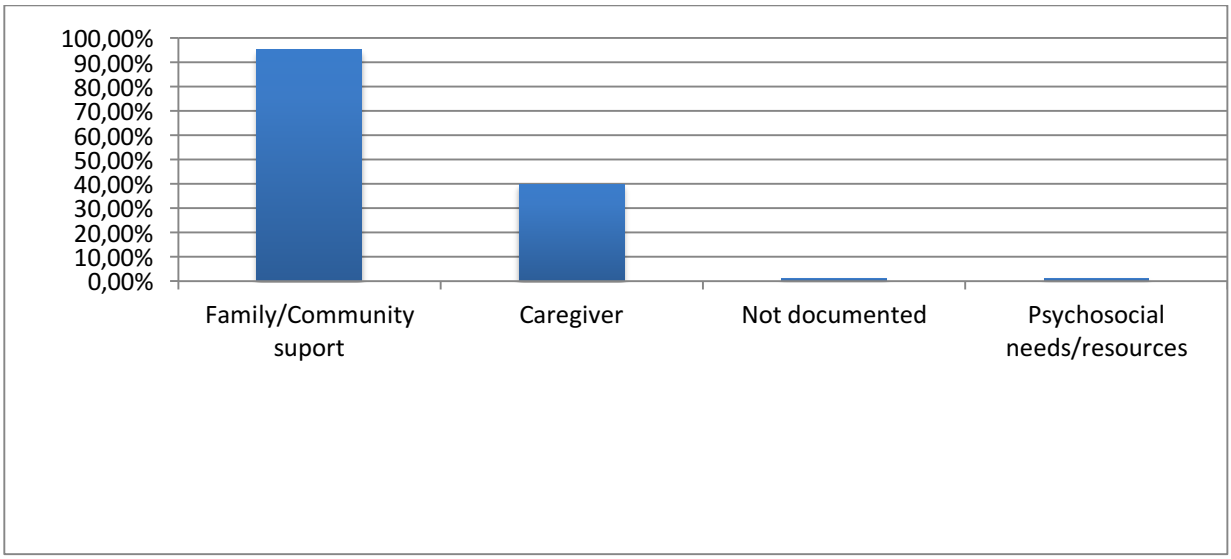

Figure 3.8 Support given and resources available

(e) Re-assessment

The research revealed that reassessment of stroke patients during in-patient physiotherapy was not common. Out of the 150 files reviewed, only 28 files had information pertaining to reassessment of the patient. Fifty seven point one percent (57.1%) were reassessed weekly and (14.3%) were reassessed monthly. (see Figure 3.9 below).

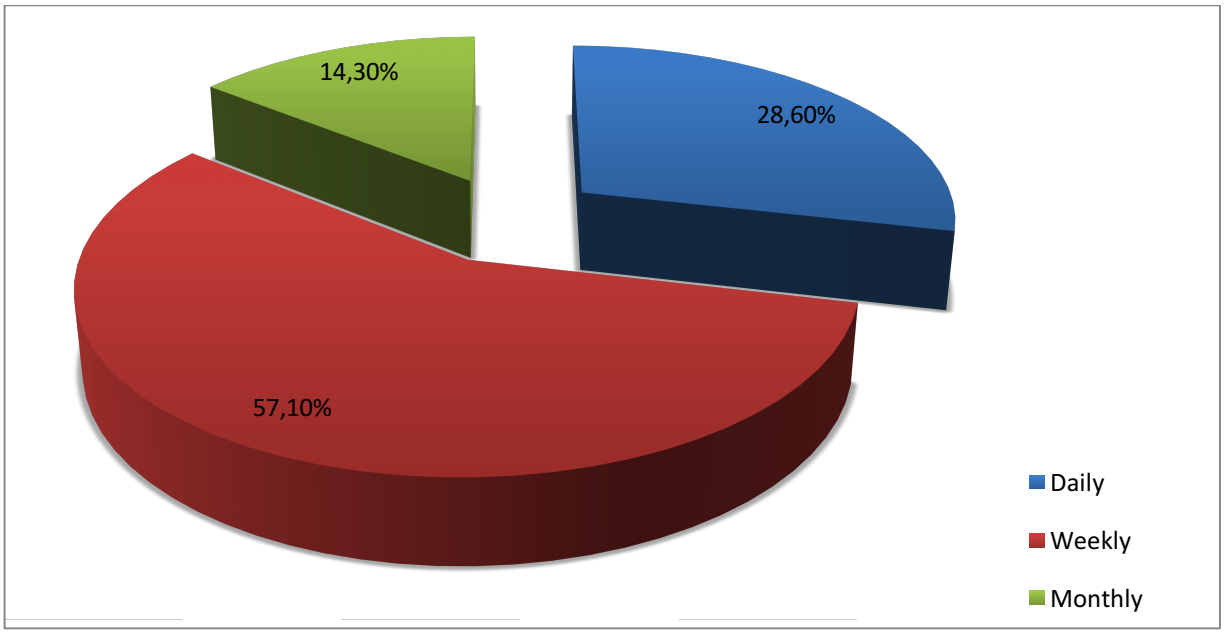

Figure 3.9: Reassessment (n=28)

(i) Discharge Destination

The patients were referred to various settings to continue with rehabilitation. Approximately (86.6%) of the patients were referred to hospital/center-based settings, while (13.4%) were referred for community-based rehabilitation. Referral settings are presented in Figure 3.10.

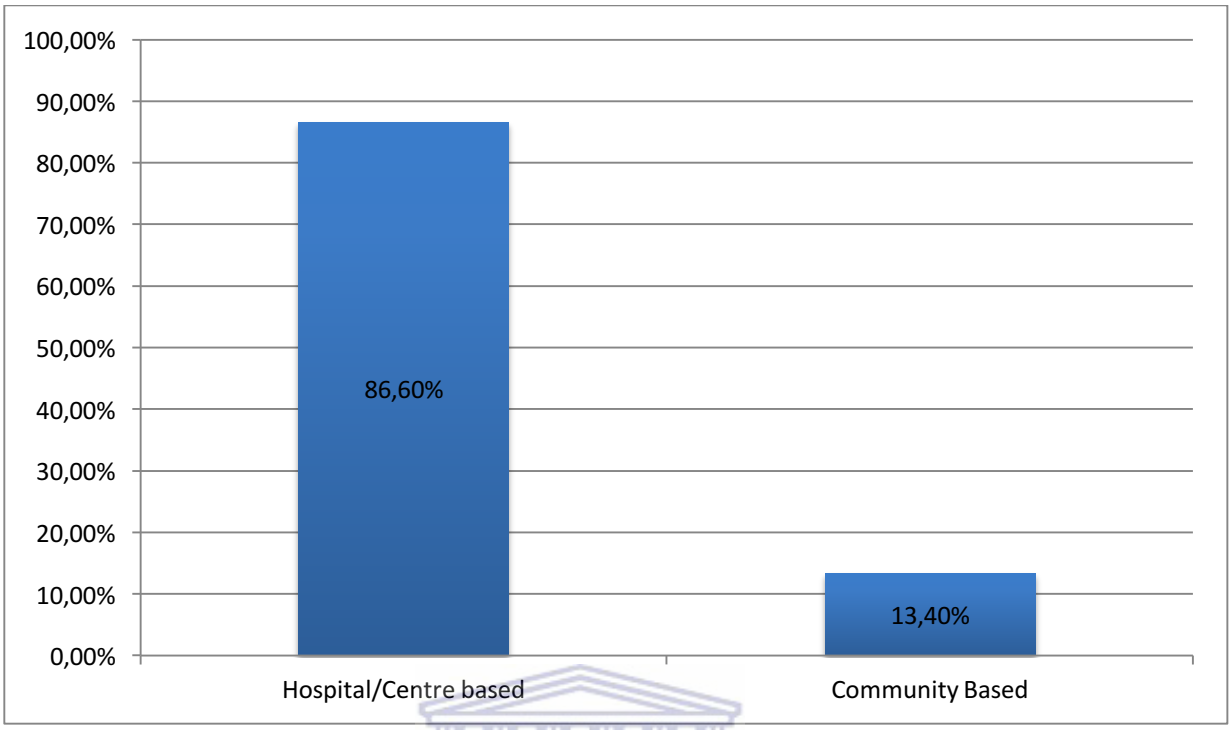

Figure 3:10: Referral Settings (n=149)

3.4.5.5. Out-Patient Stroke Rehabilitation

During the study period, there were very few files of out-patient cases. Pertinently, only eight patients had been treated and discharged. A total of 37.5% of the patients were treated once a week while 62.5% attended the physiotherapy out-patient clinic twice a week. (see Figure 3.11 below).

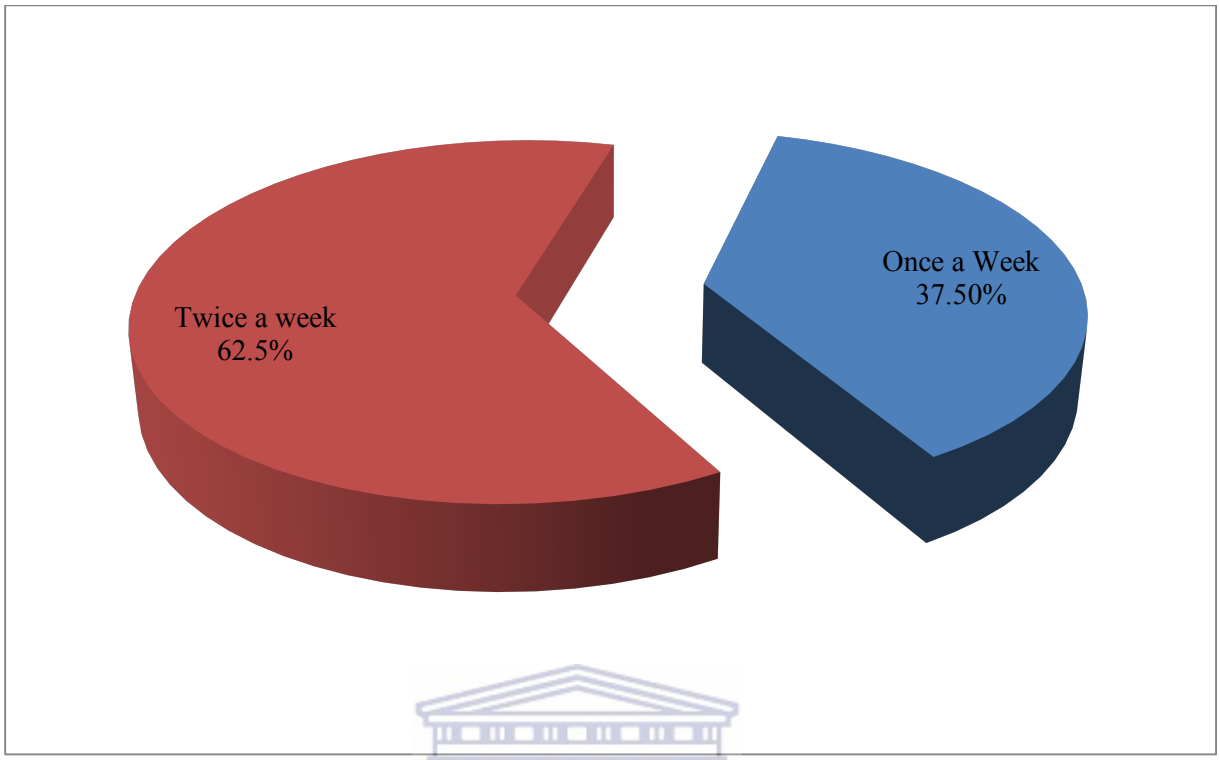

Figure 3.11: Number of out-patient physiotherapy sessions in a week

3.4.5.6. Secondary Complications

In the current study several complications were identified. These include pain (28.9%) and stiffness (0.7%) . This is demonstrated in Figure 3.12 below.

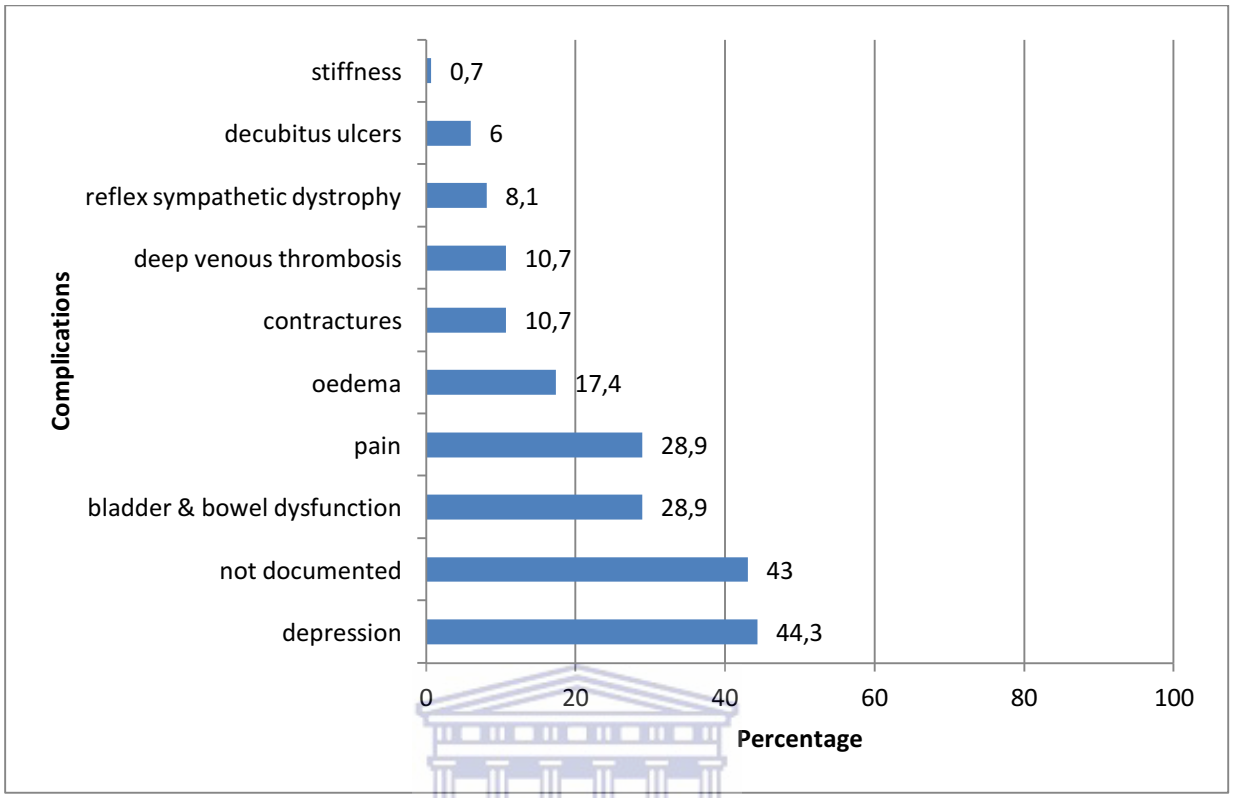

Figure 3.12: Complication Frequencies

3.4.5.7. Referral To Other Health Care Providers

In the context of an interdisciplinary approach, stroke rehabilitation requires input from various medical disciplines. The majority of the patients (95.3 %) were referred to other medical professional during the rehabilitation period, as shown in Figure 3.13 below.

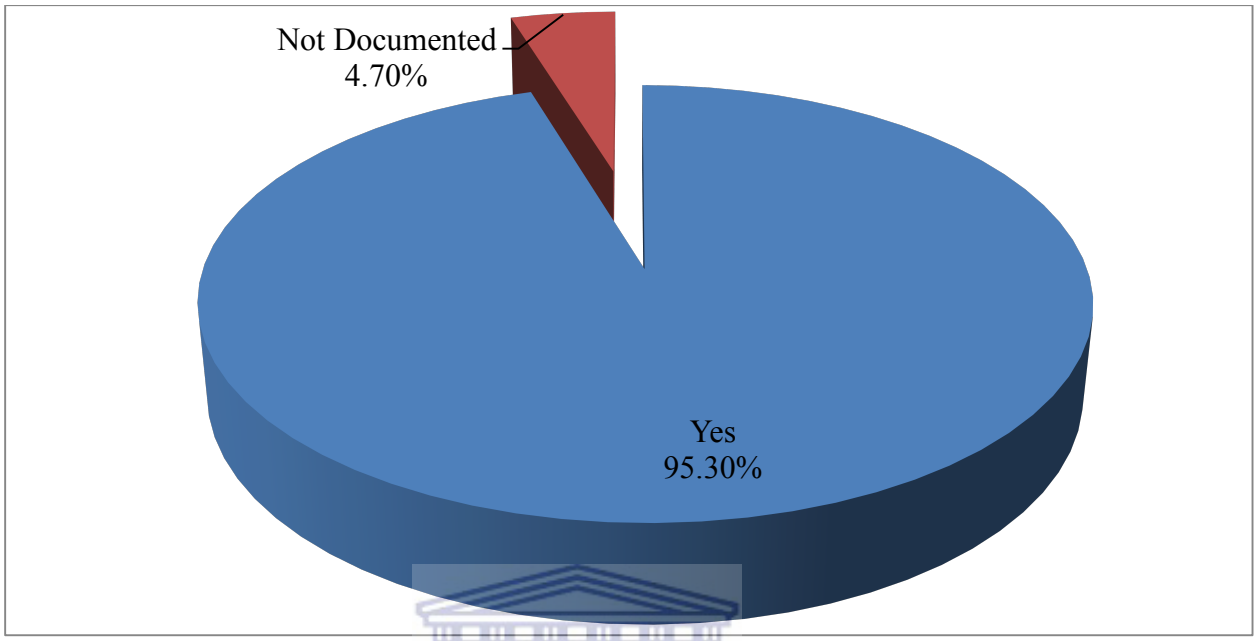

Figure 3.13: Referral to other healthcare providers (n=150)

Moreover, the study identified the types of healthcare providers that the patients were referred to by the physiotherapist for stroke management. These included a 97.3% referral to orthotists, and 85.8% referral to social workers. (see Figure 3.14 below).

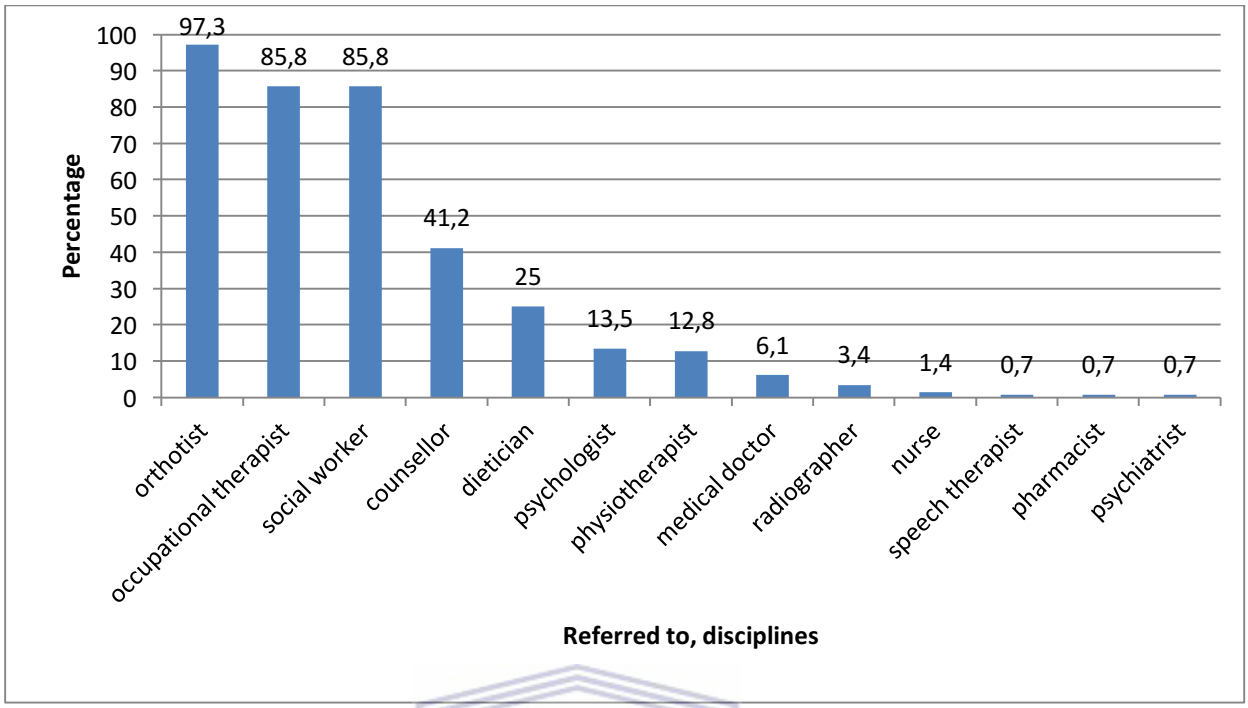

Figure 3.14: Disciplines referred to

3.5: (PATIENT JOURNEY)

3.5.1: STUDY DESIGN

A cross-sectional, descriptive design was used to obtain data by means of a survey questionnaire, with closed and open-ended questions (see Appendix 10).

3.5.2: RESEARCH SETTING AND SAMPLE

The study was conducted in the physiotherapy department at 17 County Referral Hospitals in Kenya during 2014. A total of 126 physiotherapists were approached to participate, due to the small number of the population. Of those, a total of 112 participated voluntarily.

3.5.3: DATA COLLECTION METHODS

The questionnaire was used to obtain data and was developed based on study objectives and a review of relevant literature (Hargittai, 2010; Lietz, 2010). The questionnaire made use of six categories, which included demographic information, assessment, in and out-patient treatment, discharge plans, family involvement and physiotherapy content. A pilot study was conducted with participants from Kenyatta National Hospital (n=15) in order to test the reliability of the instrument. A test-retest analysis with a one-week gap between tests demonstrated that the instrument was reliable (Cronbach's alpha = 0.88). Physiotherapists' feedback and analysis of the results led to improvement of the instrument by removing ambiguity and standardizing terminology. Finally, consultation with two expert researchers in the field of neuro-rehabilitation was used to improve face and content validity.

3.5.4: PROCEDURE

The survey was administered to all registered physiotherapists in County Referral Hospitals. The questionnaires were interviewee administered. The physiotherapists' in charge supervised the surveys and liaised with the researcher in order to address any questions that would have arisen. Data was captured using double entry to ensure consistency and accuracy. This was analyzed descriptively (Paulsen, Overgaard, & Lauritsen, 2012).

3.5.5: RESULT

3.5.5.1: Description Of The Study Sample

A total of 126 questionnaires were distributed among physiotherapists in 17 County Referral Hospitals in Kenya. Some 112 physiotherapists participated in the study, giving a response of 88.8%. Of this total 51.8% were male and 48.2% were female. Their years of practice ranged from 2 years to 40 years with median of 13, mean of 15.86 and standard deviation of 10.96.

3.5.5.2: Professional Qualification

Professional qualifications included diploma, Bachelor's degree, Master's degree and Doctor of Philosophy. The majority of the participants have diplomas (77.7%) while few (0.9%) had PhD's. The levels of qualification of participants are summarized in Figure 3.15.

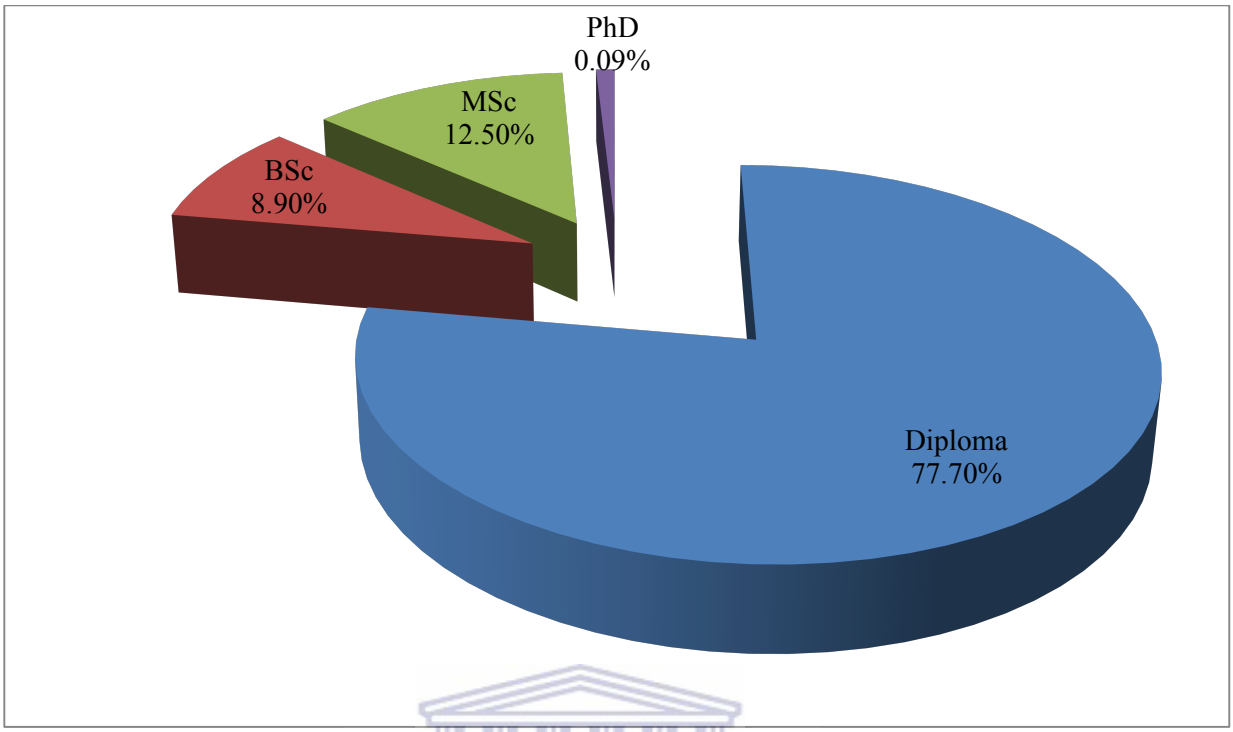

Figure 3.15: Highest professional qualification (n=112)

3.5.5.3: Settings For Stroke Rehabilitation

Five rehabilitation settings were identified, with Out Patient Clinics most utilized (85.6%) and nursing homes least utilised (26.1%). This is illustrated in figure 3.16.

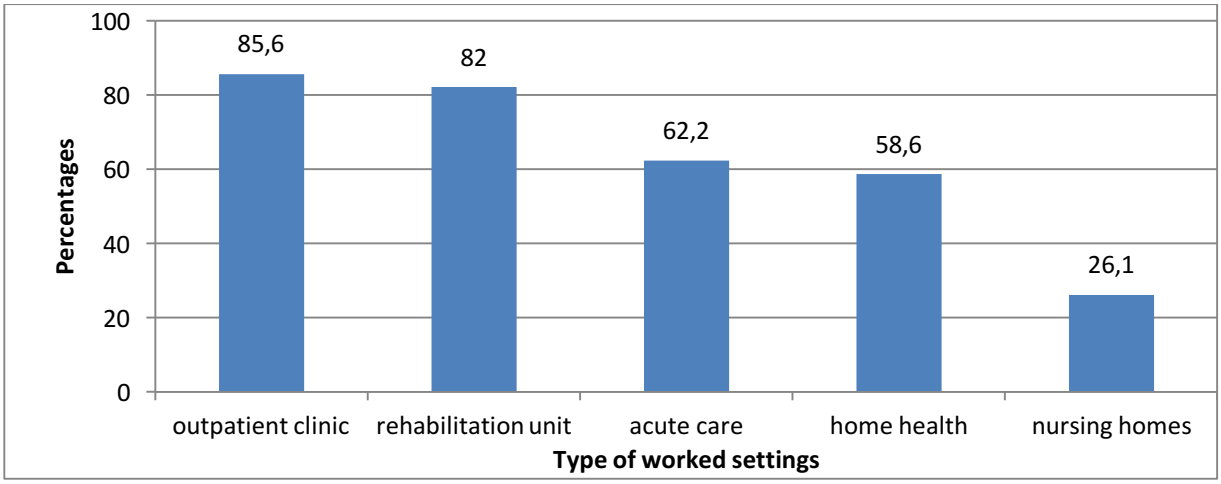

Figure 3.16: Types of settings for rehabilitation (n=349)

3.5.5.4: Access/Referral

The respondents were questioned about the source of the patients who attended for stroke rehabilitation. The majority of the patients (89.3%) came from clinics, while others (45.5%) were self-referrals from homes. (see table 3.11)

Table 3.11: Source of Stroke Patients (n= 346)

	Frequency	%
Clinics	100	89.3%
Wards	98	87.5%
Other Hospitals	97	86.6%
Homes	51	45.5%

3.5.5.5: Multidisciplinary Team Members

The questionnaire was devised to determine the involvement of healthcare providers in stroke rehabilitation. As shown in Figure 3.17, there was 94.6% involvement of the physiotherapists and 19.6% involvement of speech therapists (19.6%).

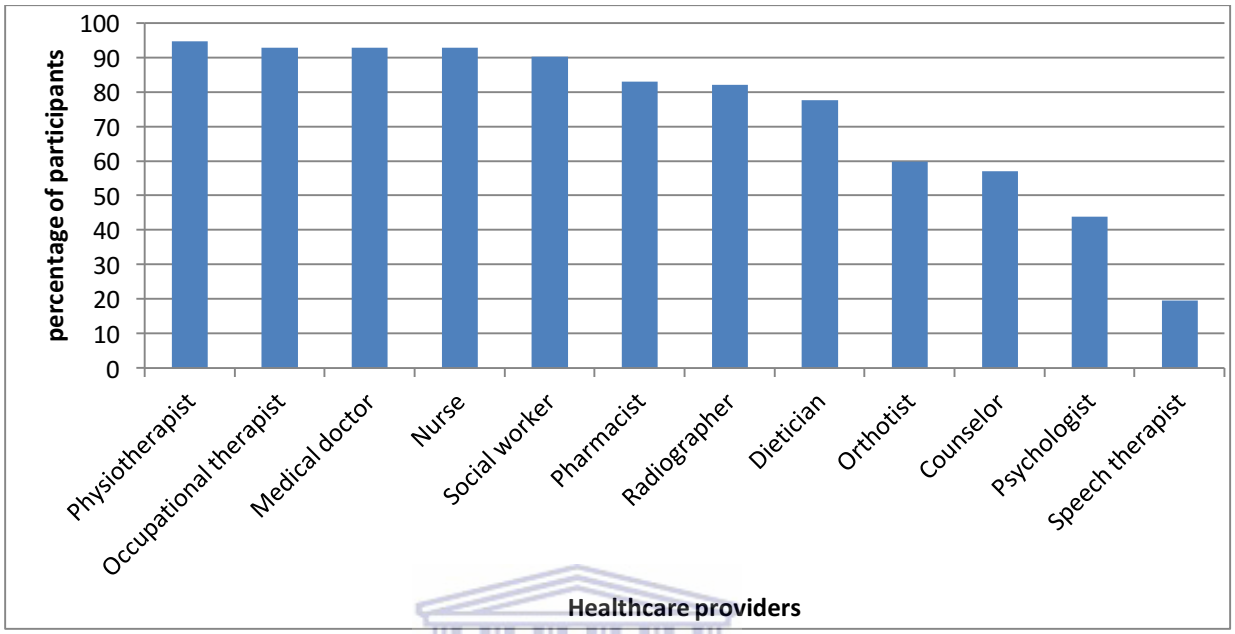

Figure 3.17: Healthcare providers

3.5.5.6: Assessment

(a) Outcome measure used for assessment

The majority) of the participants (75.2%) used the outcome measure tool for assessment, while 24.8% did not use the outcome measure tool for assessment. Furthermore, the study found the various outcome measure tools used by the physiotherapists for assessment of stroke patients (51.2%) utilizes Ashworth Modified Scale, while a mere (1.2%) employs goniometry (see Figure 3.18).

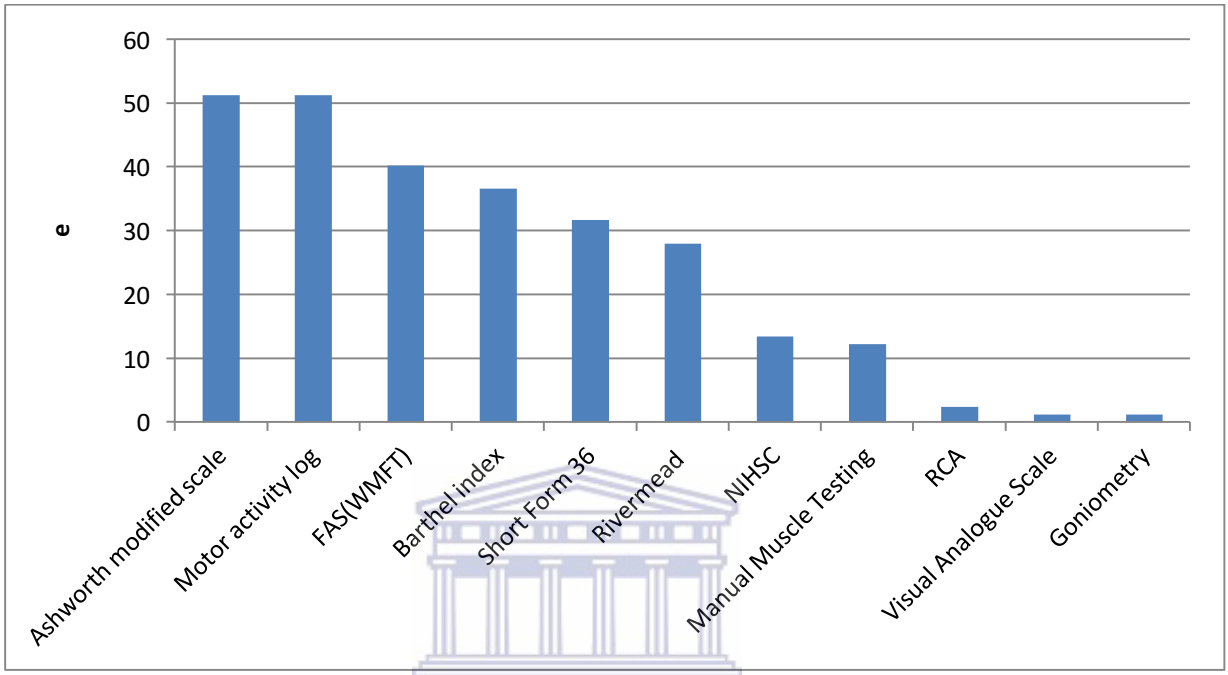

Figure 3.18: Outcome measure tools (n = 296)

(b) Assessment of Impairment, activity limitation and participation restriction

Assessment of the impacts of stroke was done in the context of ICF. Data shows that 99.1% of the physiotherapists assess stroke patients on Muscle power, while 55.4% assess on neglect (see Figure 3.19).

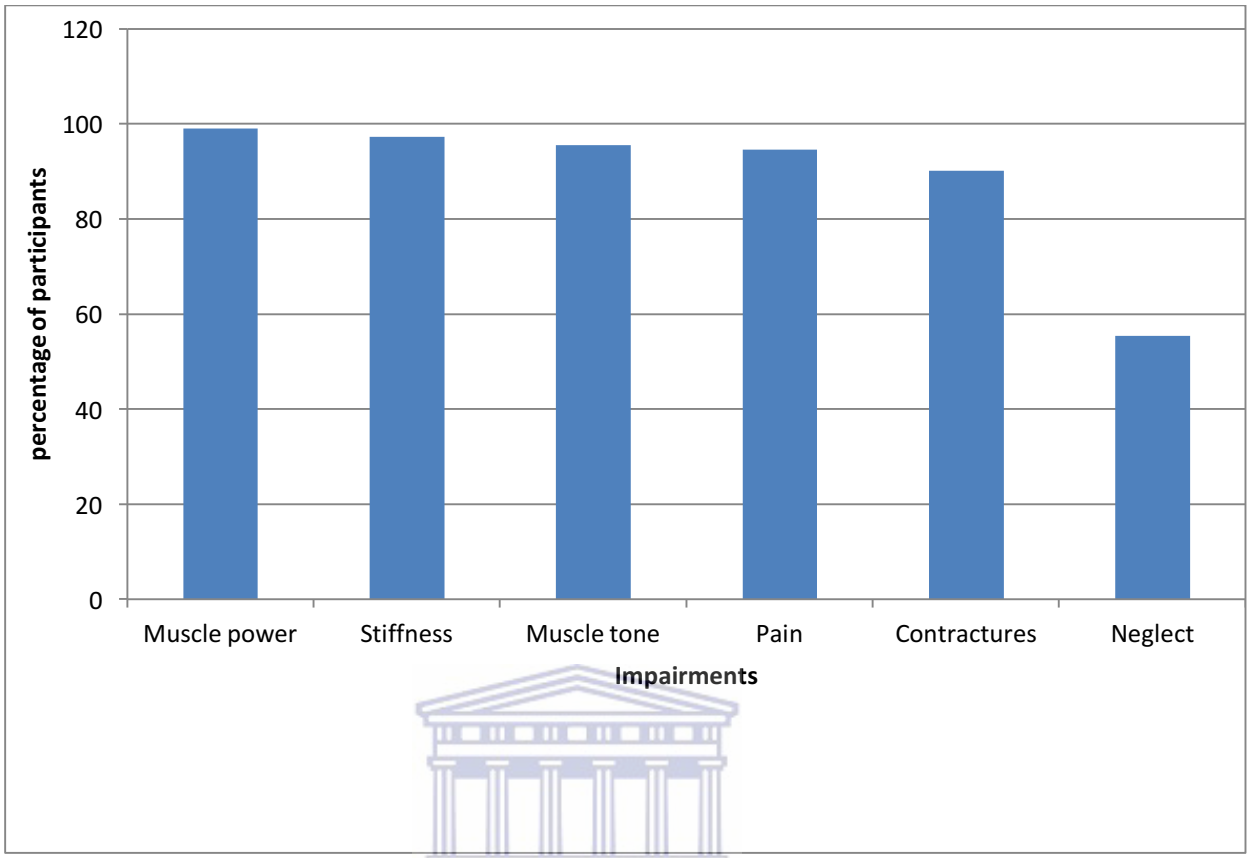

Figure 3.19: Impairment Assessment (n =112)

Similarly, participants were requested to indicate the types of activity limitation and participation they evaluate on stroke patients before treatment. Data confirmed that 97.3% assessed activities of daily living and independent activities of daily living, while 49.5% assessed issues related to problem solving as shown in Table 3.12 and Figure 3.20 respectively.

Table 3.12: Activity Limitation Assessment (n = 505)

	Frequency	%
Posture	106	94.6 %
Communication	98	87.5%
Cognitive function	86	76.8%
Motor function	106	94.6%
ADL/AIDL	109	97.3%

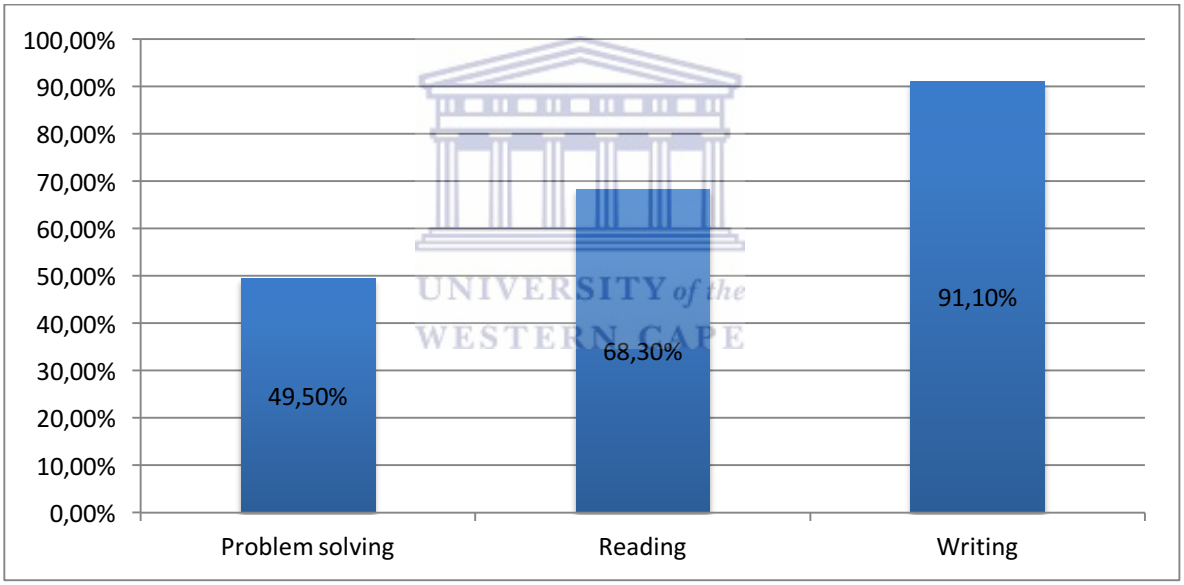

Figure 3.20: Participation restriction assessment (n=211)

(c) Referral to other health care provider

Approximately (97.3%) of the physiotherapists referred patients, while (2.7%) of the physiotherapists did not refer patients. The main rationale for referral was cited as the need to get ambulatory aids, appliances, for blood pressure review, nutritional advice and counselling. Furthermore the study sought to understand the range of healthcare providers that stroke patients are referred to.

The majority of the participants (87.2%) referred stroke patients to the medical doctor, while just under a third (31.2%) referred stroke patients to the psychologist.

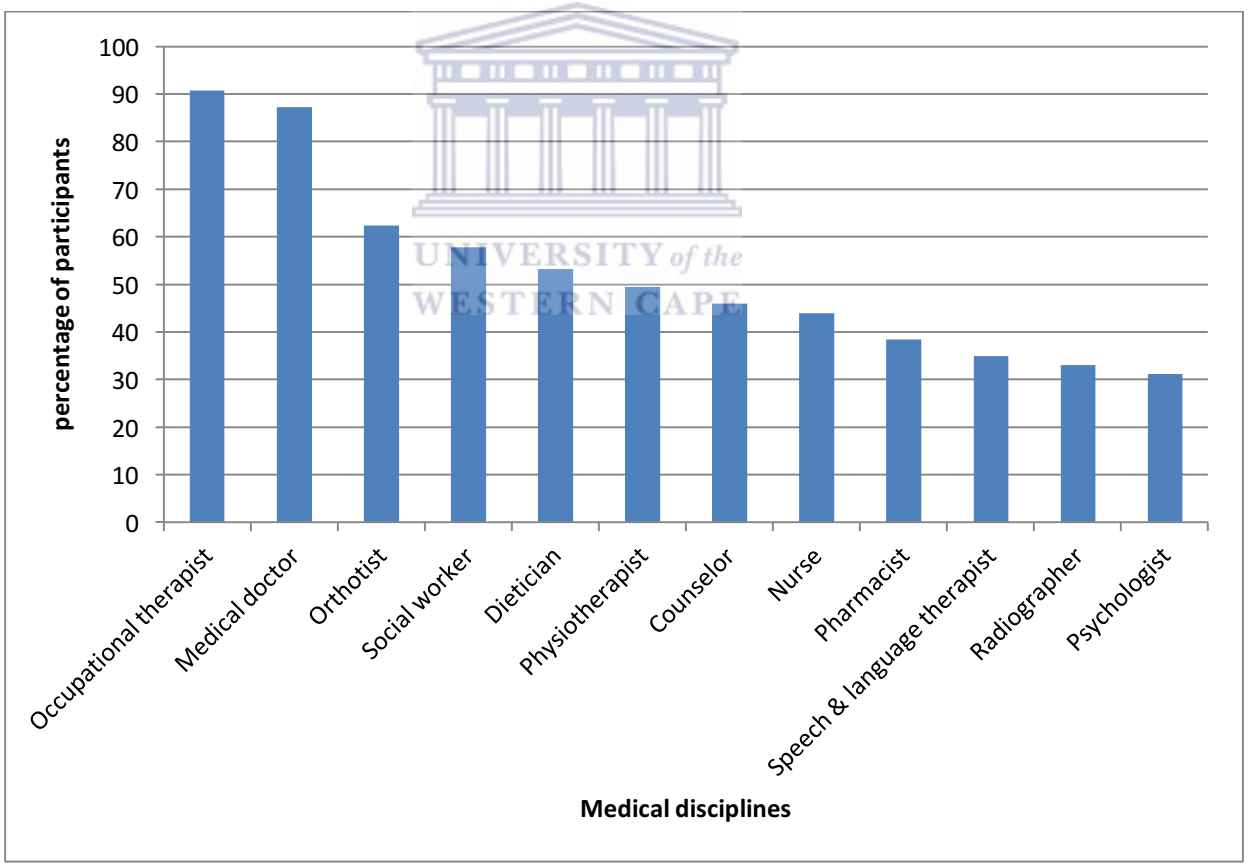

Figure 3.21: Referral Discipline Frequencies (N = 109)

3.5.5.5. PHYSIOTHERAPY MANAGEMNT

Methods for stroke rehabilitation

Seventy-six point four (76.4%) of the respondents used specific methods/models for stroke rehabilitation, while 23.2% of the participants did not use any method/model for stroke rehabilitation. A large number of participants (91.8%) used passive/active exercises, while a roughly a quarter (25.9%) use constrained induced movement therapy (Figure 3.22).

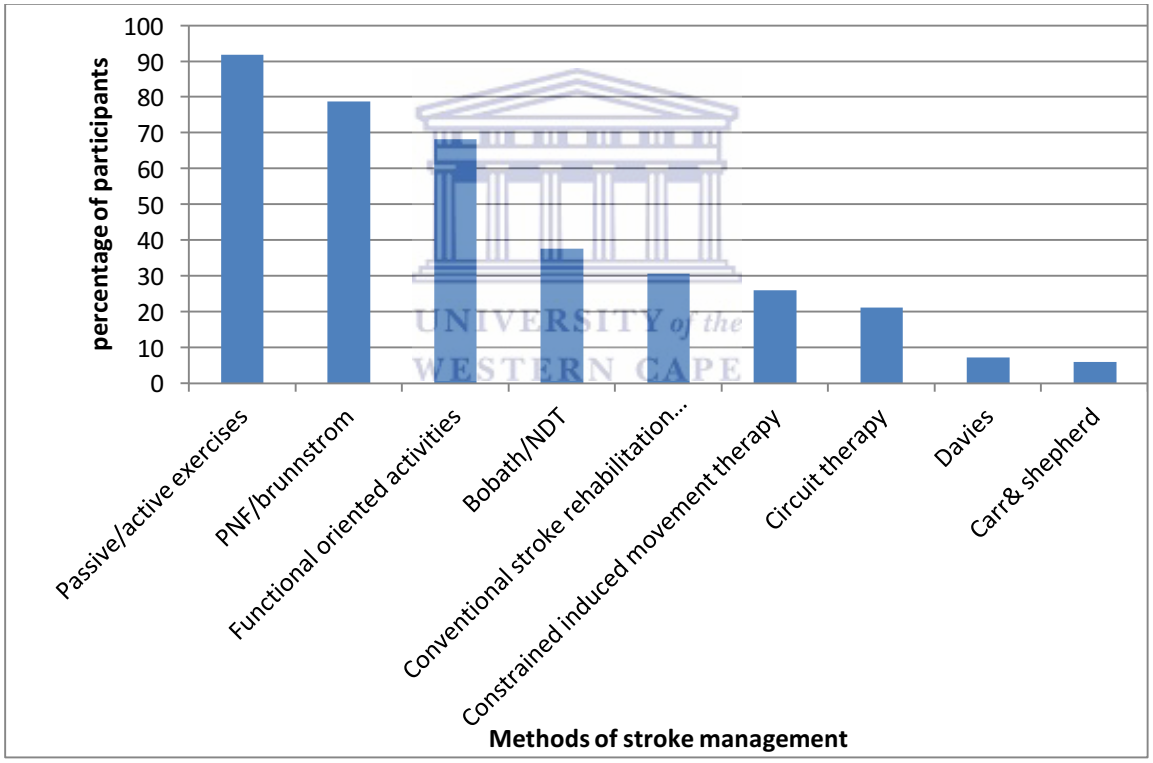

Figure 3.22: Methods used for stroke management

Start of rehabilitation

A total of 85.7% of physiotherapists reported starting physiotherapy management the same day, if the patient was stable, while 14.3% started physiotherapy at one week (See Figure 3.23).

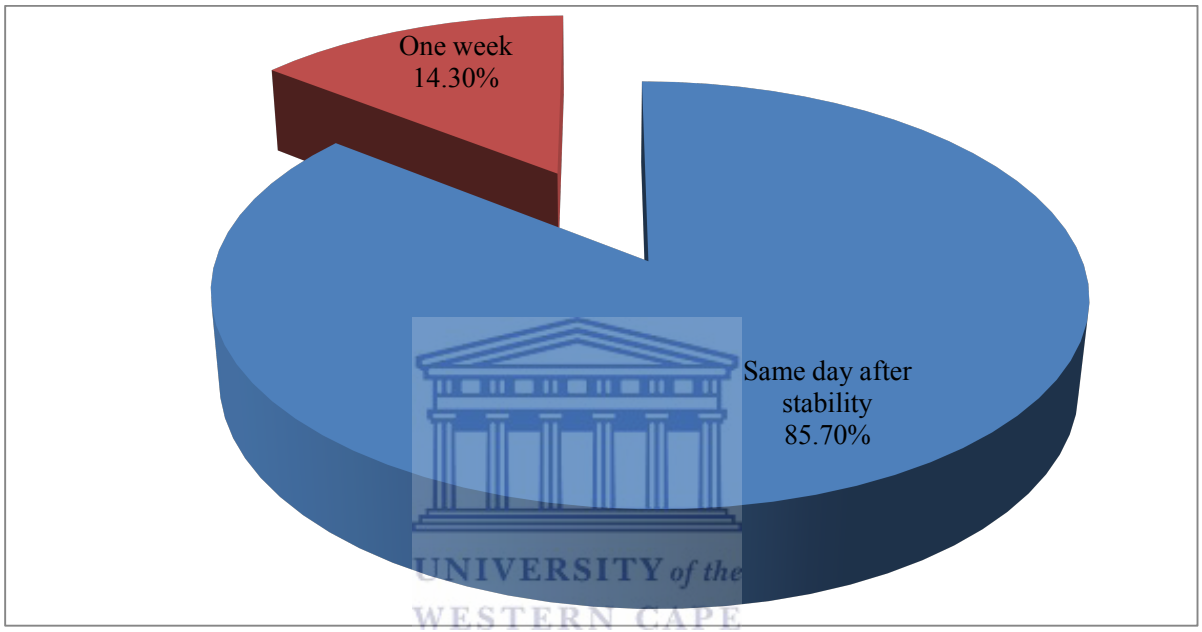

Figure 3.23: Start of rehabilitation (n = 112)

Management of post stroke Impairment

As shown in Figure 3.24, 97.3% of the physiotherapists manage motor impairment, while 23.2% manage emotional/behavior.

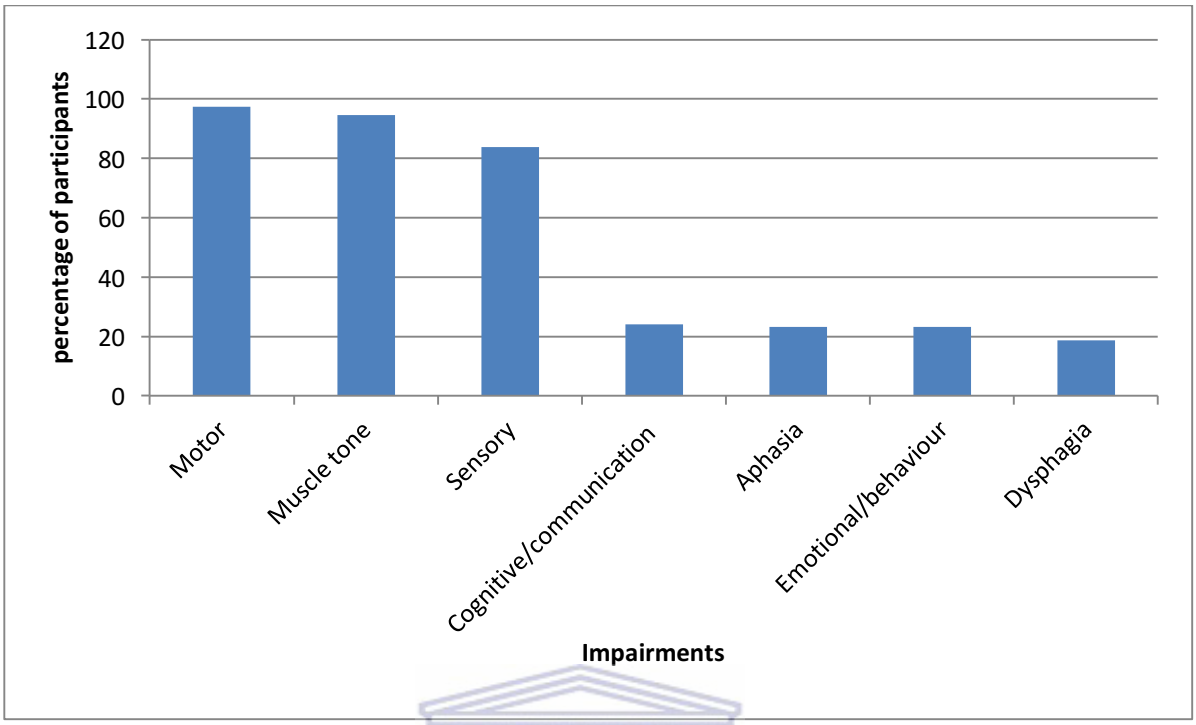

Figure 3.24: Impairment (n = 112)

(b) Management of activity limitation and the support system

In terms of physiotherapy intervention in activity limitation and the support system, 98.2% of the physiotherapists manage mobility while 27% of the physiotherapists manage sexuality (see Table 3.13). Additionally 98.2% of the physiotherapists are involved in initiating a rehabilitation program to the family and the caregiver of a stroke survivor, while 38.2% were involved with the community rehabilitation as illustrated in Figure 3.25.

Table 3.13: Activity Limitation (n = 111)

	Frequency	%
Sexuality	30	27%
ADL/IADL	107	96.4%
Mobility	109	98.2%
Endurance	90	81.1%

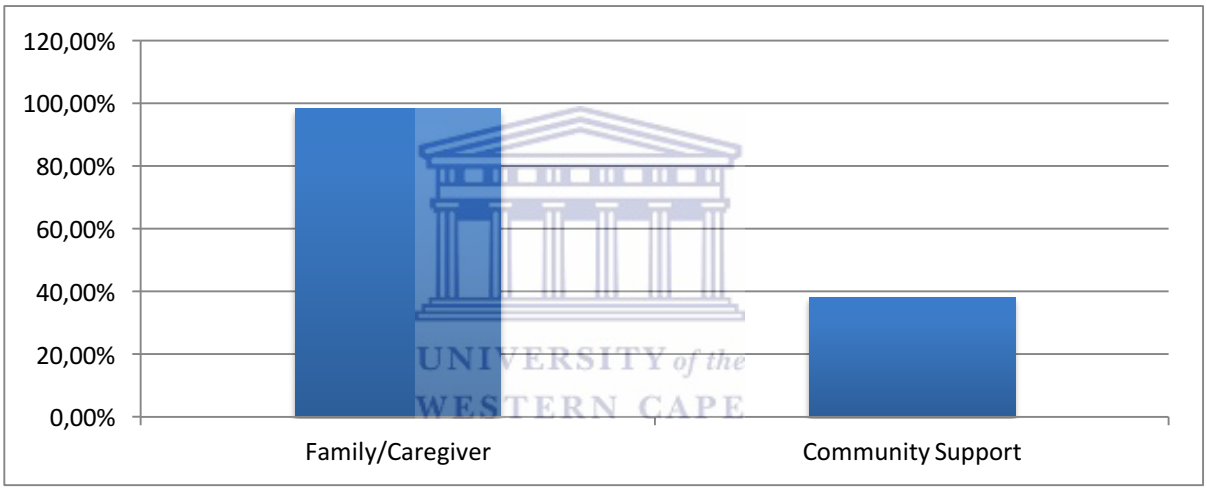

Figure 3.25: Support Systems **(n= 110)**

(b)Frequency

During in-patient rehabilitation 98.2% of physiotherapists have five sessions with the patients while only 5% have one session in a week (see Table 3.14).

Table 3.14: In-patient Treatment sessions in a week

	Frequency	%
1	6	5.4%
2	11	15.3%
3	17	30.6%
4	5	34.2%
>5	71	98.2%

The study sorts the frequency of physiotherapy treatment in out-patients. A total of 47.3% of the physiotherapists have three sessions with the patients in a week, while just 0.9% of the physiotherapists treat patient four times in a week (See Table 3.15).

Table 3.15: Number of physiotherapy sessions in a week (n=110)

	Frequency	%
1	18	16.4%
2	21	19.1%
3	52	47.3%
4	1	0.9%
>5	18	16.4%

(c) Intensity/progression

A total of 78% of physiotherapists increase intensity with improvement, while 4% of the physiotherapists do not alter the intensity (see Figure 3.26).

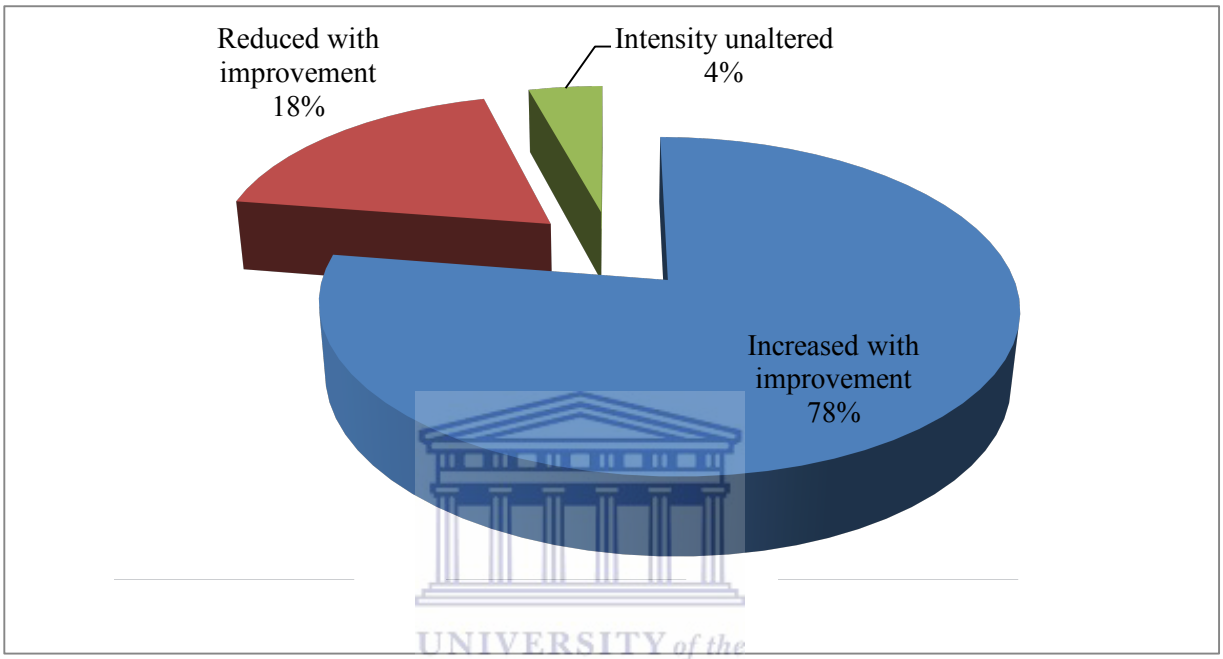

Figure 3.26: Intensity of physiotherapy treatment (n= 111)

(d) Reassessment

A total of 81.3% of physiotherapists reported reassessing their patients every week, while 0.9% of physiotherapist reported reassessing their patients every two weeks. Figure 3.27 summarizes the re-assessment time.

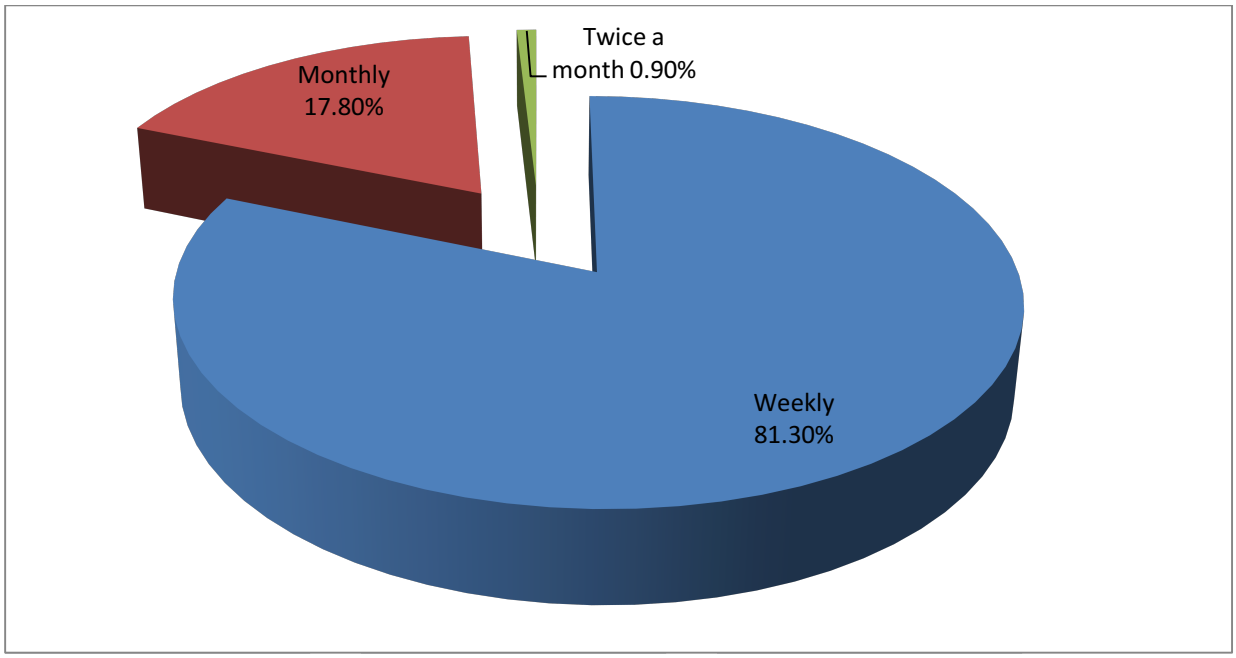

Figure 3.27:Re-assessment

Additionally, stroke patients are referred to various settings to continue with rehabilitation. A total of 85.8% referred patients to Hospital/Centre based facilities, while 3.8% referred patients to home-based care as illustrated in Figure 3.28.

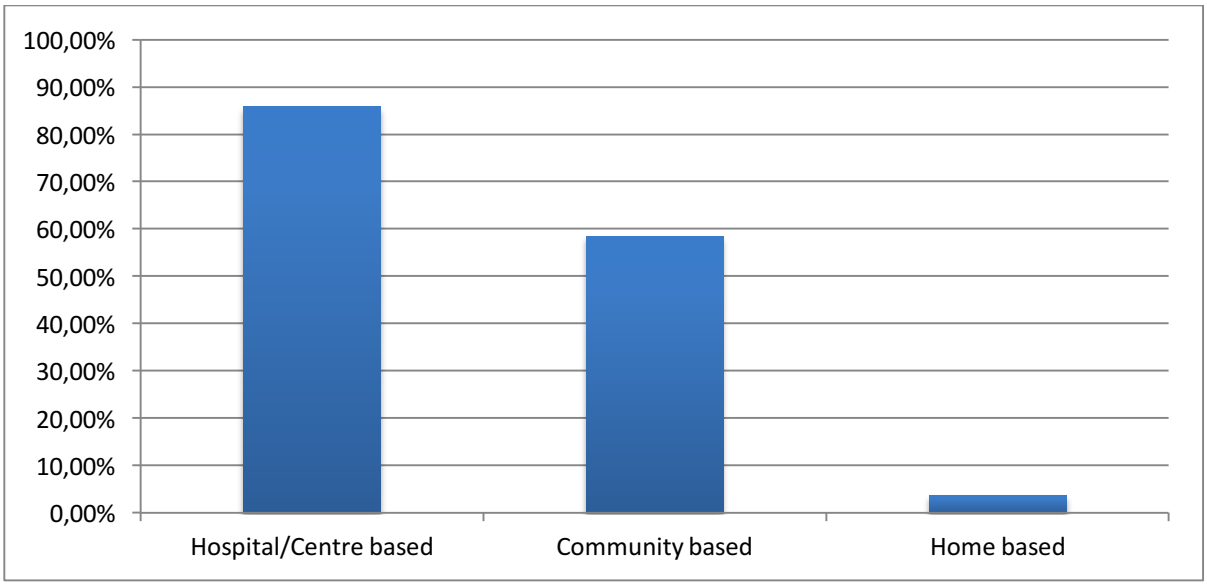

Figure 3.28: Referral settings (n=106)

3.5.5.6. Content Of Management

The majority (93.7%) of the physiotherapy treatments involved normalizing tone, while just under two thirds (61.3%) provided the orthotics. Figure 3.29 summarizes the content of physiotherapy management.

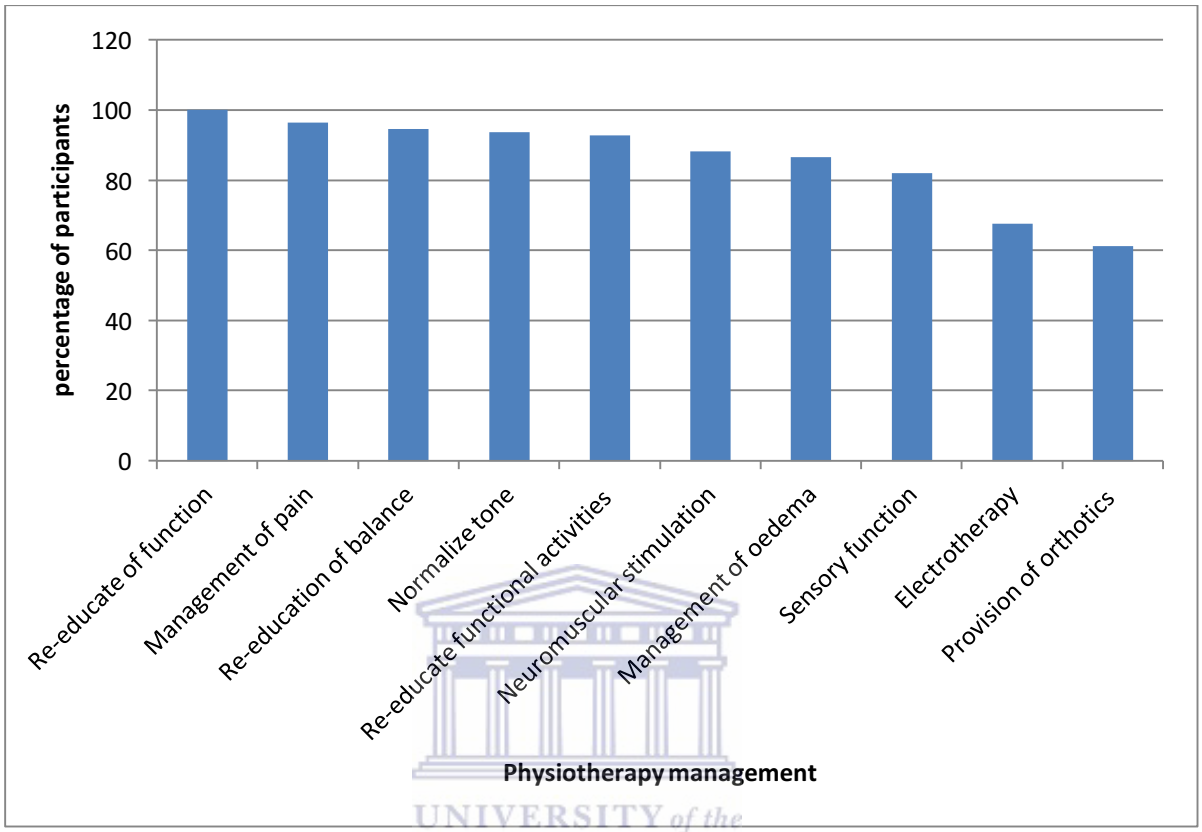

Figure 3.29: Content of management

3.5.5.7. Complications of Stroke

The common complication secondary to stroke includes contractures (98.2%) and reflex sympathetic dystrophy (42.9%). (See figure 3.30)

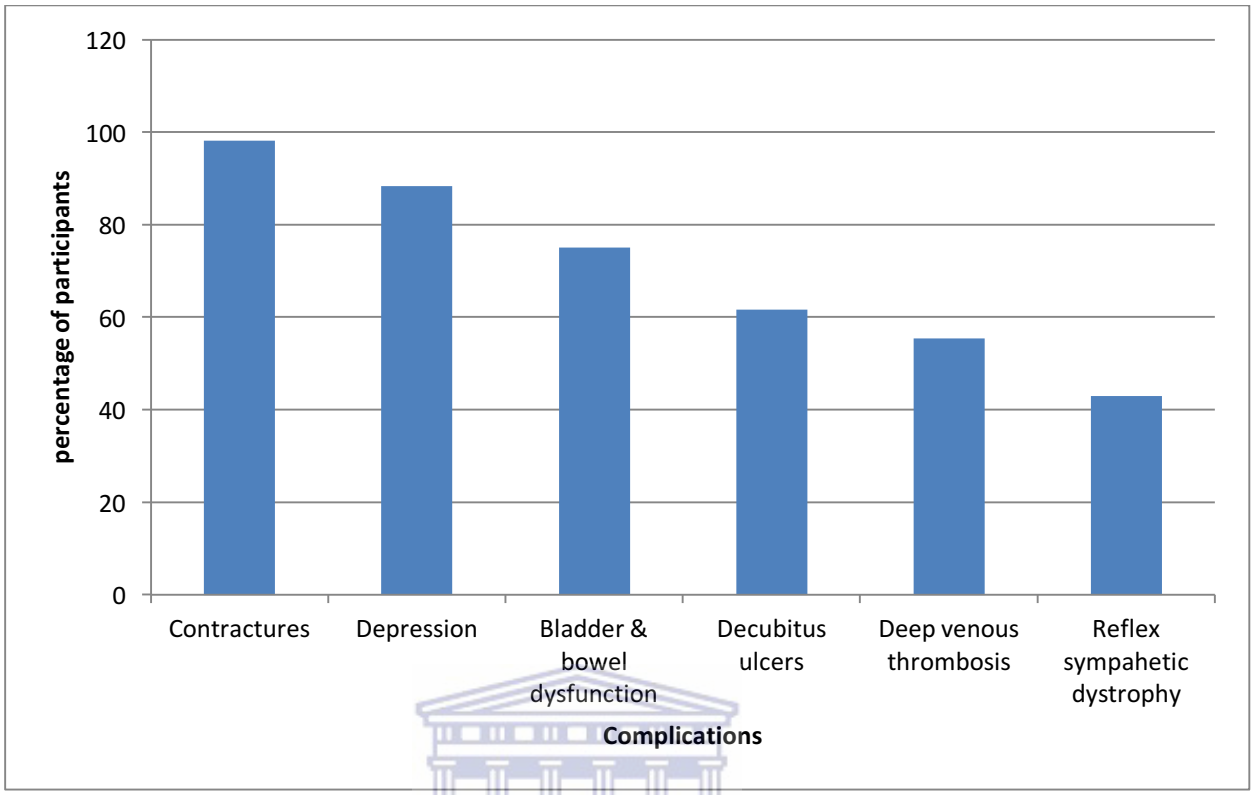

Figure 3.30: Complications of stroke (n = 112)

3.6: DISCUSSION

3.6.1. SOCIAL DEMOGRAPHIC DATA OF STROKE PATIENTS IN KENYA

In the current study, the average age of the sample was 61.7 years which is slightly reduced compared to bulk of literature These results are consistent with a study by Jowi and Mativo (2008) in Nairobi, Kenya which reported a mean age of stroke occurrence as 61 years. Similarly, the results compares well with average age of stroke patients in China, shown to be 64 years by Li et al., (2008). In Korea the average age is 64 years, according to Kim, Ahn, Kim, & Hong, (2011) and in the Arab Gulf countries 58.9 years, as shown by Deleu, et al., (2011). Furthermore, in India this is shown to be 68.6 years by

Sridharan, et al., (2009) and the figure for Indian Americans in New York, is shown to be 71 years by Biswas, Sen, & Simmons, (2009). A study by Desalu et al. (2011) reported the average age of stroke patients in Nigeria to be 68 years (-+12). In a similar study in Bosnia, Saric, Buric, Vasilj and Simovic (2011) reported an average age of stroke patients to be as 73 years. A study by Kissela, et al. (2012) found trends toward increasing stroke incidence at younger ages. This is of great public health significance because strokes in younger patients carry the potential for greater lifetime burden of disability. Adults who survive a stroke at a younger age have an alarmingly shortened life expectancy rate compared to the general population. A new study suggests that people who experience a stroke before they reach the age of 50 are more likely to pass away 20 years sooner than non-stroke adults (American Heart Association, 2011a). In Kenya, the reduced age of stroke patients is likely to negatively affect productivity.

The reduction in average age for stroke patient may be as a result of many factors. For instance, patients in remotes parts of Kenya suffer due to insufficient primary care needed to control risk factors such as hypertension, inadequate use of anti-platelet treatment in patients at risk for stroke and inadequate emergency care systems. Likewise there is low public awareness regarding issues related to stroke. there is also poor preventive strategies, which includes lack of control of risk factors, and medical care when stroke events do occur.

In the current study there were more male stroke patients (63.5%) than female stroke patients (36.5 %), which are replicated in volumes of literature. A study by Appeglos et al. (2009) reported that men had a 33% higher incidence of stroke compared to women.

In another study Spengos and Vemmos (2010) found a ratio of 3:1 male to female from Athens Stroke Registry. In a previous study Li et al. (2008) studied 1913 consecutive hospital admission and reported more males (57%) than females (43%) in the sample. The difference could be attributed to reported gender difference in risk profiles between males and females. Males, in literature, are associated with smoking, heavy alcohol intake and higher risk of peripheral vascular diseases (Goto, Baba, Ito, Maekawa, & Koshiji, 2007).

3.6.2. REHABILITATION SETTINGS

Hospital/Centre based rehabilitation

The current study reviewed files of stroke patients who had been admitted to the wards, as well as stroke patients who were receiving physiotherapy as out-patients. Pertinently, the study established the various settings of stroke rehabilitation by physiotherapists.

All stroke patients who were admitted received rehabilitation during their stay in the hospital. Correspondingly, the patients were referred to various settings to continue during following discharge with continuation of rehabilitation. Approximately 86.6% of the patients were referred to hospital/center-based settings to continue with physiotherapy. Likewise, 85.8% of the physiotherapist's reported to having referred stoke patients to hospital/center based settings. The results of the current study echo the study conducted by Lee, Huber, & Starson (1996). In that study the authors reported that 73% of the older American stroke survivors receive institutional rehabilitation care. In a similar study Lee, Chang, Chen, & Wei (2010) recounted that 34% of stroke patients had been admitted to an in-patient rehabilitation institution to continue with therapy.

However, the current study revealed a disturbing finding, showing that of the 150 files reviewed, only 18.7% files were from out-patient physiotherapy. The percentage of patients who used this setting to continue with physiotherapy is noticeably low. A study conducted by the Centre for Disease Control and Prevention (2007), found that 30.7% of the stroke survivors in 21 districts in the US received care in out-patient settings. In Kenya, on the other hand, most outpatient physiotherapy services are available in urban centres, whereas rural facilities offer the same services, but cover a very big catchment area. Therefore, patients have to travel long distance. These services are also not affordable to many Kenyans. The extra cost and effort of transporting the patient to an out-patient clinic may play a role in the decrease of utilization of outpatient rehabilitation, as a result, many post stroke patients may not receive adequate rehabilitation hence disability.

Home Rehabilitation

Home-based care was not a preferred choice for many. Only 3.8% of the physiotherapists referred patients to home rehabilitation. The main reason for this is financial; as many people are unable to afford the cost of home therapy. This finding stresses the issue of affordability of the services. It further supports the findings of O'Mahony, Rodgers, Thomson, Dobson and James, (1997). The second reason of not using home-based rehabilitation could have been the severity of stroke. The families of stroke survivors might probably have considered poor prognosis and decided the potential outcome was not worth the strain.

However, Duncan et al. (1998) emphasizes that home rehabilitation improves lower extremity functions, which affects mobility and consequently improves participation. Home-based rehabilitation is composed of family surroundings, home environment, efforts of caregivers and extensive care that can contribute to better stroke outcome, especially when the family members are empowered and the home environment is adapted.

Community-based rehabilitation

In this section community-based rehabilitation (CBR) is presented as a strategy within general community for rehabilitation and social inclusion of people with disabilities and their families. In Kenya community-based rehabilitation is implemented through the combined efforts of the Association of Physically Disabled of Kenya (APDK) (an NGO); people with disabilities themselves; their families and community, as well as the appropriate health, education, vocational, and social services. Data indicates that CBR was prescribed to 13.4% of the stroke patients during discharge, while 58.5% of the physiotherapists reported referring stroke patients for CBR. Community-based rehabilitation was accessible in areas that had APDK clinics. This result affirms Evans, Zinkin, Harpham and Chaudury (2001), who state that community-based rehabilitation (CBR) is the prime means by which disabled people in most countries of the world have access to rehabilitation or disability services.

Community-based rehabilitation (CBR) is strategy within community development for rehabilitation, equalization of opportunities, and social inclusion for people with disabilities. CBR is implemented through the combined efforts of people with disabilities themselves, their families and communities, and appropriate health, education, vocation and social services (Kuipers & Allen, 2004).

The basic concept of CBR is decentralising responsibility and resources, both human and financial, to community level. CBR models are based on a collaborative relationship between the Allied Health Professional, Community Based Workers and the broader community (Zinkin, Harpham & Chaudury, 2001).

While traditional rehabilitation frameworks tend to be based on a medical model CBR is built on a social, community focused, frameworks. This community orientation is designed to address barriers that affect a person's ability to engage in activities and participate in the community, and build the capacity of remote and rural communities. Availability of Community-based rehabilitation (CBR) provides a platform to the families members of people with stroke to take the primary responsibility for rehabilitation (Kuipers & Allen, 2004).

3.6.3. INTERDISCIPLINARY TEAM

The principal aspect of rehabilitation is the provision of a coordinated management by a specialized, interdisciplinary team of health professionals (American Clinical Practice Guideline, 2010; Duncan, et al., 2005). Table 3.14 shows the results of members of the interdisciplinary team and their roles.

3.6.4. FAMILY INVOLVEMENT IN STROKE REHABILITATION

Data indicates family involvement (95.2%) in the rehabilitation process. Family members are motivated, available and an inexpensive source of rehabilitation. They provide services to the patient especially in cases where the cost of physiotherapy services is overwhelming. Therefore, rehabilitation is more available at home than in a health facility An added bonus with home rehabilitation is that it reduces the need for transporting the patient to a rehabilitation centre.

This affirmative effect of family involvement on stroke supports the finding of Holmqvist, Von Koch and De Pedro Cuesta (2000). Furthermore Holmqvist et al. (1998) asserts that when education about stroke is offered to the spouses, it plays a major role in functional achievement and equals the accomplishment of other stroke patients admitted in affluent in-patient rehabilitation facilities. The outcomes of the study likewise sustain the findings of Tsouna-Hadjis, Vemmos, Zakopoulos and Stamatelopoulos (2000) who highlight the effect of social and family support in the process of recovery of stroke.

The authors maintain that there is improved functional status, less depression and better social status of the stroke patient at six months after stroke as equated to patients without good social and family support. The findings of the current study are also consistent with the findings of Glass et al. (1993) who concluded that the involvement of strong family social support had significantly better functional activities as measured by the Barthel Index, compared to stroke patients with the same severity, but with less social support.

On the contrary, Karla et al. (2004) found that family carer training was associated with less carer anxiety and stroke burden did not influence the stroke patients ability as measured by the Barthel index at one year after stroke.

3.6.5. ASSESSMENT

Outcome Measure Tool Use

Data indicates that the physiotherapist used outcome measure tools for assessment. These results concur with the American Clinical Practice Guideline (2010) which recommends the use of well-validated, standardized instruments in assessing stroke patients. The guidelines further emphasize that the instruments ensure consistent documentation of the patient's neurological condition, levels of disability, functional independence, family support, quality of life and progress over time (Agency for Health Care Policy and Research (AHCPR), 1995). Use of outcome measure for assessment by the physiotherapist provides a clear starting point to guide treatment, and serves as a reference point for re-evaluation.

Assessment of Impairments

Stroke causes varying degrees of complications in body structure and function, noted as impairment (Salter, Foley, Jutai, & Teasell, 2007). The most common impairments following a stroke include impaired muscle tone, poor coordination, imbalance, poor sensation, impaired cognition and poor communication (Lawrence et al., 2001).

Kelly-Hayes et al. (1998) points out the importance of assessment. The authors recommend assessment of motor impairment in the arm, leg, face, speech, muscle

strength and tone, reflexes, balance, gait, coordination, apraxia and deep and superficial sensation. In the current study around 84% of stroke patients were assessed for impairments. Likewise 87.5% of the physiotherapists reported the same assessment before commencement of rehabilitation programme. These results sustained the findings of Jorgensen et al. (2000) who found that 46% of stroke patients present with neurological impairments and must be assessed. In addition the American Clinical Practice Guideline (2010) recommends that stroke patients should be assessed for motor, sensory, cognitive, communication and swallowing insufficiencies by properly trained clinicians. Likewise, Uchino, Billheimer and Cramer (2001), in a systematic review, reported a baseline NIHSS for neurological impairments

Activity Limitation

A pattern of impairments may lead to decrease and sometimes loss of patient's ability to perform activities required in daily living (McKevitt et al., 2011; Miller et al., 2010). Pan, Lien and Chen (2010) suggest the assessment of activity limitation via the use of Barthel index. In the current study data confirms that 94.6 % of the physiotherapists were involved in assessment of posture, 76.8% in assessment of cognitive function, 94.6% in assessment of motor function and 97.3% in activities of daily living and independent activities of daily living. The results support the findings of Kelly-Hayes et al. (1998) who emphasized the importance of assessing and recording instrumental activities of daily living that extend functional activities beyond basic activities.

Participation

Kelly-Hayes et al. (1998) cited the American Heart Association classification of stroke outcome and reported on outcomes that fit into participation of stroke patient. The authors describe them as religious responsibilities, employment, leisure time and recreational activities. In the current study participants did assess reading (68.3%), writing (91.1%) and problem solving (49.5%). Miller, et al. (2010) affirms the importance of assessment of these domains as an underpinning for management. The writers state that participation restriction can lead to social isolation and prevention of individual's involvement in many domains of life, which has the potential to preclude the patient from regaining or starting a societal life.

3.6.6. PHYSIOTHERAPY REHABILITATION OF STROKE PATIENT

Rehabilitation is a proactive, person-centered and goal-oriented process that begins the first day after stroke. The aim is to improve function and/or prevent deterioration of function, as well as bringing about the highest possible level of independence physically, psychologically, socially and financially (Duncan, et al., 2005). Rehabilitation is concerned not only with physical recovery, but also with reintegration of the person into the community. Furthermore, rehabilitation is a process that aims to maximize self-determination and optimize choices for those with stroke.

In light of this, physiotherapists address recovery of sensorimotor functions in upper and lower limb, functional mobility ranging from bed transfers to community ambulation, treatment of musculoskeletal complications (e.g. shoulder pain) and respiratory problems.

Data indicates that there was management of muscle tone (98.7%), emotional/behavior (1.3%), cognitive/communication deficit (9.3%), motor impairments (100.0%) and sensory impairments (90.7%). Additionally, 98% of patients were managed for activities of daily living and independent activities of daily living, 99.3% for mobility and 85.8% for cardiovascular and muscle endurance.

These result are in tandem with the findings of Putaman et al. (2010), wherein the authors suggest that mobilization exercises, selective movement, balance exercises in lying, sitting, standing, sensory training, transfers, personal activities of ADL, domestic ADL, leisure and work activities, and miscellaneous techniques are among the 12 domains that physiotherapists use during stroke rehabilitation. These findings are further sustained by Duncan et al. (2005) and French et al. (2007), who maintain that rehabilitation should encompass services and programs that aim to decrease impairment while heightening recovery and adaptation to residue disabilities.

START OF REHABILITATION

Majority of the physiotherapists (85.7%) reported starting physiotherapy management the same day, if the patient was stable, while 14.3% started physiotherapy at one week. These results mirror results from previous studies by Bernhardt, Chitravas, Meslo, Thrift and Indredavik (2008), Gagnon, Nadeau and Tam (2006), Langhorne and Holmqvist (2007) and Sorbelloet al. (2009). In all these studies the authors recommend that stroke patients should be mobilized as early as possible, once medical stability is reached. The authors further affirm that the rehabilitation of stroke patients should start preferably within the first 24 hours of stroke symptoms onset, unless contraindicated.

Neurological recovery is greatest early in the post-stroke period. When patients delay in starting stroke rehabilitation, they loss the most valuable time for improving functional outcomes.

FREQUENCY, DURATION AND INTENSITY OF THERAPY

During in-patient rehabilitation 98.2% of the patients received more than five sessions in a week, while 30.6% received three sessions in a week. In out-patient physiotherapy, 47.3% of the patients had three sessions of physiotherapy per week, while 16.4% had one session per a week. In addition, the duration of treatment session was reported to be approximately one hour.

The results of this study shows that patients admitted to the wards received more physiotherapy sessions in a week than patients being rehabilitated as out-patients. Most of the participants in this study were socio-economically deprived, therefore the extra cost of transporting the patient may play a role in the decrease of utilization of out-patient rehabilitation services.

Similarly, the average length of physiotherapy sessions in Kenya was in contrast with the average length of such sessions in Europe (De Wit et al., 2006). The average length of physiotherapy sessions in Europe ranged from 33 min to 46 minutes with a mean session time of 41.7 minutes (De Wit et al., 2006). However, the results are consistent with Warner and Kessler (1996).

A decrease in the frequency of physiotherapy sessions will ultimately decrease the intensity of physiotherapy and has a risk of affecting the outcome, as alluded to by Teasell, Foley, Salter, Bhogal, Jutai and Speechley (2009). The authors found that the intensity of physiotherapy on the functional outcome was signified by an improvement of stroke patient's gait. This finding was e supported by Kwakkel et al. (2004); Bode, and Heinemann, Semik and Mallinson (2004). Sorbelloet al. (2009) and Bernhardt et al. (2008) also stresses that stroke patients must be mobilized as frequently as possible.

3.7. SUMMARY

Chapter Three mapped the stroke rehabilitation journey in Kenya. There are sufficient statistical indicators to show that the physiotherapists in Kenya are involved in assessment of stroke patients prior to commencement of treatment. However, data indicates that the use of the recommended outcome measures for assessment was not familiar to many therapists. Impairment, activity limitation and participation restriction were among the items considered during the assessment and management. Additionally, data brought forth the aspect of timing; duration; frequency and intensity in rehabilitation. The involvement of the family/carer in stroke rehabilitation also came out strongly for continuity of therapy after discharge.

Contents of physiotherapy included re-education of function; management; re-education of balance; normalization of tone; re-education of functional activities; sensory function management; and provision of Orthosis.

CHAPTER FOUR:

EVIDENCE SOURCING AND SYNTHESIS: SYSTEMATIC REVIEW

4.0: BACKGROUND AND LITERATURE

For this part of the study, a systematic review was done. A systematic review is a high level overview of primary evaluation on a specific research question that seeks to separate; select; integrate and appraise all high quality research evidence relevant to the question in order to answer it (Cochrane Collaboration, 2013).

Systematic review provides experts with pre-filtered evidence, which saves time and minimizes the necessity for expertise appraisal (Schlosser, 2007). This is an suitable methodology for the present research question as it provides a systematic summation of CPGs recording on content and methodological rigor. A systematic review enables the researchers to assemble and amalgamate recommendations from all appropriate CPGs meeting the inclusion criteria, while reducing the effect of bias, in an effort to effectively answer the proposed research question. The aim of the systematic review was to identify CPGs for stroke rehabilitation.

The development and employment of CPGs is an emergent concept in the healthcare sector. When bearing in mind the development of a CPG for stroke rehabilitation in the Kenyan context, it was essential to consider whether such a guideline already exists; whether existing guidelines are of superior quality and whether such guidelines characterizes the holistic rehabilitation of stroke. Knowledge about the presence and quality of CPGs for stroke rehabilitation would advise the choice between adoption,

adaptation, contextualization or *de novo* development of a CPG(s) (see Chapter One).

A systematic review of existing CPGs was hence steered to tackle this knowledge gap and the study objectives. The recommendations from CPGs were systematically extracted and assembled. Before the start of the review, a systematic review procedure was drawn up in order to lead the process (see Chapter Two Part Two).

PICO is a standardized format for creating clinical questions to guarantee formation of searchable and answerable questions (Kitchenham 2004). The CPGs were chosen according to population, intervention, comparison and outcome (PICO), to improve the significance of the studies included. The population was the stroke patients, the intervention was rehabilitation, comparison was 'no rehabilitation' and the outcome was related to improved functional activities and quality of life.

While few CPGs were identified within the review period, the results suggested that the recommendations from the available evidenced base CPGs had the potential to rehabilitate stroke patients in Kenya. However, it is imperative to note that those CPGs were formulated in developed countries and do not reflect developing world healthcare systems. This infers that stroke rehabilitation in Kenya should be devised within the framework of a resource scarce setting and be cognizant of the unique challenges faced in a third world country.

Chapter Four involves the course of extracting, evaluating and synthesizing evidence-based recommendations from existing high-quality CPGs. The shaping of recommendations by assemblage, evaluating and reconciliation of similar recommendations is likewise explained. Furthermore, the standards used to methodically

analyze and merge the recommendations whilst keeping their supporting evidence are shown.

This adoption and alteration of the recommendations is a core procedure in CPG contextualization. As part of the contextualization, particular attention is paid to phrasing integrated recommendations. Gagliardi, Brouwers, Palda, Lemieux-Charles and Grimshaw (2009) and Woolf et al. (2012) maintain that the content, format and wording of guideline recommendations can have an influence on the acceptance of a CPG in clinical practice. If a recommendation is worded properly, the end-users of the recommendation should be able to appreciate the principle idea and the strength of the body of evidence supporting the recommendation.

The end product of Phase Two of this dissertation was a core set of prudently worded evidence-based recommendations for stroke rehabilitation. Figure 4.1 show different chappter of the thesis and the process undertaken as a part of evidence sourcing and synthesis

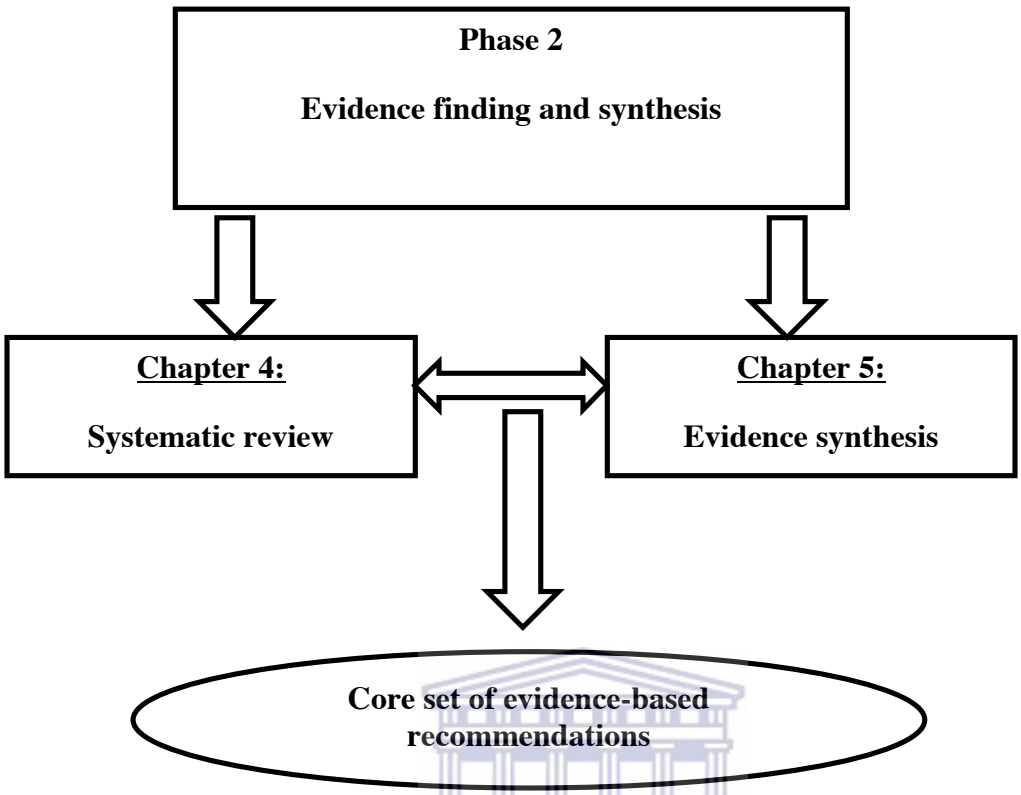

Figure 4.1: Evidence sourcing and synthesis

4.1. AIM

The aim of this systematic review was to methodically identify and appraise the available evidence-based clinical practice guidelines for stroke rehabilitation.

4.2. OBJECTIVES

i. Identify clinical guidelines for stroke rehabilitation

ii. Analytically evaluate the quality of the incorporated CPGs using the AGREE II tool.

iii. Summarize the recommendations of the CPGs.

4.3. METHODS

4.3.1. STUDY DESIGN

Systematic review was conducted to identify, evaluate and interpret current available guidelines relevant to the research question, using a review protocol (Appendix 11) (Green et al., 2008).

4.3.2. SEARCH STRATEGY

The search strategy included search terms and resources (Jesson & Lacey, 2006). The key words included 'stroke', 'clinical guideline', 'physiotherapy', 'rehabilitation', 'management' 'transient ischemic attack' and 'cardiovascular accident'. Resources included published and unpublished documents (Da Silveira, Borenstein & Fogliatto, 2001). Electronic databases of the following guideline clearinghouses were sought: the US National Guideline Clearinghouse (US NGC); the Agency for Healthcare Research and Quality (AHRQ); the Guidelines International Network (G-I-N); the Scottish Intercollegiate Guidelines (SIGN); New Zealand Guidelines Group (NZGG), National Health and Research Medical Council (NHRMC), the United Kingdom's National Institute for Health and Clinical Excellence (NICE); the WHO guidelines; the TRIP database; the National Institutes of Health (NIH); the Monash University Centre for Clinical Effectiveness; Australia's National Health, Guidelines Infobase and the Institute for Clinical Systems Improvement (ICSI). In addition, the following online databases were searched to include those guidelines that were peer- reviewed and published in journals: Allied Health Literature (CINAHL), PEDro; PubMed, EBSCO host, Science Direct, Medical Literature on Line (MEDLINE), Google scholar, Master File Premier,

Psychology Information (PsycINFO), Health Source-Consumer Edition, Embase, ERIC, and ASSIA.

The initial search was conducted from May 2015 - February 2016 and the search was updated in August 2016. The inclusion and exclusion measures were applied by screening the identified CPG titles and objectives to select the eligible CPGs. Data was extracted in the PICO format. The co-authors and a neurologist, on a unsystematic review basis, verified the process. A documentation of search yields and decision-making was kept. A soft copy of the qualifying guidelines and results of the methodological quality assessment were preserved in a lock and key cupboard as well as a soft copy in a computer for which only the principal researcher had the password.

4.3.3. STUDY CRITERIA

The study criteria were prepared using the Population, Intervention, Comparison, and Outcomes (PICO) format for guideline reviews (Green et al., 2008). The types of guidelines eligible were CPGs available in full text, published in English between 1995 and 2016.The cut-off date was set to guarantee up-to-date CPGs. The focus population and disease characteristic for the review-included adult post stroke survivors, with no other medical complications.

Interventions should include physiotherapy rehabilitation as part of stroke management. CPGs pursuing any healthcare professionals involved in stroke management were eligible for inclusion.

4.3.4. CRITICAL APPRAISAL

Quality assessment form

The researcher formulated a quality assessment form based on the AGREE II tool domains and items, (Appendix 12).

Quality assessment form pilot study

A pilot study for quality assessment form was conducted using the South African clinical practice guideline for low back pain. The purpose of a pilot study was to check competence of research instruments and to evaluate the feasibility of the full study (Van Teijlingen, Rennie, Hundley, & Graham, 2001). The pilot study was done in order to establish whether the tool covered all the pertinent information. Changes were made on the quality assessment form. These included additions of a column for the total score after every item, removal of the column beneath every item and inclusion of enough space in every item to provide the reviewers with enough space to respond.

Quality assessment

The methodological quality of qualified CPGs was independently evaluated by three reviewers, using the AGREE II tool (Brouwers et al., 2010). The AGREE II is a universally developed, extensively established, valid, reliable, easy to use and transparent instrument used to assess the described methodological rigor of the CPG (Brouwers et al., 2010). The reliability is 0.79 while validity correlation is 0.69 (Brouwers et al., 2010). It comprises of 23 key quality items categorized in six domains, scored on a 7-point Likert scale.

AGREE II assesses the procedure of CPG development and the quality of writing. However, it does not assess the content of the CPG, or the superiority of evidence accompanying the recommendations. Each AGREE II domain emphases on a distinct aspect of guideline quality, namely scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability and editorial independence. High AGREE II scores imply the procedure of CPG development and the quality of reporting, hence high superior recommendation and the vice versa.

The reviewers' AGREE II scores were captured. A quality score was computed for every of the six AGREE II domains using the guiding principles and method stipulated in the user manual. Total item scores in a domain were summed up and the total was harmonized as a percentage of the maximum likely score for that domain (Kredo et al. 2012).

Maximum possible score = 7 (strongly agree) x No. of items x No. of appraisers.

Minimum possible score = 1 (strongly disagree) x No. of items x No. of appraisers.

Therefore the percentage scaled domain score would be:

$$\frac{\text{Obtained score} - \text{Minimum possible score}}{\text{Maximum possible score} - \text{Minimum possible score}} \times 100$$

Methodological scores for clinical guidelines in %.

4.4. RESULTS

Search results

Eighteen CPGs were extracted. Following the inclusion/exclusion criteria, eight CPGs were incorporated. Figure 4.2 illustrates the process of clinical guidelines extraction.

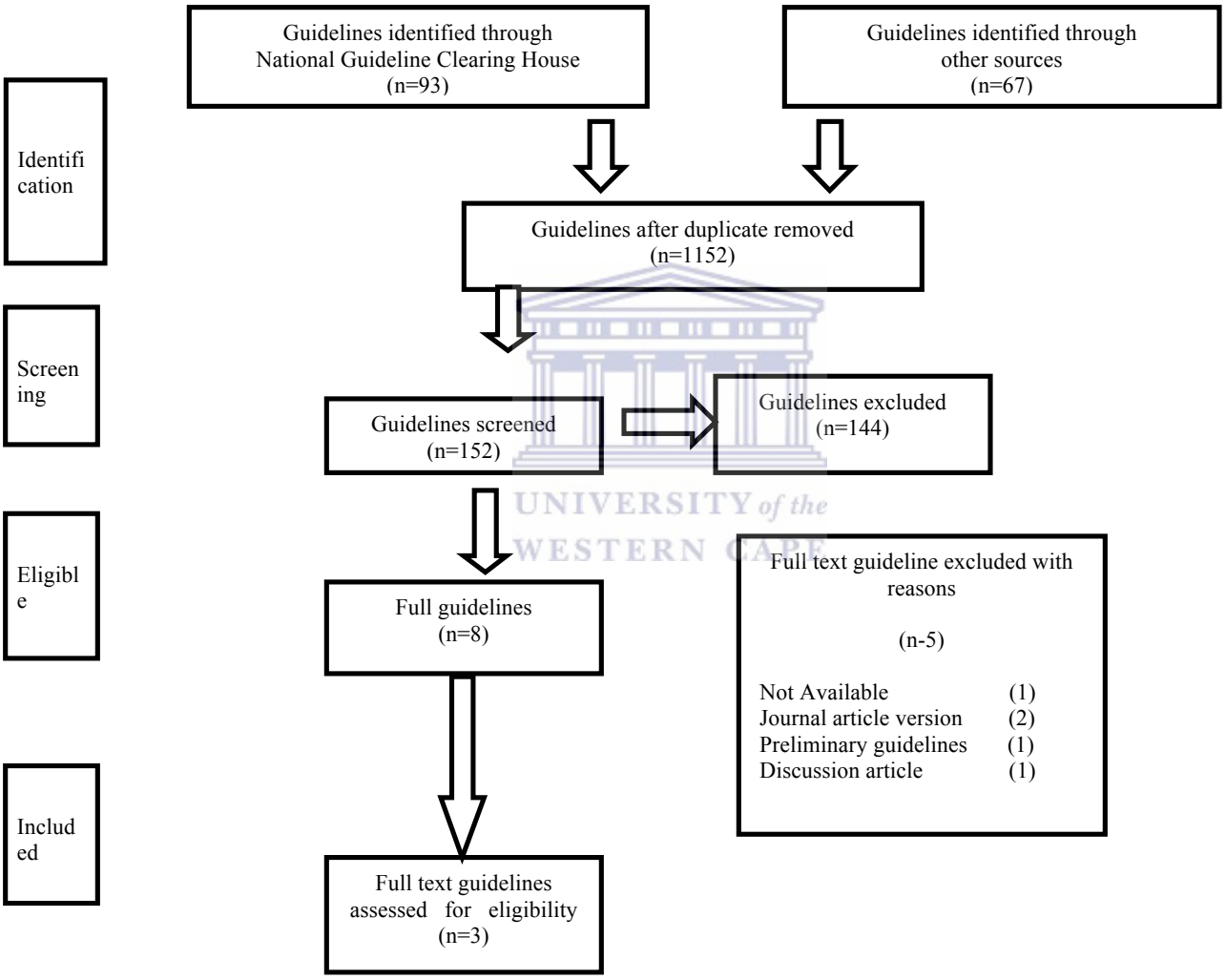

Figure 4.2. Summary of the retrieved CPGs

Included clinical practice guidelines

Eight (8) clinical guidelines for stroke management qualified for inclusion. These guidelines included:

1. The Canadian Stroke Network and Heart and Stroke Foundation of Canada 2010. Canadian Stroke Strategy: Canadian best practice recommendations for stroke care (update 2). URL: http://www.hsf.sk.ca/siss/documents/2010_BP_ENG.pdf [CSS]
2. The National Stroke Foundation. Clinical Guidelines for Stroke Management 2010. Melbourne Australia. URL: www.strokefoundation.com.au/clinical-guidelines [NSF].
3. SIGN 2011. Management of patients with stroke: identification and management of dysphagia. Edinburgh: Scottish Intercollegiate Guidelines Network (SIGN publication Number. 119).
   URL:http://www.sign.ac.uk/guidelines/fulltext/119/index.html [SIGN 2011].
4. USVA/Dod. 2010 Management of stroke rehabilitation. Department of Veterans Affairs / Department of Defense and the American Heart Association/ American Stroke Association. URL: http://www.healthquality.va.gov/stroke/stroke_full_221.pdf [USVA/Dod].
5. The Stroke Society of the Philippines 2010. Guidelines for the prevention, treatment and rehabilitation of stroke. 5th Edition: Golden Pages Publishing. [SSP].
6. The Royal Dutch Society for Physical Therapy. KNGF Guideline. Stroke 2014.

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Netherlands. :www.kngf.nl www.fysionet.nl info@kngf.nl.

7. Stroke Foundation of New Zealand and New Zealand Guidelines Group. Clinical Guidelines for Stroke Management 2010. Wellington: Stroke Foundation of New Zealand; 2010.
8. National Institute for Health and Care Excellence. Stroke Rehabilitation; Long term rehabilitation after stroke. Clinical guideline 2013.

Methodological quality

The AGREE II domain scores are specified in Table 4.1. The domains with the highest score were Domain 2 (stakeholder involvement) and Domain 3 (rigour of development), while the lowest scores were shown for Domain 5 (applicability) and Domain 6 (editorial independence). The AGREE II tool was found to be very meticulous. Therefore, all the qualified guidelines scored less than 50% in the applicability domain.

On consensus with the supervisors, it was agreed that the research would utilize the International Centre for Allied Health Evidence (iCAHE). International Centre for Allied Health Evidence is a tool assessing the quality of clinical guideline . iCAHE Three guidelines qualified for data extraction. Table 4.1 shows the AGREE II scores.

Table 4.1: AGREE II Domain scores

Clinical guidelines:	Domain 1	Domain 2	Domain 3	Domain 4	Domain 5	Domain 6	Total score
1 KNGF Guideline for stroke (Dutch)(2014).	75.9	66.7	54.8	85.2	0	59.5	57.1
2. Clinical guideline for stroke management (2010).	94.4	73.6	78.1	88.6	32.3	22.9	65.0
3. Canadian stroke strategy (Canada)(2010).	70.4	79.9	41.0	94.4	0	86.1	62.0
4. New Zealand clinical guideline for stroke management, (2010).	96.3	81.5	52.4	100	50	50	71.7
5. The National Institute for Health and Care Excellence, (2013).	85.2	27.8	64.9	88.9	0	22.2	48.2
6. Strike rehabilitation guidelines (Philippines).	80.6	90.3	46.9	100	26.0	0	57.3
7. National clinical guideline for stroke (UK) (2012).	81.5	59.3	68.5	100	2.8	47.6	60.0
8. American Clinical Practice Guideline, (2010).	95.8	94.4	69.8	90.3	0	70.8	70.1

Guideline content analysis

The recommendations found in the quality CPGs were gotten for additional use to warrant reliability of recommendations. The AGREE II tool (Brouwers et al., 2010) does not provide cut-off scores to distinguish between high-quality and poor-quality guidelines. They suggest that the choice of poor and high-quality guidelines should be made by the user and take the context into account. The score cut off was adopted from the clinical guidelines for the management of low back pain in South Africa (shown in Tables 4.2).

Table 4.2 Cut-off scores for inclusion of a guideline using the AGREE II tool

Domain	**Cut off point**
Scope and purpose	70%
Rigours of development	70%
Stakeholders involvement	50%
Clarity of presentation	50%
Applicability	50%
Editorial independence	50%

Three guidelines qualified for inclusion, from which data was extracted. The three guidelines are presented in Table 4.3. Further analysis of each question within the AGREE II domain of the qualified guidelines is represented in Table 4.4.

Table 4.3. Qualified CPGs

CPG Number	Title of the Guideline	Organization/ Authors	Country of Origin	Guideline Currency	
				Date of Revision	Publication Date
CPG 1	USVA/Dod Management of stroke rehabilitation. Department of Veterans Affairs / Department of Defense and the American Heart.	Department of Veterans Affairs Department of Defense and the American Heart Association.	America	2015	2010
CPG 2	Royal Dutch Society for Physical Therapy. KNGF Guidelines.	The Royal Dutch Society for Physical Therapy.	Netherlands	2018	2014
CPG 3	Clinical Guidelines for Stroke Management.	The Stroke Foundation of New Zealand.	New Zealand	2015	2010

Table 4.4: All AGREE II Domain scores

	CPG 1	CPG 2	CPG 3	Total	%
	DOMAIN 1: SCOPE AND PURPOSE				
The overall objective	18	21	21	60	95%
The health question	21	15	21	57	90%
The population	21	16	18	55	87%
	DOMAIN 2: STAKEHOLDERS INVOLVEMENT				
Guideline development group	15	21	16	52	83%
Views and preference of target population	2	0	21	23	37%
Target user clearly defined	21	21	21		100%
	DOMAIN 3: RIGOR OF DEVELOPMENT				
Systematic method	21	18	21	60	95%
Criteria for evidence selection	18	18	18	54	86%
Strength and limitation of evidence	18	12	16	46	73%
Method for formulating recommendation	18	15	21	54	86%
Health benefits, side effects and risk, considered n formulating recommendation	0	0	3	3	5%
Explicit link btw evidence and recommendation	21	18	21	60	95%
Externally reviewed prior to publication	15	12	3	30	48%
Procedure for update	15	18	17	50	79%
	DOMAIN 4: CLARITY OF PRESENTATION				
Unambiguity of recommendations	21	18	21	60	95%
Different options for management	21	21	21	63	100%
Key recommendation easily identifiable	18	18	21	57	94%
	APPLICABILITY				
Facilitators and barriers described	0	0	3	3	5%
Tools on how recommendation can be put into practice	0	0	18	18	29%
Resource implications for applying guidelines	0	0	18	18	29%
Monitoring or audit criteria provided	0	0	18	18	29%
	EDITORIAL INDEPENDENCE				
Views of funding body addressed	0	16	21	37	59%
Competing interest of guideline developer	21	21	3	45	71%

Recommendations were extracted from CPGs 1, 2 and 3. Recommendations were categorized into related health topics informed by the patient rehabilitation journey from the Kenyan context. Table 4.5 offers an outline of the recommendations that were made per health topic and shows which CPG the recommendation originated from.

Table 4.5: Summary of recommendations extracted from high quality CPGs

RECOMMENDATION TOPIC	**Total Recommendatio**	**TOTAL% Recommendatio**	**CPG1 (KNGF**	**CPG2 (NZCG**	**CPG3 (DOD**
Assessment and outcome measures	8	4%	7		1
Timing, duration and intensity	9	4.5%	3	5	1
In-patient rehabilitation	23	11.5%		1	22
Discharge Plan	21	10.5%		2	19
Out-patient	15	7.5%	4		11
Family/care	12	6%	2	7	3
Reassessment	3	1.5%		2	1
Content of physiotherapy					
Walking therapy	19	9.5%	8	7	4
Upper extremity therapy	26	13%	10	11	5
Shoulder pain	4	2%		4	
Spasticity	7	3.5%		3	4
Contractures	4	2%		4	
Strength	7	3.5%	4	2	1
Shoulder subluxation	4	2%	1	3	
Cardiovascular fitness	4	2%	2	2	
Range of motion	2	1%	1		1
Balance & posture	3	1.5%	2		1
Swelling of the	7	3.5%		2	5
Orthosis	9	4.5%	3	1	5
Activities of daily living	13	6.5%	6	4	3
TOTAL	200	100%	53	60	87

4.5. DISCUSSION

The results of this review shows that, due to the presence of high-quality CPGs on stroke rehabilitation, prevailing CPGs can be adapted, adopted and contextualized to local contexts, instead of the de novo development of CPGs, especially in resource scarce environments. In this way, resources may be used to promote the uptake of CPG recommendations with a rigorous execution plan and sustainability plan, instead of resources being spent on de novo CPG development (Gonzalez-Suarez et al., 2012). The included CPGs originate from Western countries with strong healthcare systems. The envisioned setting for the CPG is a resource scarce environments. CPGs developed from strong healthcare settings should be contextualized for use in resource scarce environments with different societal, political, environmental and economic backgrounds (Gonzalez-Suarez et al., 2012;. Therefore, the process of CPG contextualization was preferred and started.

One strategy to improve stroke rehabilitation in Kenya is through the development of a CPG, which is context-specific. As part of the research project, the framework of an evidence-based CPG, which takes into consideration local, social, healthcare organisational and system factors, was developed. Lau et al. (2016) contend that context-specific interventions will maximise the uptake of CPGs and will facilitate the implementation and outcome of interventions. In this project, a novel approach to develop such a contextually relevant CPG was followed. This approach was adapted from the contextualisation approach developed by Gonzalez-Suarez et al. (2012) in the Philippines. The de novo development of CPSs is often not feasible and possible in a low- or middle-income setting; hence the need for alternative methodologies such as the

contextualisation of existing CPGs.

The approach followed in this projects, builds on the current body of knowledge about contextualisation by refining and enhancing the features of the contextualisation process. The exploratory approach in this research has enhanced the field of CPG contextualisation by proposing a feasible way to integrate evidence in to practice in resource scarce settings.

4.6. SUMMARY OF FINDINGS

This systematic review concentrated on identifying and appraising CPGs for stroke rehabilitation. The publication dates of the CPGs ranged from 1995 – 2016. The three guidelines originated from developed countries. Recommendations for stroke rehabilitation were mainly entrenched in the CPGs for stroke management. Three CPGs were rated as high-quality using the AGREE II (2013) criteria. The highest AGREE II scores were obtained for the domains of scope and purpose, stakeholder involvement, rigour of development and clarity of presentation. The lowest scores were obtained for the AGREE II domains of applicability and editorial independence.

CHAPTER FIVE

CONTEXTUALISING RECOMMENDATIONS

5.0: BACKGROUND AND LITERATURE

Contextualization of CPG involves retaining original product and using writing strategies to assist in the operationalization of the guideline recommendations in a different context (Dizon, Machingaidze & Grimmer, 2016). Contextualization takes recommendations from one or more relevant CPGs and puts them into context in another setting with no changes to recommendations, but with additional information to assist local uptake (Gonzales-Suarez et al. 2012).

In contextualization, the focus is not to update or review present CPG recommendations as is the case with adaptation. With contextualization, similar evidence-based recommendations from different high-quality CPGs are combined and they are converted into a descriptive version of the initial recommendations. Contextualizing CPGs has the advantage that it considers context-specific factors, local practice patterns and an authentic care pathway when writing the guideline recommendations. The process of contextualization of CPGs started from the understanding that guideline adaptation has been undertaken predominantly in Western countries; and no structure existed to guide the use of Western guidelines in resource-limited low and middle income countries with distinctive healthcare systems, healthcare provider relationships, education and patient needs.

The choice to adopt, adapt or contextualize CPG recommendations is subject to the local context and resources. The de novo development of CPGs is costly, laborious and skill demanding. In resource-constrained environments such as Africa, de novo CPG development may not be practicable. A viable option would be to adopt, adapt or contextualize existing CPGs for use in that context (ADAPTE II Collaboration, 2009; Gonzalez-Suarez et al., 2012). Bearing in mind the need for a CPG on stroke rehabilitation in Kenya, and the array of contextual factors that may affect optimum stroke rehabilitation in the Kenyan healthcare system. The contextualizing process was indicated in Chapter One.

5.1. AIM

The aim of this chapter is to synthesis the recommendations obtained from the high-quality CPGs identified in Chapter Four. The CPGs included USVA/Dod Management of stroke rehabilitation; The Department of Veterans Affairs / Department of Defense and the American Heart; Royal Dutch Society for Physical Therapy and KNGF Guideline and Clinical Guidelines for Stroke Management.

5.2. OBJECTIVES

i. To develop one set of evidence-based recommendations from the three guidelines that reflects the stroke-care process in Kenya.

5.3. METHODS

5.3.1. METHODOLOGY

The methodology of this chapter is an in-depth content scrutiny of recommendations that were obtained as part of the systematic review (Chapter Four). Moreover, this chapter depicts the philosophies and processes of amalgamation of CPG recommendations as a step in the CPG contextualization process.

5.3.2 MERGING RECOMMENDATION

Recommendations were merged to provide common recommendations for a particular aspect of the patient journey. (See Figure 5.1 below).

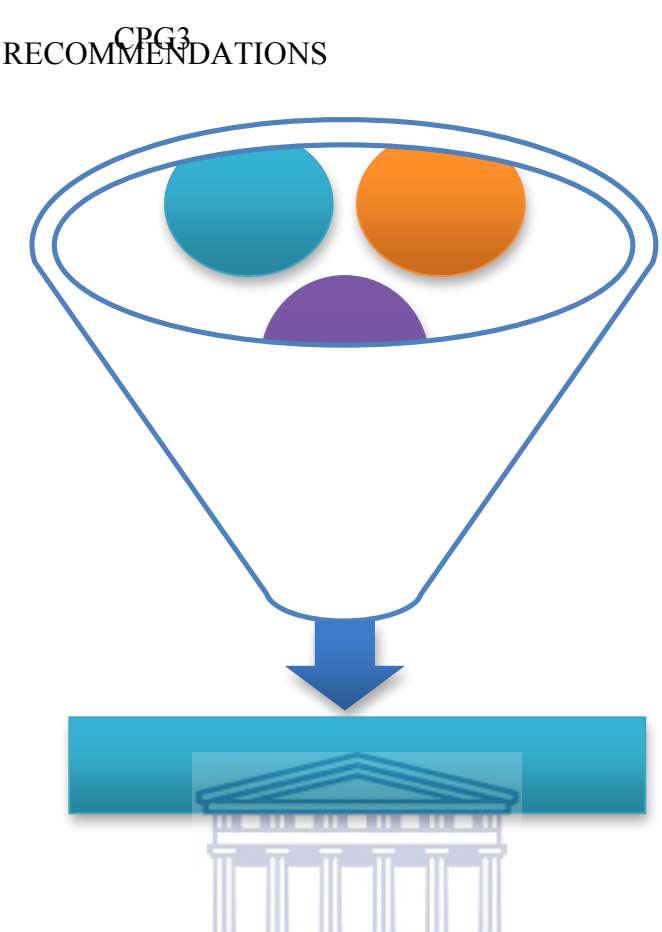

Figure 5.1: Merging recommendations.

5.3.3. RULES FOR MERGING RECOMMENDATIONS {UNIFORMITY}

To merge recommendations, a PARM writing guide was used (Table 5.1). This stipulated a constant structure for summarizing differently-worded recommendations, and differently-reported strengths of evidence for recommendations extracted from the included guidelines. All relevant recommendations (to the patient journey), based on context analysis (Chapter Three) were organized in a table for each component of the journey, along with the supporting levels of evidence, and the guideline reference from which the recommendation had been obtained (Appendix 13).

Table 5.1: Guide for Merging Recommendation (Gonzalez-suarez, et al., 2012)

	Criteria	Explanation of criteria
1	Levels of evidence	The quality level of evidence was graded high, moderate or low. • High quality evidence could be variably described as Levels I or II, A or B. • Moderate quality evidence could be variously described as Levels II or III, B or C. • Low quality evidence could be variously described as Levels III or IV, C or D. Good Practice Points (GPPs): Recommendations based on expert opinion or the consensus of what the guideline development group was identified as, and a level of evidence was not assigned.
2	**Volume of recommendations**	Low volume: 3 references or less. Moderate volume: 4-7 references. High volume: 8 or more references. GPP: Recommendation is supported by expert opinion.
3	**Consistency of recommendations - content**	Consistency of the recommendations relating to a health/clinical question within the different CPGs was compared for their level of similarity/comparability. This construct was labeled 'uniformity of thought'.
4	Currency of Literature	Current - (50% of the papers cited were published after 2006). Noncurrent - (The majority of the papers were published before 2006).

Each included recommendation was further rated according to the PARM guide for evidence rating (outlined in Table 5.2) and collated in a table (Appendix 14).

NB: The guide does not consider the age of reference; rather it considers the number of references.

Table 5.2: Guide for rating the recommendation (Gonzalez-suarez, et al., 2012)

Recommendations	Strength of evidence
There is strong evidence	Consistent grades of high quality evidence with uniform thought, and at least a moderate volume of references to support the recommendation(s).
There is evidence	A mix of moderate and high quality evidence with uniform thought and at least a low volume of references, OR A mix of high and low quality evidence with uniform thought and high volume of references, OR High level evidence coupled with GPPs and at least amoderate volume of references, OR A Level I paper with at least moderate volume references.
There is some evidence	A single level II (A) paper, OR Inconsistent grades of high and low evidence with uniform thought and moderate volume references, OR Consistent grades of low level evidence with uniform thought and at least a moderate volume of references.
There is conflicting evidence	A mix of levels of evidence with non-uniform thought, irrespective of the volume of references with or without GPPs.
There is insufficient evidence	Low or inconsistent levels of evidence with low volume references with or without GPPs.
There is no evidence	Absence of evidence for any aspect of the patient journey.

5.3.4. ENDORSEMENTS (Wording of the Recommendation)

The PARM writing guide (Gonzalez-suarez, et al., 2012) (Table 5.3) was used to categorize the level of evidence using specific criteria, in order to lead the phrasing of the recommendations. Applying these principles consistently to the recommendations created final recommendation statements. The included recommendations were worded and collated in a table (Appendix 15).

Table 5.3: PARM Guide for wording the recommendation (Gonzalez-suarez, et al., 2012)

Wording	Strength of evidence (Table 4.2)
We strongly endorse	When there is strong evidence as determined by the criteria in Table 4.4.
We endorse	When there is evidence as determined by the criteria in the Table 4.4.
We recommend	When there is some evidence as determined by the criteria in Table 4.4.
We suggest	When there is conflicting evidence as determined by the criteria in Table 4.4.
We do not endorse	There is insufficient or no evidence as determined by the criteria in Table 4.4.

Due to the recommendations that had to be merged, a full list of recommendations is provided in Appendix 16. Table 5.4 illustrates an example on how related recommendations were evaluated and combined using the writing guide. If there was only one recommendation about a health topic, that recommendation was approved and re-phrased using the writing guide for wording the recommendation. Once the full CPG record is produced, all original recommendation statements will appear verbatim as stated in the original CPG, and will be correctly referenced. The final

recommendations are presented in Appendix 23. (Contextualized guideline).

5.3.5. QUALITY ASSURANCE AND DATA VERIFICATION

Two postgraduate students and one supervisor achieved this through analysis of evidence levels and merging of wording of recommendations. Table 5.4 demonstrates an example of contextualised recommendation.

Table 5.4: Example of a contextualized recommendation

Recommendation	**Source guideline**	**Quality level of evidence**	**Reference**
Rehabilitation should be structured to provide as much practice as possible within the first six months after stroke.	NZCG KNGF DoD	High quality X 9	9
Criteria for evaluation: there is uniformity of thought; with consistent levels of evidence and a high volume of non-current references. ***Merged level of evidence:*** There is strong evidence. ***Merged endorsement statement:*** **we strongly endorse** that rehabilitation be structured to provide as much practice as possible within the first six months after stroke • *Kwakkel et al., 2004 (SR); Wevers et al., 2009 (SR); McClellan & Ada, 2004(SR); Bhogal et al., 2003b (SR); Bakheit et al., 2007 (SR); Godecke, 2009 (SR); Carnaby et al., 2006) (MR); Van Peppen et al.. 2004 (MR); Kwakkel et al.. 1997 (MR) [high level of evidence].*			

5.3.6. CONTEXT POINTS FOR EACH RECOMMENDATION

Each endorsed statement was then considered for applicability. A PARM framework was adopted to facilitate local service delivery (Gonzalez-suarez, et al., 2012) (Table 5.5). The framework defined the fundamentals, which need to be in place for least best-practice care to be

provided fairly across Kenya. Fundamentals that tackled added standard care of practice were also cogitated. This information provides direction to physiotherapists wherever they may practice in the Kenya, regarding essential equipment, standards and resources, training and workforce, in order to provide evidence-based care. Table 5.5 illustrates the context points that are to be considered during the contextualization process

Table 5.5: Context points

Context points	***Minimum Standard of Care***	***Additional Standard of Care***
Practice Method		
Equipment		
Workforce		
Training		
Timing		
Re-assessment		
Outcome measures		
Consumer/ Family		
Policy		
Organizational/System		

Table 5.6 illustrates a brief summary of the recommendations extracted from high quality clinical guidelines.

Table 5.6. Summary of the Recommendations

Topic	Recommendation	Number of Recommendation merged to 1	Merged level of evidence	Endorsement
Assessment and outcome measures	The perfect moment to estimate a patient's chances of performing basic ADL activities 6 months after the stroke is to determine their Barthel Index at the end of the first week after the stroke, but preferably on Day 5.	2	There is strong evidence.	Strongly endorse.
Timing, duration and intensity	Start rehabilitation as early as possible, preferably within 24 hours	2	There is strong evidence.	Strongly endorse.
In-patient rehabilitation	The rehabilitation programme should be guided by specific goals developed in consensus with the patient, family and rehabilitation team.	1	There is some evidence.	We recommend.
Discharge Plan	Stroke survivors should continue to have access to specialized stroke services after leaving hospital, whether from acute care or in-patient rehabilitation.	3	There is evidence.	We endorse.
Out-patient rehabilitation	Rehabilitation services after hospital discharge should be offered to all stroke patients as needed and where available, delivered in the home setting.	2	There is strong evidence.	Strongly endorse.
Family/care involvement	Should have contact with and be education by trained staff. This should be offered to all people with stroke and family/carers after discharge.	2	There is conflicting evidence.	We suggest.
Re-assessment	Patients should be re-evaluated intermittently during their rehabilitation progress. Particular attention should be paid to interval change and progress towards stated goals.	2	There is evidence.	We endorse.
Content of physiotherapy Walking therapy	All people with difficulty walking should be given the opportunity to undertake tailored, repetitive practice of walking (or components of walking) as much as possible.	3	There is strong evidence.	We strongly recommend.

Upper extremity therapy	Use of constraint-induced movement therapy.	3	There is strong evidence.	We strongly recommend.
Neglect	Use simple cues to draw attention to the affected side.	2	There is conflicting evidence.	We suggest.
Shoulder pain	Use of shoulder strapping.	1	There is some evidence.	We recommend.
Spasticity	Botulinum toxin A should be trialed in conjunction with rehabilitation therapy, which includes setting clear goals.	3	There is evidence.	We endorse.
Range of motion	Consider active and passive ROM prolonged stretching program to decrease risk of contracture development (night splints, tilt table) in early period following stroke.	2	There is some evidence.	We recommend.

5.4. SUMMARY OF FINDINGS

Chapter Five provided a description of a comprehensive examination of the recommendations obtained from high quality CPGs identified through a systematic review (Chapter Four). One of the key results was that there was uniformity in the guideline recommendations about related stroke rehabilitation care pathways. However, though the recommendations content were steady, the quality/level of evidence supporting recommendation varied considerably.

In this chapter the course of synthesizing recommendations from various CPGs, through a stepwise process of merging the wording and level/quality of the supporting evidence is described. The process of integrating led to the assembly of a core set of clinical recommendations, which shaped the basis of the approach for the contextualized CPG. The content of the core set included recommendations about the method, assessment, management, referral and discharge plan.

EVIDENCE SOURCING AND SYNTHESIS

SUMMARY

Phase Two (Chapters Four and Five) of this dissertation focused on sourcing evidence-based recommendations for stroke rehabilitation, by methodically reviewin current existing clinical practice guidelines on the topic.

The results of this review shows that, due to the presence of high-quality CPGs on stroke rehabilitation, current CPGs can be adapted, adopted and contextualized to local contexts,

instead of the *de novo* development of CPGs' especially in resource-scarce settings. In this way, resources may be used to promote the uptake of CPG recommendations with a rigorous implementation plan and sustainability plan; as opposed to spending resources on *de novo* CPG development (Gonzalez-Suarez et al., 2012). Additionally, the bulk of the incorporated CPGs originated from Western countries with well-developed healthcare systems. As illustrated in Chapter One, the envisioned setting for the CPG is a resource scarce setting. CPGs developed for well-resourced healthcare settings need to be contextualized for use in resource scarce settings with different societal, political, environmental and economic contexts (Gonzalez-Suarez et al., 2012). Consequently, the procedure of CPG contextualization was preferred and embarked on.

In Chapter Five a stepwise formula for synthesizing practice recommendations to their new form as part of the contextualization process, was provided. Numerous features of guideline recommendation writing were emphasized in Chapter Five, including or example, the importance of phrasing recommendations to communicate a strong or weak recommendation. Wording of the recommendations was considered vital as it affect behavior change (Michie & Johnston, 2004). Furthermore, the significance of using a writing guide to confirm reliability in writing recommendations was emphasized. The use of strength of the recommendation in future CPGs was encouraged. The context point factored in this chapter included equipment, workforce, training, timing and organizational/systems among others.

The subsequent step in the guideline contextualization course was to validate the core set of recommendations resulting from the synthesizing process for the intended setting

CHAPTER SIX

ASSESS FEASIBILITY OF A CONTEXTUALIZED CPG IN STROKE REHABILITATION IN KENYA

Stroke care has been challenging for decades particularly in developing countries (Gonzalez-Suarez, et al., 2012). This is due to poor access to stroke rehabilitation services, as well as inadequate rehabilitation secondary to scarcity of resources (Gonzalez-Suarez, et al., 2012). Therefore, in order to improve future rehabilitation services in Kenya , this chapter assessed the feasibility and applicability of a contextualized clinical practice guideline. The guideline included analysis of the context in Kenyan healthcare. The targeted contextualized CPG in this study is based on the principles of available resources, greatest support to stroke patients and cost-effectiveness, (Norrving, et al., 2007). Therefore, the CPG may facilitate the equal allocation of healthcare resources and support a high standard of healthcare (The National Board of Health and Welfare, 2017).

In Chapter Six of the research project, a group of physiotherapists assessed the merged evidence-based recommendations for their applicability in the Kenyan context. The recommendations projected for inclusion in the contextualized CPG were tested for validity via a survey.

The feedback from the survey was considered significant in improving decision-making and writing strategies to assist in the operationalization of the guideline recommendations in Kenyan context (Campbell & Cantrill, 2001). It is proposed that the opinions of a group have greater

validity and reliability than the decision of an individual (Raine, Sanderson & Black, 2005). Context points were described as contextual (personal and environmental) influences that may have control on implementation, and practice points were described as general practical matters for implementation of the recommendation. Context points form a core part of the contextualization procedure. The validated CPG recommendations with their context points are organized in an accurate patient care pathway. A summary of the guideline was recorded, containing the context, process information, pathway and recommendations.

6.1. AIM

Assess the implementability of the contextualized CPG in target setting.

6.2. OBJECTIVE

i. To confirm implementability of the endorsed recommendations to target setting.

ii. To raise decision points.

6.3. METHODOLOGY

6.3.1. SETTING.

The study was conducted in the physiotherapy departments at two public healthcare facilities, hospital; two private hospitals and two training institutions.

6.3.2. STUDY DESIGN

A cross-sectional, descriptive design was used to obtain data by means of a survey questionnaire.

6.3.3. SAMPLING

Purposive sampling was utilized to recruit participants. Participants included specialized in stroke rehabilitation with at least five years experience in stroke care. Six physiotherapists were recruited.

6.3.4. PROCEDURE OF DATA COLLECTION

A copy of the contextualized guideline was sent electronically to the six participants. The participants were requested to respond concerning the practicality of the guideline within the Kenyan context. Practicality was aimed at assessing whether the high quality recommendation could be practiced in Kenya. The participants were required to respond within one month.

6.4. RESULTS

A number of recommendations were identified and listed from the source guidelines that would not be directly practical in Kenya. Table 6.1 shows high quality recommendations that were not directly applicable in Kenya.

Table 6.1. Assessment and Outcome Measure

Patients admitted to hospital with acute stroke should have an initial assessment by rehabilitation professionals as soon as possible after admission, preferably within 48 hours (A). ***Moderate Level of evidence***
Systematic measurements (monitoring) using reliable and valid measurement instruments enhance the

process of clinical argumentation and the continuity of care for patients with a stroke. (C) ***High level evidence***
Valid, reliable and responsive instruments should include the following on admission and discharge always to be administered (A) ▪ National Institutes of Health Stroke Scale ▪ Barthel Index. ***High level evidence***
Patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke, using reliable and valid measurement instruments. This remains necessary as long as a patient is unable to walk independently. (A) ***High level evidence***
Establishing an estimated prognosis for the patient's dexterity 6 months after the stroke requires their capacity for finger extension (assessed with the Fugl-Meyer Assessment) and shoulder abduction (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on Day 2 after the stroke. (A)

Table 6.2 Timing, Duration and Intensity

Task-specific circuit class training or video self-modeling should be used to increase the amount of practice in rehabilitation (B) ***Consistent level of evidence – low volume –- non current***
For patients undergoing active rehabilitation, physical therapy (physiotherapy and occupational therapy) should be provided as much as possible, but should be a minimum of one-hour active practice per day (at least five days a week) (GPP).

Table 6.3. In-Patient Rehabilitation

Where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available, early supported discharge services may be provided for people with mild to moderate disability. [B] ***High level of evidence –high volume – non current***
Ensure all stroke patients receive early active rehabilitation by a dedicated stroke team. ***High level of evidence***
Patients should be transferred to a stroke rehabilitation unit if ongoing rehabilitation is required (A). ***High level of evidence***
All patients, including those with severe stroke, should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of ongoing rehabilitation. ***High level of evidence***
People with disability after stroke should receive rehabilitation in a dedicated stroke in-patient unit and subsequently from a specialist stroke team within the community. ***High level of evidence***
Access to other services that may be needed, for example: Continence advice.

High level of evidence
▪ Electronic aids (for example, remote controls for doors, lights and heating and communication aids). ***High level of evidence***
▪ Psychiatry. ***High level of evidence***
▪ Wheelchair services. ***High level of evidence***
▪ Psychosocial resources and needs, including caregiver capacity and availability. ***High level of evidence***

Table 6.4. Discharge Plan

All patients, including those with severe stroke, should be assessed by the specialist rehabilitation team prior to discharge from hospital to assess their suitability for ongoing rehabilitation. ***High level of evidence –high volume –Non Current***
Early supported discharge services provided by a well-resourced, coordinated specialized inter-professional team are an acceptable alternative to more prolonged hospital stroke rehabilitation unit care and can reduce the length of hospital stay for selected patients [Evidence Level A]. ***High level of evidence***
▪ They have access to comprehensive interprofessional community rehabilitation services and caregiver or support services [Evidence Level A]. ***High level of evidence***
▪ An inter-professional team of specialists in stroke care and rehabilitation working in collaboration with community-based healthcare professionals [Evidence Level B]. ***High level of evidence***
▪ Services that are delivered in the most suitable environment based on client issues and strengths [Evidence Level C]. ***Moderate evidence***

Table 6.5. Outpatient Rehabilitation

After leaving hospital, stroke survivors must have access to specialized stroke care and rehabilitation services appropriate to their needs (acute and/or inpatient rehabilitation) [Evidence Level A]. ***High level of evidence***
Interdisciplinary community rehabilitation services and support services should be made available whenever possible, to enable early supported discharge to be offered to all people with stroke who have mild to moderate disability (A) ***High level of evidence, Low volume, non current***
Rehabilitation services after hospital discharge should be offered to all stroke patients as needed and where available, delivered in the home setting (A)

High level of evidence, Low volume, current
Outpatient stroke rehabilitation after discharge of stroke survivors to an organized rehabilitation team (physiatrist, physical therapist, occupational therapist, and speech and language pathologist). ***High level of evidence***

Table 6.6. Lower Extremity

The patient's walking ability six months after the stroke requires their sitting balance (assessed with the sitting balance item of the Trunk Control Test) and the motor function of the leg (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on Day 2 after the stroke. (Level 1). ***High level of evidence***
Body-weight supported treadmill training improves the comfortable walking speed and walking distance of patients with a stroke. (Level 1). ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
Robot-assisted gait training for stroke patients who are unable to walk independently improves their comfortable walking speed, maximum walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living, compared to conventional therapy (including over ground walking). (Level 1). ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
Combining robot-assisted gait training with functional electro stimulation of the paretic leg improves the sitting and standing balance and walking ability of patients with a stroke, compared to conventional therapy (including over ground walking). (Level 1). ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
It has been demonstrated that circuit class training (CCT) for walking and other mobility-related functions and activities improve walking distance/speed, sitting,standing, balance and walking ability. Thisreduces inactivity in patients with a stroke. (Level 1). ***High level of evidence***
One or more of the following interventions can be used in addition to conventional walking therapy:
Use Joint position biofeedback (B) ***High level of evidence –low volume***
Use virtual reality training (C) ***Moderate level of evidence –moderate volume –- Current – Uniform thought***

Table 6.7.Upper Extremity Therapy

The following interventions should be given in order to encourage patients to use their upper limbs as much as possible:
Mechanical assisted training (B) ***High level of evidence –low volume***
Unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke improves the selective movements and muscle strength of the paretic arm, and reduces atypical pain in the paretic arm. (Level 1) ***Inconsistent, high level of evidence –High volume - Current – Uniform thought***

Virtual reality training of the paretic arm and hand as an add-on to regular exercise therapy for patients with a stroke improves the performance of basic activities of daily living. (Level 1). ***High level of evidence***
EMG-triggered neuromuscular electro stimulation (EMG-NMS) of the paretic wrist and finger extensors of patients with a stroke improves selective movements, active range of motion and dexterity. (Level 1). ***Inconsistent, level of evidence –High volume - Current – Uniform thought***
Circuit class training with workstations for the paretic arm improves selective movements and dexterity of patients with a stroke. (Level 2). ***High level of evidence***
A mechanical arm trainer improves the dexterity of patients with a stroke. (Level 2) ***High level of evidence***
Use strengthening exercises in addition to functional task practice. [C] ***High level of evidence***

Table 6.8. Neglect

Visual scanning training has a favourable effect on the attention for the neglected side of patients with a stroke in the right hemisphere. (Level 1). ***High level of evidence***

Table 6.9. Spasticity

Botulinum toxin A should be trialed in conjunction with rehabilitation therapy, which includes setting clear goals. ***Consistent, high level of evidence – low volume - current – uniform thought***
Use of oral agents such as Tizanidine and oral Baclofen for spasticity, especially if the spasticity is associated with pain, poor skin hygiene or decreased function. Tizanidine should be used specifically for chronic stroke patients. ***High level of evidence – low volume - current***

6.5 DISCUSSION AND CONCLUSION

Data from stroke rehabilitation journey in Kenya indicates that the use of the recommended outcome measures for assessment was uncommon (39.3%). Of the 39.3% use of outcome measure, the most commonly tool used were visual analogue scale 39% and Ashworth modified scale 36%. This is contrary to most common recommended National Institutes of Health Stroke

Scale, and Barthel Index. Likewise, in-patient rehabilitation in Kenya, the frequency is at 21.3% for thrice a week, and 42.7%, for four times a week. In outpatient rehabilitation, 47.3% of the physiotherapists provide services three times in a week, while 0.9% treat patient four times in a week. Timing of rehabilitation was 85.7% to start the same day, if the patient was stable, while 14.3% started physiotherapy at one week. This is contrary to the recommendations that patients undergoing active rehabilitation, physical therapy should be provided as much as possible, but should be a minimum of one-hour active practice per day at least five days a week.

Additionally, healthcare providers in stroke rehabilitation in Kenya were shown to comprise of doctors, physiotherapist, occupational health, social worker, pharmacist radiographers, nutritionist, and orthotists. However, the recommendations from high quality clinical guidelines suggest the involvement of a comprehensive interdisciplinary dedicated stroke team. .

Contents of physiotherapy included re-education of function; management; re-education of balance; normalization of tone; re-education of functional activities; sensory function management; and provision of Orthosis. In management of the upper extremity, the recommendations on mechanical assisted training, unilateral robot-assisted training of the paretic shoulder and elbow of patients, virtual reality training, and EMG-triggered neuromuscular electro stimulation (EMG-NMS) of the paretic wrist and finger extensors among others are not practical in Kenya due to poor resources.

This called for further contextualization within the target setting for practicality. Chapter Seven therefore presents the process of ultimate contextualization.

CHAPTER SEVEN

ULTIMATE CONTEXTUALIZATION OF EVIDENCE-BASED RECOMMENDATIONS: A CONSENSUS STUDY

7.0. BACKGROUND AND LITERATURE

This chapter presents testing for the recommendations proposed for inclusion in the contextualized CPG, in the envisioned setting by a set of experts using a consensus study. A Delphi method was used to determine unanimity about the inclusion of suggested recommendations. The unanimity view of an expert panel was regarded essential in improving practicality. It is assumed that the opinions of a group have superior validity and reliability than the judgment of an individual (Raine, Sanderson & Black, 2005).

The Delphi technique is as a multiple repetition technique normally meant to be unidentified. The purpose of this is to refine the expert view and finally arrive at a consensual position (Helmer & Rescher, 1959).

The validated CPG recommendations with their context points (gained during contextualization process) were organized in a representative patient care pathway using the information gained in Phase One of the thesis. Figure 7.1 shows the final contextualisation process.

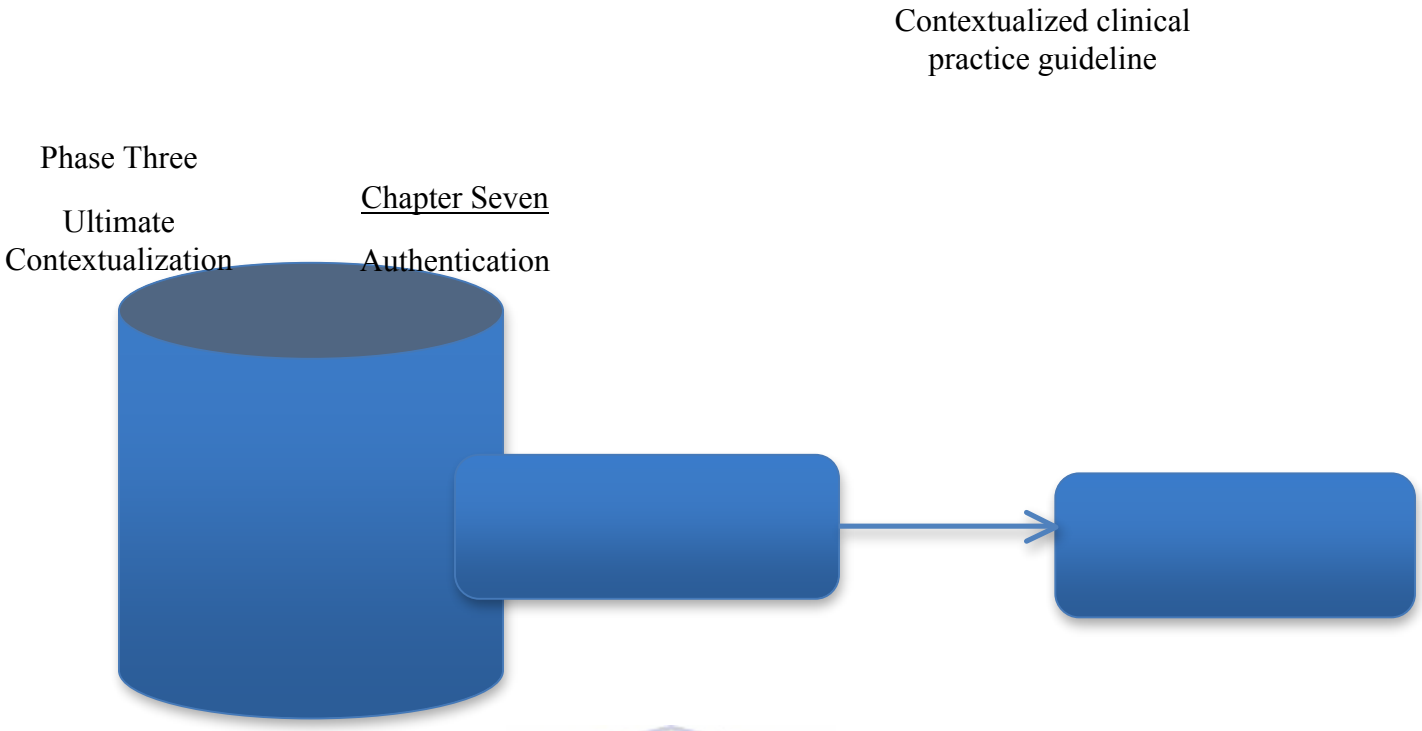

Figure 7.1: Outline of the final contextualization process

7.1 AIM

The aim of this part of the study was for the experts to assess, ratify and contextualize the clinical guideline recommendations that were developed for the local context.

7.2. OBJECTIVES

i. Assess and validate the evidence-based recommendations that were bred, for their applicability to the local context.

ii. Ascertain context and practice points that signify standards for the implementation of the evidence-based recommendations.

7.3. METHODS

7.3.1. STUDY DESIGN

In this study consensus methodology was used to enable the experts to make decisions about the evidence-based recommendations that were not implementable in Kenya (Falzarano & Zipp, 2013). (Chapter Six). The Delphi technique was used (refer to Chapter Two).

7.3.2. PARTICIPANTS

Participants involved experts (panel members), who were described as individuals who had more than five years experience in stroke rehabilitation. The experts included the clinical physiotherapists, lecturers in physiotherapy training institution as well as the policy makers. A varied group of experts was invited to ensure a wide range of views and limit bias, as advocated by Hutchings and Raine (2006). In exact, possible end-users were invited to foster engagement and facilitate ownership of the CPG (Halcomb et al., 2008). Purposive sampling was used to define the consensus panel using the following key criteria:

i. Different healthcare settings: a focus on all levels of healthcare subdivisions, private sector, training institution and managerial level.
ii. Skills and experience in stroke rehabilitation.

Panel members were identified through the Ministry of Health headquarters. The principal researcher contacted the Ministry of Health who provided contact details for the physiotherapists in charge of the 17 County Referral Hospitals in Kenya; who met the inclusion criteria.. The

participants were identified due to their involvement in stroke management within various healthcare facilities. Patients were not incorporated in this process, patients' views were already integrated during Phase One of the study. The participants in the consensus study included three physiotherapists from Level Six hospitals, three physiotherapists from Level Five hospitals, three from Level Four hospitals, three from Level Three hospitals, three from Level Two hospitals, two from private facilities, and three physiotherapists from the managerial levels of the Ministry of Health in Kenya.

The configuration of the group of experts made it possible for the researcher to capture features of various settings in Kenya that are involved in stroke rehabilitation, ranging from a health centre to a national hospital.

7.3.3. INSTRUMENTS OF DATA COLLECTION

A self-administered questionnaire (Appendix 18) was designed based on the contextualized recommendations that were not applicable in the Kenyan questionnaire (refer to Chapter Six). Two independent researchers reviewed and validated the questionnaire for face and content validity. A Cronbach's alpha value of 0.881.

Procedure of data collection

Electronically mailed invitations were sent to 20 experts from various parts of the country, who were invited to participate in the current study. In these emails, copies of the questionnaire (Appendix 18), consent form (Appendix 19), and information sheet(Appendix 20) were attached.

The information sheet explained the purpose of the study and what was expected of the panelists. They were also requested to indicate their willingness to participate in the study by signing the consent forms.

The consent form and the questionnaires for the different rounds of the Delphi were devised in a Word document. The Delphi process was administered online using the questionnaire as an attachment (Appendix 18).), as a large number of the experts, particularly in the rural areas, did not have reliable Internet connectivity. As a result, most of the experts were not conversant with on-line surveys in any case. Experts were requested to give their opinions on the decision points that were identified during the feasibility study. Decision points included, for example, personal and environmental factors that might impact on implementation, such as the use of treadmills for gait training (refer to Chapter Six).

During round one of the survey, the experts were presented with recommendation statements. They were required to rate their agreement with each recommendation on a Likert scale, for the applicability of the recommendation for the target setting. The scale had 42 questions, with fixed statements that were represented by different ratings: strongly agree (1), strongly disagree (2), disagree (3), undecided (4) agree (5). Strongly agree. The higher the number, the more they were in agreement that the items were implementable in Kenya. The participants could also select 'non-applicable (N/A)' if a statement was outside their area of practice. The survey also enabled the participants to write comments, if desired. Data was captured and analyzed on an Excel sheet. In order for unanimity to be reached on each question, a score of 70% and beyond had to be

attained.

During Round Two, the experts were sent a questionnaire relating to the questions where a unanimity of 70% and above was not gotten during Round One. They were once more asked to choose a number from the scale 1-5, which was specified to show whether the changes made to these questions or sections (following input from the experts in Round One) met their agreement. The experts were equally given the chance to remark on these subdivisions and offer any added information that they felt was of significant to physiotherapy management of post stroke survivors. Agreement was reached at the conclusion of Round Two since all the questions posed in the questionnaires during Round , two attained a score of 70% and more.

In Round Three, experts were invited to confirm and rank their agreement following consensus in Rounds One and Two. The contentious elements were e-mailed to the sixteen participants comprising all the items that had agreement levels of 70% and higher in Rounds One and Two. At this stage the participants had the chance to re-consider and alter their initial answers if they wanted to.

The final agreement allowed the researcher to gain an understanding from experts as to the implementability of the physiotherapy clinical practice guideline in Kenya.

7.3.4. DATA ANALYSIS

In the Delphi procedure, data collected included both qualitative and quantitative items. In quantitative data, literature recommends measures of central tendency (mean, median, and mode)

and level of dispersion (standard deviation and inter-quartile range). These are considered to be the major statistics in Delphi studies for quantitative data, for presentation of information regarding collective judgments of respondents (Hasson, Keeney, & McKenna, 2000). The quantitative data was analyzed and presented using the mean and mode for each component. Qualitative data was also gained during the Delphi study. The qualitative data was summarized with all the answers classified under the specific questions, and was then organized into themes. Quotes were used to demonstrate the themes, and the researcher then deciphered the quotes in line with the treatment components. The researcher then mirrored on the quotes and offered remarks for the application and deliberation of the revised components.

Figure 7.2 offers an outline of the whole Delphi method that took place. This figure charts the procedure from the choice of the expert panel up to the point where unanimity was reached.

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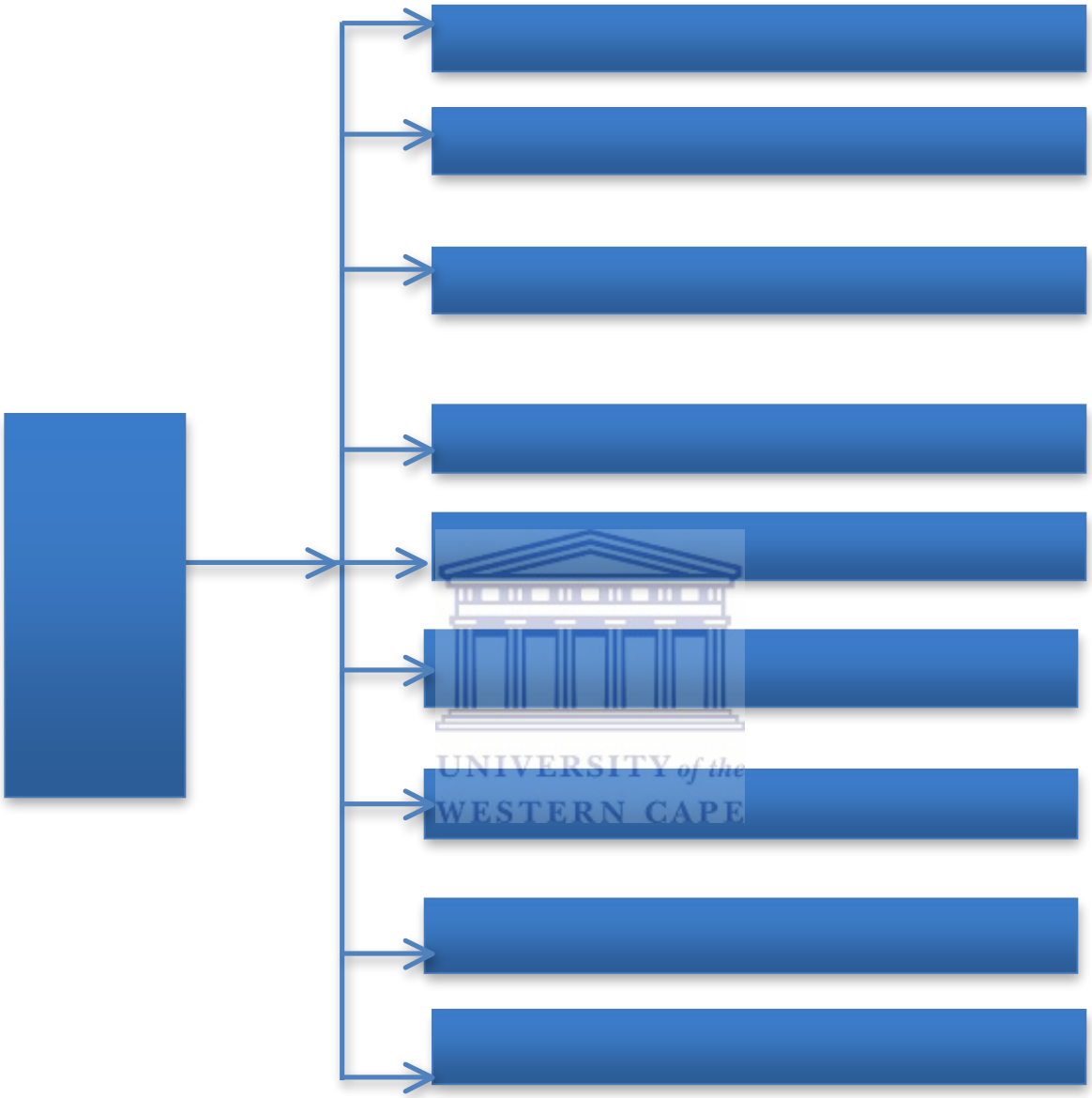

Figure: 7.2: Process of the Delphi study

7.4. RESULTS

7.4.1 RECRUITMENT OF SAMPLE

Twenty experts were invited to participate. Of these, sixteen consented to participate in the study. Diverse explanations were afforded by three of the experts for not accepting the invitation. In the key these were mentioned as unavailability due to work obligations and time constraints. One of the experts did not reply initial e-mail.

Of the participants who consented; three were physiotherapists from Level Six and Five hospitals, two were physiotherapists from Level Four, Level Three and Level Two hospitals respectively; two were from private hospitals and two were from managerial levels of the Ministry of Health, Kenya.

During Rounds One and Two, sixteen of the experts completed the process, while in Round Three, fifteen participants completed the full process. As the procedure was unidentified, the researcher could not recognize any expert, and had to rely on the support of the experts to partake.

7.4.2. DEMOGRAPHIC CHARACTERISTICS OF PANEL OF EXPERTS

A description of the participants is outlined in Table 7.1.

Table 7.1: Demographic characteristics of Panel of Experts

ID	AGE	GENDER	HIHGEST QUALIFICATION	EXPERIENCE IN STROKE REHABILITATION	WORKING STATION
1	54	Male	BSc	22 Years	Level Six
2	36	Male	BSc	7 Years	Level Four
3	35	Female	Diploma	11 Years	Level Five
4	40	Male	BSc	8 Years	Level Three
5	42	Female	BSc	7 Years	Level Five
6	32	Female	BSc	6 Years	Level Five
7	57	Female	BSc	18 Years	Level Three
8	48	Male	Diploma	13 Years	Level Four
9	45	Male	Masters	10 Years	Level Six
10	29	Female	Diploma	5 Years	Private
11	50	Male	Diploma	12 Years	Private
12	52	Female	Diploma	16 Years	Level Two
13	37	Male	Master	10 Years	Level Six
14	38	Female	BSc	9 Years	Ministry of Health
15	46	Male	BSc	11 Years	Ministry of health
16	40	Male	Diploma	9 Years	Level Two

The participants had a mean age of 42.56 years (SD = 9.26) and 10.94 (SD = 5.35) years of work experience in stroke rehabilitation.

7.4.3. FIRST ROUND OF DELPHI STUDY

During the first round, sixteen experts (Clayton, 1997) responded to several components of the proposed physiotherapy clinical practice guidelines that were contentious in terms of implementability in Kenya. With this method, the panel of experts could provide input on different aspects of the Kenyan patient's journey. This information included:

(i) Assessment of stroke patient

(ii) Amount, intensity, frequency and duration of physiotherapy treatment sessions for stroke patients

(iii) (iii) Discharge plan

(iv) (iv) Management of the lower extremity

(v) (v) Management of the upper extremity.

The response rate for Round One of the Delphi study was 100%, as all sixteen participants completed the survey. The sections on which the experts had to answer and comment during Round One are listed below.

A minority of the experts agreed on the use of Fugl-Meyer (n=2, 12.5%), use of Action Research Arm Test (n=1, 6.3%), while half of the participants agreed on the use of Motricity index of (n=8, 50%); The experts commented that these types of outcome measures were complex and therefore not implementable in Kenya (see Table 7.2).

Table 7.2: Assessment (n=16)

Items	Agree	Mean	Mode
1. (a) Use Fugl-Meyer	(2) 12.5%	2.25	2
(b) Use of Motricity	(8) 50%	2.75	2
(c) Action Research Arm Test	(1) 6.3%	2.13	2

The majority of the participants (n = 15, 93.8 %) agreed that repetitive training was practical and implementable to increase the amount of therapy in rehabilitation, unlike video self-modeling. Likewise, there was consensus from the experts on the benefits of one hour of intense physiotherapy three days a week, for stroke patients (n = 15, 93.8 %). This data is summarized in Table 7.3.

Table 7.3: Amount, Intensity, Frequency and Duration of Treatment Session (N=16)

Items	**Agree**	**Mean**	**Mode**
2. (a)Task-specific circuit	(8) 50%	3.0	2
(b) Use video self-modeling - Tailored	(1) 6.3%	1.19	2
(c) Repetitive practice	(15) 93.8%	4.81	5
3. (a) 1h practice 5 days a week	(8) 50%	3.0	2
(b) 1h practice 3 days a week	(15) 93.8%	3.86	5

With regard to post stroke discharge, the majority of the experts felt that the specialist stroke team as well as rehabilitation by a nurse, physiotherapist, occupational therapist and counselor was not available at all levels of healthcare facilities in Kenya. This information is summarized in Table 7.4. A suggestion was made to have a rehabilitation team constitute of a doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist.

All the participants (n = 16, 100%) agreed that the following components are implementable and should be included:

i. Early supported discharge with physiotherapy, occupational therapy and caregiver support services;
ii. The stroke survivors to remain in the general ward/medical ward if on-going rehabilitation is required,
iii. The stroke survivors should have access to continence advice, electronic aids and wheelchair services.
iv. Psychosocial resources and rehabilitation post discharge should be offered as needed, or at home.

The majority of the participants (n = 14, 87.5 %) agreed that rehabilitation post discharge should be based on a client-centered approach. These are summarized in Table 7.4

Table 7. 4: Discharge Plan (N=16)

Items	Agree	Mean	Mode
4.Rehab by specialist stroke team	(4) 25%	2.5	2
Rehab by nurse, PT, OT & Counselor.	(8) 50%	3.0	2
5.Early supported discharge with comprehensive interdisciplinary team	(8) 50%	3.0	2
Early supported discharge with PT, OT and caregiver support services.	(16) 100%	4.5	5
6.Assessment by specialist stroke team	(4) 25%	2.5	2
Assessment by nurse, PT, OT and a Counselor.	(8) 50%	3	2
7.Use of a stroke rehabilitation unit for on-going rehabilitation	(5) 31.3%	2.7	2
Use general ward/medical ward if on-going rehabilitation.	(16) 100%	5	5
Receiving early active rehabilitation by a dedicated stroke team.	(8) 50%	3	2
Receiving early active rehabilitation by a nurse, PT, OT and a counselor.	(8) 50%	3	2
Access to continence advice.	(16) 100%	5	5
Access to electronic aids.	(16) 100%	5	5
Access to wheelchair services.	(16) 100%	5	5
Access to psychosocial resources.	(16) 100%	5	5
10.Rehabilitation post discharge offered as needed, or at home	(16) 100%	5	5
Rehabilitation post discharge based on a client-centered approach	(14) 87.5%	4	4

All the participants (n = 16, 100%) agreed on the use of ground walking to improve walking speed and walking distance; the use of therapy assistance and devices to improve heart rate, sitting and standing and the use of tailored repetitive practice for walking to improve functional ambulation. The majority of the participants (n = 14, 87.5 %) agreed on the use of circuit training for walking and mobility-related functions. However, the use of robot-assisted training and Functional electrical stimulation (FES) to improve sitting, standing, balance and walking was not agreed upon. The majority of the experts reported (qualitatively) that robotic devices are not available in Kenya while Functional electrical stimulation (FES) was not commonly used for improving sitting, standing balance and walking in Kenya (See Table 7.5).

Table 7:5: Management of the Lower Extremity (N=16)

Items	Agree	Mean	Mod
Use treadmill training to improve walking speed and walking distance	(1) 6.3%	2.13	2
Use ground walking to improve walking speed and walking distance	(16) 100%	5	5
Use robot-assisted gait training to improve heart rate, sitting and standing	(1) 6.3%	1.19	1
Use therapy assistance and devices to improve heart rate, sitting & standing	(16) 100%	5	5
Use robot-assisted training and FES to improve sitting, standing balance and walking	(1) 6.3%	1.19	1
Use FES and exercises to improve sitting, standing balance abd walking	(8) 50%	2.5	2
14Use circuit training for walking & mobility-related functions	(14) 87.5%	4	4
Use tailored repetitive practice for walking to improve functional ambulation	(16) 100%	5	5

Concerning management of the upper extremity, the majority of the participants (n = 14, 87.5 %) agreed on the use of Functional electrical stimulation (FES) on the wrist and forearm to improve functional motor recovery; use of electrical stimulation/functional electrical stimulation for reducing motor impairment and improving upper limb function (n = 93.8 %) and the use of circuit training for paretic arm to improve selective movements and dexterity (n = 14, 87.5 %). All the participants (n = 16, 100%) agreed on the use of task specific repetitive activities of paretic arm to improve movements and dexterity; and practice of casting, range of motion, and positioning to reduce or prevent spasticity (See Table 7.6).

Table 7:6: Management of the Upper Extremity (N=16)

Items	Agree	Mean	Mode
Joint position biofeedback	(2) 12.5%	0.56	2
FES on wrist and forearm to improve functional motor recovery	(14) 87.5%	3.93	4
Robot-assisted Ex of shoulder and elbow to improve movements and muscle strength	(2) 12.5%	0.5	2
ES/FES is used for reducing motor impairment and improving upper limb function	(15) 93.8%	4.81	4
(NMS) of the paretic wrist and finger extensors	(1) 6.3%	0.25	1
Circuit training for paretic arm to improve selective movements and dexterity	(14) 87.5%	4	4
Use task specific activities of paretic arm to improve movements and dexterity	(16) 100%	5	5
Use mechanical arm trainer to improve the dexterity	(2) 12.5%	0.5	2
Use Botulinum toxin A for patients with severe spasticity	(5) 31.3%	1.25	2
Use casting, ROM and positioning to reduce or prevent spasticity	(16) 100%	5	5

Key: Ex-Exercises

ES- Electrical stimulation

FES-Functional electrical stimulation

NMS- Neuromuscular electrical stimulation

ROM-Range of motion

During Round One the experts also provided comments for the researcher to consider concerning the contentious elements of the draft of contextualized physiotherapy clinical practice guideline for stroke rehabilitation in Kenya. There were few comments on the qualitative aspect. Most of the participants had no qualitative comment on items where at least one of the given choices of a particular item was implementable in Kenya. Table 7.7 illustrates the comments made by the experts under the components of Round One.

Table 7.7: Qualitative Responses from Experts Round One Delphi

Component	**Theme**	**Comments**	**REASONING (principal researcher with the help of a local supervisor)**
Assessment	Outcome measures	"*Manual muscle power testing, muscle tone and strength are the major assessment done by physiotherapist after admission before management commences*" **(E10)** *"We do a generalized assessment for muscle power, range of motion and tone. This forms the baseline data and not as a determinant of prognosis*" **(E12)** *"…the assessment indicated here are (sic) not common in Kenya, we do assess tone, muscle power, functional activities of daily living and mobility among other before we start our management"* ***(P4)***	Most of the physiotherapists are not conversant with the various outcome measures for various conditions. Physiotherapists are not aware that prognosis can be determined at the initial assessment.
Treatment	Duration	*Physiotherapist[s] use sessions of intense exercises of between 30 minutes to*	Due to huge workload and

Session	Frequency	*one hour.* **(E2)** *"The duration of physiotherapy session is at times determined by what a patient can take, but we advocate between 45 min and one hour"* ***(P8)*** *"Many a time we recommend that stroke patients get physiotherapy sessions at least five time in a week. Oftentimes this is not possible in our setting because of the issues with distance, cost of services as well as accessibility to healthcare facilities"* **(E6)** *"So for those that can afford, they come for therapy sessions thrice a week, but some patients receive physiotherapy services even once in two weeks"* **(E8)**	shortage of staff. Challenges with poverty, and accessibility of healthcare facilities
Discharge	Active	*"Most of the facilities use occupational therapist[s] and physiotherapist[s],*	Lack of specialty in Kenya

Plan	rehabilitation by a dedicated stroke team.	*which is considered as the rehabilitation team"* **(E4)** *"Some hospital[s]have the services of a counsellor available, while the lower levels of hospitals don't have counsellors"* **(E13)** *"Only physiotherapy and sometimes occupational therapy are available. Other team members are either not involved or are absent from the hospital healthcare team"* **(E16)** *"Oftentime counsellors are not available, so assessment prior to discharge is done by a nurse, physiotherapist, occupational therapist and a doctor or a clinical officer"* **(E7)** "A *dedicated stroke team is not available in many hospitals in Kenya. The disciplines that are almost always found in all levels of hospitals are nurses, physiotherapists, occupational therapists and doctors orclinical officers. We would recommend this team because of its availability"* ***(P14)***	

Management of the Lower Extremity	Use robot-assisted training	*"Robotic mechanical devices are not available in Kenya. There is use of FES for the lower limb, however, there are settings where the stimulators are not available, therefore therapists use exercises to improve sitting, standing balance and walking"* **(E5)**	Lack of resources
Management of the Upper Extremity	Circuit training	*Most patients use specific exercises (manual and mechanical) with task specific activities* **(E11)** *We use different stations for exercises of different function of the upper extremity, which might not be the ideal circuit class training* **(E3)**	Improvised Circuit training

During Round One the experts also provided comments for the researcher to consider concerning the contentious elements of the draft of contextualized physiotherapy clinical practice guideline for stroke rehabilitation in Kenya. There were few comments on the qualitative aspect. Most of the participants had no qualitative comment on items where at least one of the given choices of a particular item was implementable in Kenya. Table 7.7 illustrates the comments made by the experts under the components of Round One

In the theme of assessment, a few suggestions were made regarding the use of outcome measure for determining prognosis of the upper extremity six months after stroke. The emphasis on lack of skills and knowledge on outcome measure use was highlighted In addition, the discharge plan by use of a specialized team was challenged, as the availability of these disciplines was questioned. A suggestion was likewise proposed to use the available healthcare disciplines. (See Table 7.7).

For the component of stroke rehabilitation process where one of the given choices scored more than 70%, consensus was made during Round One. However, components on which less than 70% consensus was achieved during Round One, were then revised, based on the emergent themes from the answers of Round One of the Delphi study

7.4.4. SECOND ROUND OF DELPHI STUDY

The purpose of the second round was to reach agreement on the content of physiotherapy stroke rehabilitation guidelines. All the items that had not reached consensus in Round One were sent back (Appendix 21). Likewise, changes and modifications for the second round were devised founded on the emergent themes from the answers of Round One of the Delphi study.

Under the use of outcome measure for assessment, experts advised on assessment of muscle power, tone and range of motion. The assessments were seen to be implementable in Kenya, as the physiotherapists were conversant with them. Another area where agreement could not be reached through Round One pertained to the assessment of stroke patients by a specialist rehabilitation team.

The expert noted that a specialist rehabilitation team was not available due to lack of specialty in Kenya. Experts advised that a team comprising of a doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist should be involved in assessment, owing to the availability of these disciplines in all levels of healthcare in Kenya. The expert added that the involvement of a counsellor was vital, however, counsellors were not available at all healthcare facilities in Kenya.

Similar comments from the expert were also noted in early active rehabilitation. Recommendation from relevant guidelines suggested early active rehabilitation by a dedicated stroke team. However, experts advised on the same available disciplines. The third part where agreement could not be gotten during Round One, related to the use of robot-assisted training to

improve sitting, standing balance and walking. Experts opined on use of exercises and Functional electrical stimulation (FES), to improve sitting, standing balance and walking, as many facilities lacked the resources.

During Round Two the experts were sent a questionnaire that combined the items discussed above, namely:

(i) Outcome measure; use of Fugl-Meyer, Motricity, Action Research Arm Test (ARAT), and an added modification, which involved muscle power, tone, and range of motion assessment.

(ii) Rehabilitation by a specialist stroke team - rehabilitation by anurse, physiotherapist, occupational therapy and Counselor - and an added modification that included rehabilitation by a doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist.

(ii) Use of robot-assisted training, and a modification was added which involved exercises and Functional electrical stimulation (FES) to improve sitting, standing balance and walking.

The experts were invited to rank on a scale of 1 to 5 if the changes made to the questions, after input from Round One, met with their approval. Additionally, the experts were requested to add any remarks after the completion of ranking their agreement on the changes.

Sixteen participants completed the second round survey, resulting in a response rate of 100%. Consensus was set at 70% and above for a component to be included in physiotherapy stroke rehabilitation guidelines (McKenna, Hasson, & Smith, 2002; Sumsion, 1998). Tables 7.8, 7.9, 7.10, 7.11, 7.12 and 7.13 illustrate the results of Round Two of the Delphi study.

All the participants (n= 16, 100%) agreed that muscle power, tone and range of motion should be included in assessment of stroke patients before commencement of rehabilitation. Only one participant (n=16, 6.25% agreed that Fugl-Meyer should be used for assessment of stroke patients on admission, in order to establish an estimated prognosis for the patient's agility six months after stroke. Additionally, most of the participants (qualitatively) commented that a huge number of physiotherapists were not erudite on the advanced outcome measure for assessment. As a result they used assessment tools that they were familiar with, and which they found easy to use.

Consensus was also reached on the components of the amount, intensity, frequency and duration of treatment sessions. All the participants (n= 16, 100%) agreed that, task-specific circuit therapy is practical to increase amount, intensity, frequency and duration of treatment sessions. In relation to the discharge plan, the majority of the participants (n = 14, 87.5%) agreed that stroke patients should receive rehabilitation by a team comprising of a doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist within the community.

All the participants (n = 16, 100%) favoured early, supported-discharge for stroke patients with mild to moderate disability, where a doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist could provide community rehabilitation services and also where the patient received caregiver support. In the same context, the majority of the participants (n = 15, 93.25%) preferred assessment of stoke patients, by a team comprising of doctor/clinical officer, a nurse, a physiotherapist and, an occupational therapist prior to discharge from hospital regarding

their suitability for ongoing rehabilitation. Similarly, n = 15, 93.25% of the participants agreed that stroke patients should receive early active rehabilitation by a team comprising of doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist.

For the management of the lower extremity, consensus was reached on use of Functional electrical stimulation (FES) and exercises on paretic leg to improve sitting, standing balance and walking (n = 16, 100%).

Table 7.8: Assessment (n=16)

Items	Agree	Mean	Mode
1. (a) Use Fugl-Meyer	(1) 6.25%	2.13	2
(b) Use of Motricity index	(0) 0%	1.31	1.5
(c) Action Research Arm Test	(0) 0%	1.25	1
(d) Muscle power, tone and ROM	(16) 100%	4.5	5

Table 7.9: Amount, Intensity, Frequency and Duration of Treatment Session (N=16)

Items	Agree	Mean	Mode
2. (a)Task-specific circuit	(16) 100%	5	5
(b) Use video self-modelling - Tailored	(0) 0%	1.25	2
3. (a) 1h practice 5 days a week	(1) 6.25%	1.69	2

Table 7.10: Discharge plan

Items	Agree	Mean	Mode
4.Rehabilitation by specialist stroke team	(0) 0%	1.25	2
Rehabilitation by nurse, PT, OT and counsellor	(2) 12.5%	2.25	2
Rehabilitation by doctor/clinical officer, a nurse, PT and OT	(14) 87.5%	3.75	4
Early supported discharge with comprehensive interdisciplinary team	(0) 0%	1.0	1
Early supported discharge by doctor/clinical officer, a nurse, PT and OT	(16) 100%	5	5
Assessment by specialist stroke team	(0) 0%	1.0	1
Assessment by nurse, PT, OT and a Counsellor	(1) 6.25%	2.13	2
Assessment by doctor/clinical officer, a nurse, PT and OT	(15) 93.25%	4.81	5
Use stroke rehabilitation unit for on-going rehabilitation	(1) 6.25%	2.13	2
Receive early active rehabilitation by a dedicated stroke team	(0) 0%	1.25	2
Receive early active rehabilitation by nurse, PT, OT and a counsellor	(1) 6.25%	1.0	1
Receive early active rehabilitation by doctor/clinical officer, a nurse, PT, OT	(15) 93.25%	4.81	5

Table 7.11: Management of the Lower Extremity. (N=16)

Items	Agree	Mean	Mode
Use treadmill training to improve walking speed and walking distance	(1) 6.25%	1.19	1
Use robot-assisted gait training to improve heart rate, sitting and standing	(0) 0%	1.0	1
Use robot-assisted training & FES to improve sitting, standing balance & walking	(0) 0%	1.0	1
Use FES and exercises to improve sitting, standing balance and walking	(16) 100%	5	5
Use exercises on paretic leg to improve sitting, balance and walking ability	(16) 100%	5	5

Table 7.12: Management of the Upper Extremity (N=16)

Items	Agree	Mean	Mode
Joint position biofeedback	(0) 0%	1.0	1
Robot-assisted Ex of shoulder and elbow to improve movements and muscle strength	(0) 0%	1.0	1
EMG-NMS) of the paretic wrist and finger extensors	(0) 0%	1.0	1
Use mechanical arm trainer to improve the dexterity	(0) 0%	1.0	1
Use Botulinum toxin A for patients with severe spasticity	(1) 6.25%	1.19	1

During Round Two, the experts also provided comments for the researcher to consider for stroke rehabilitation.

Table 7:13 illustrates the comments made by the experts in Round Two. A number of categories emerged from the themes during Round Two of the Delphi. In the theme of assessment and outcome measures used, the importance of assessment of muscle power, tone and range of motion as a baseline evaluation emerged. This was basically seen as a theme in support of unanimous agreement on the assessment.

Table 7:13: Qualitative Responses from Experts Round 2 Delphi

Component	**Theme**	**Comments**	**Reasoning**
Assessment	Outcome measures	*"A huge number of physiotherapist[s] are not knowledgeable on the advanced outcome measure for assessment, as a result they used assessment tools that they were familiar with, and were easy to use"* ***(P7).***	Lack of knowledge on advanced use of outcome measure for assessment.
Treatment Session	Frequency	*"Three times a week is more practical in the Kenyan setting due to inaccessibility of healthcare facilities as well as financial constraints on the family"* ***(P11)****.* *"It is not practical for patients to receive rehabilitation in stroke rehabilitation units. Kenya has only two hospitals that have these facilities. In all other hospitals patients are admitted in general ward or medical wards. This is where rehabilitation continues"* ***(P5)***	Challenges with poverty, and accessibility of healthcare facilities
Discharge Plan	Active	*"…it is more realistic to include medical disciplines that are available in*	Available team

	rehabilitation by a dedicated stroke team.	*assessment and discharge plan for sustainability"* ***(P7)*** *"In Kenya we can incorporate a nurse, physiotherapist, occupational therapist and a doctor or a clinical officer to take care of the patient"* ***(6)*** *"Involving a counsellor is important, however, some hospitals have the services of a counsellor available while the lower levels of hospitals don't have counsellors"* ***(P2)*** *"…involving a counsellor is vital, however counsellors are mostly available at Level Six and Level Five hospitals****". (P7)*** *"…early supported discharge is highly advised, this will prevent patients from getting infections in the wards. tTherefore I would recommend early discharge if a clinical officer, a nurse, a physiotherapist and an occupational therapist can be able to follow up patient management at the community level****" (P12)***	
Management of		*"Physiotherapists in Kenya are not conversant with Joint position*	Lack of resources

the Upper Extremity		*biofeedback"* ***(P10)*** *"Robotic mechanical devices are not available in Kenya"* ***(P8)*** *"EMG-NMS) are not available in Kenya"* ***(P3)*** *"Mechanical arm trainers are not available in Kenya"* ***(P14)*** *Botulinum toxin A is not available in public hospitals in Kenya, however some of the private hospitals make use of it for management of severe spasticity, but it is not a common practice"* ***(P16)*** *"Almost all the public hospitals use, casting, positioning and range to manage spasticity. Botulinum toxin A is not available in our setting"* ***(P1)***	
Management of the Lower Extremity	Use robot-assisted training	*"Robotic mechanical devices are not available in Kenya"* ***(P8)***	Lack of resources

On conclusion of Round Two of the Delphi, agreement was gotten on all components following input from the invited experts.

7.4.5. THIRD ROUND OF DELPHI STUDY

During Round Three, experts were requested to confirm and rank their agreement following consensus in Round Two. The contentious elements were e-mailed to the sixteen participants and comprised all the elements that had agreement levels of 70% and higher in Rounds One and Two (Appendix 22). The participants had the chance to re-consider and revise their initial replies if they wanted to. The participants were given a two-week deadline and a reminder was sent out one week before the deadline. An allowance of an additional one week was given, as the response rate was still low after two weeks. The final response rate was 93.75% (n = 15). Results are presented in Tables below:

Table 7.14: Assessment (n=16)

Items	Agree	Mean	Mode
1. Muscle power, Tone and ROM	(15) 100%	4.7	5

Table 7.15: Amount, Intensity, Frequency and Duration of Treatment Session (N=16)

Items	Agree	Mean	Mode
2. (a)Task-specific circuit	(15) 100%	5	5
(b) Repetitive practice	(15) 100%	5	5
3. (a) 1h practice 3 days a week	(15) 100%	4.6	5

Table 7.16: Discharge plan

Items	Agree	Mean	Mode
4.Rehabilitation by doctor/clinical officer, a nurse, PT and OT	(15) 100%	4.6	5
Early supported discharge with PT, OT and Caregiver support services	(15) 100%	4.5	5
Early supported discharge by doctor/clinical officer, a nurse, PT and OT	(15) 100%	5	5
Assessment by doctor/clinical officer, a nurse, PT and OT	(15) 100%	5	5
Use general ward/medical ward if ongoing rehabilitation	(15) 100%	5	5
Receive early active rehab by doctor/clinical officer, a nurse, PT and OT	(15) 100%	5	5
Access to continence advice	(15) 100%	5	5
Access to electronic aids	(15) 100%	5	5
Access to wheelchair services	(15) 100%	5	5
Access to psychosocial resources	(13) 86.7%	4.3	4
10.Rehab post discharge offered as needed, or at home	(15) 100%	5	5
Rehab post discharge based on client-centered approach	(15) 100%	4.7	5

Table 7.17: Management of the Lower Extremity. (N=16)

Items	Agree	Mean	Mode
11.Use ground walking to improve walking speed and walking distance	(15) 100%	5	5
12.Use therapy assistance and devices to improve heart rate, sitting and standing	(15) 100%	5	5
Use FES and exercises to improve sitting, standing balance and walking	(15) 100%	5	5
Use exercises on paretic leg to improve sitting, balance and walking ability	(15) 100%	5	5
Use FES and exercises to improve sitting, standing balance and walking	(15) 100%	5	5
Use circuit training for walking and mobility-related functions	(15) 100%	5	5
Use tailored repetitive practice for walking to improve functional ambulation	(15) 100%	5	5

Table 7.18: Management of the Upper Extremity (N=16)

Items	Agree	Mean	Mode
FES on wrist and forearm to improve functional motor recovery	(15) 100%	5	5
ES/FES is used for reducing motor impairment and improving upper limb function	(15) 100%	5	5
Circuit training for paretic arm to improve selective movements and dexterity	(15) 100%	5	5
18.Use task specific activities of paretic arm to improve movements and dexterity	(15) 100%	5	5
Use casting, ROM and positioning to reduce or prevent spasticity	(15) 100%	5	5

Fifteen of the participants (n=15, 100%) had consensus on assessment of manual muscle power, muscle tone and strength on admission, in order to establish an estimated prognosis of the patient, tailored repetitive exercises and task-specific circuit class training practice to increase the amount of practice. The opinions of the participants regarding the duration and frequency of therapy and the rehabilitation team, were unchanged for Round Three. [A result of] (n=15,100%) signifies that stroke patients should receive as much therapy as possible with a minimum of one-hour active practice per day for at least three days a week, and that rehabilitation be done by a team comprising a doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist (available medical healthcare provider) within the community.

Likewise the experts confirmed that stroke survivors can remain in the general ward/medical ward if ongoing rehabilitation is required, and receive early active rehabilitation by available medical healthcare providers (n=15, 100%).

The other area that needed confirmation from the experts was with regard to early supported discharge. The experts ratified early supported discharge (n=15, 100%) if community rehabilitation can provide physiotherapy, occupational therapy and caregiver support services. Likewise stroke patients, including those with severe stroke, should be assessed by a team comprising of available medical healthcare providers prior to discharge from hospital, regarding their suitability of ongoing rehabilitation.

Consensus was not altered for the available healthcare providers for early active rehabilitation (n=15, 100%). Experts were unanimous that stroke patients should have access to continence

advice, electronic aids, wheelchair services and psychosocial resources (n=15, 100%). In addition they advised that rehabilitation services after discharge should be offered to all stroke patients based on a client-centered approach, delivered in the most suitable environment, as needed and where available, delivered in the home setting (n=15, 100%).

With regard to management of the lower extremity; ground walking was agreed upon for training stroke patients in order to improve walking speed and walking distance in the absence of a treadmill. Also agreed on, was the use of therapy assistance in conjunction with assistive devices to improve walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living for stroke patients who are unable to walk independently.

There was validation of exercises on paretic lower limbs and electro stimulation of affected legs to improve sitting, standing balance and walking ability of patients with a stroke. Circuit class training and tailored repetitive practice of walking was seen to be practical to improve functional ambulation and other mobility-related activities

In management of the upper extremity, the use of functional electrical stimulation on the wrist and forearm, in addition to conventional therapy, was confirmed as practical in reducing motor impairment, and in improving functional motor recovery of patients with stroke. Similarly, circuit class training and task specific activities of the paretic arm were approved for improvement of selective movements and dexterity of patients with stroke. Lastly, all experts ratified casting, ROM and positioning for reducing or preventing spasticity.

Table 7.19 below presents a summary of the practice and context points identified during the consensus period

Table 7.19. Key practice and context points for standards for the implementation of recommendations in a Kenyan setting

Organizational	• An interdisciplinary team. • General ward/medical ward for ongoing rehabilitation is required. • Patients to have access to continence advice, electronic aids, wheelchair services and psychosocial resources.
Practice method	• Muscle power, muscle tone and range of motion for assessment of stroke patients on admission. • Tailored repetitive practice and task-specific circuit class training to be perused to increase the amount of therapy. • Rehabilitation to be be done for one-hour - active practice. • Frequency of treatment to be three days a week. • Use well known, validated screening tools and outcome measures. • Discharge rehabilitation to be based on a client-centered approach. • Community-based support programme. • Ground walking to improve walking speed and walking distance. • Therapy assistance and devices to improve heart rate and sitting. • Tailored repetitive practice for walking to improve functional ambulation. • Functional electrical stimulation on wrist and forearm to improve functional motor recovery. • Circuit training and task specific activities for paretic arm to improve selective movements and dexterity. • Casting, range of motion and positioning to reduce or prevent spasticity in management of the upper extremity.
Staff (who)	• Clinical officer/doctor, nurse, physiotherapist (interdisciplinary team). • Therapy clinicians (physiotherapists, occupational therapist). • Mental health practitioners (psychologist, counsellor). • Social worker. • Support staff and community workers.
Resources	• Rehabilitation services. • Access to equipment (where indicated). • Room space to conduct group and individual sessions. • Screening tools available; and culturally relevant.
Re-assessment	• Before and after rehabilitation (outcome-based approach).

Referral	• Refer early for rehabilitation therapy.
Patient/family	• Patient should be empowered to take part in decision-making. • Educate patient on the role of therapy; expected effects; adverse effects. • Patient preference to play a role. • Family education to enhance support. • Education for self-management.
Policy	• Standard treatment guidelines .

Through the successful implementation of the Delphi study, the experts evaluated and contextualized the contentious recommendations for local context. The following adjustments were incorporated to facilitate implementability of a contextualized physiotherapy clinical practice guideline and to improve effectiveness when implemented. Firstly, muscle power, muscle tone and range of motion will be utilized for assessment of stroke patients on admission. Stavric, (2007) in a study on muscle power, emphasizes the importance of assessment of power after stroke. The author asserts that muscle power determines the ability to generate a quick muscle force and therefore it may have a larger influence on activity performance. Similarly, Thibaut, Chatelle, Ziegler, Bruno, Laureys and Gosseries (2013), in a study on muscle tone assessment after stroke, state that it is important to focus on three issues relating to the functional problem when evaluating tone. These are:

i. identifying the clinical pattern of motor dysfunction and its source
ii. identifying the patient's ability to control muscles involved in the clinical pattern, and
iii. differentiating the role of muscle stiffness and contracture.

Likewise in a discussion on range of motion, Lang, Bland, Bailey, Schaefer and Birkenmeier (2013) assert fractionated and multi-faceted movement deficits may be present after a stroke..

Secondly, tailored repetitive practice and task-specific circuit class training will be perused to increase the amount of practice in rehabilitation. This concurs with studies by Arya, Pandian, Verma and Garg (2011); Hubbard, Parsons, Neilson and Carey, (2009) and French, et al.. (2007). The studies maintain that motor training after stroke should be targeted to goals that are relevant to the functional needs of the patient. Therefore, focusing on task-specific training to facilitate activities of daily living or other relevant motor tasks is a well-accepted principle of stroke rehabilitation. The approach emphasizes the repetitive practice of skilled motor performance to improve individual functional abilities (Arya, et al.., 2011). Task-specific practice can effectually recover a wide array of motor behaviours including the upper limbs, lower limbs, sit-to-stand movements and gait after stroke (Hubbard, et al., 2009; Arya, Verma, Garg, Sharma, Agarwal and Aggarwal, 2012). Furthermore, repetitive task-specific practice has been found to restore function as opposed to non-repetitive training (Michaelsen, Dannenbaum, & Levin, 2006).

Rehabilitation of stroke patients will be done for one-hour of active practice as suggested by the Intercollegiate Stroke Working Party (2008). However, the frequency of at least five days a week will be replaced by three days a week due to shortage of resources and logistics.

With regard to a discharge plan, general ward/medical ward will be considered if ongoing rehabilitation is required. This is contrary to Gonzalez-Suarez, et al. (2012) who recommended a stroke rehabilitation unit for on-going rehabilitation. This was due to poor resources. A further

component that needed to be incorporated in the CPG was the involvement of the doctor/clinical officer, a nurse, physiotherapist and occupational therapist. The central reason for including these disciplines in the CPG is due to their availability in most of the health settings. Likewise, it will be practical for patients to have access to continence advice, electronic aids, wheelchair services and psychosocial resources, which are also supported by literature as important components needed for successful rehabilitation of stroke patients.

Post discharge rehabilitation is essential to re-establish pre-morbid or optimal levels of functional independence and return to work. The experts advised that rehabilitation post discharge be offered as needed, or at home as advocated by American Clinical Practice Guideline (2010). Likewise post discharge rehabilitation should be based on a client-centered approach (National Stroke Foundation, 2010). Concerning management of the lower extremity, ground walking was cogitated to improve walking speed and walking distance, therapy assistance and devices to improve heart rate, sitting and tailored repetitive practice for walking to improve functional ambulation. This echoes the Royal Dutch Society for Physical Therapy (2014) and Gonzalez-Suarez, et al. (2012), who stresses on ground walking in conjunction with conventional gait training to enhance walking speed, endurance and walking distance. Gonzalez-Suarez, et al. (2012) also strongly endorse the use of a tailored repetitive practice of walking or components of walking to improve functional ambulation.

Functional electrical stimulation on wrist, and forearm will be used to improve functional motor recovery (Mirelman et al.. 2009; Kwakkel et al.. 2008; Fazekas et al.. 2007; Mehrholz et al.. 2007) Circuit training and task specific activities for paretic arm will be utilized to improve

selective movements and dexterity, consistent with French et al.. (2010). Harris et al. (2009) and Kirton et al. (2008) endorse repetitive task training for improving upper limb motor coordination in individuals with some voluntary finger extension.

Lastly, casting, range of motion and positioning will be considered to reduce or prevent spasticity in management of the upper extremity, which is in tandem with Gonzalez-Suarez, et al. (2012). It is important to note that much of the adjustments made were due to a shortage of resources.

7.5. DISCUSSION

Complex factors were found to influence the local context in which stroke patients are rehabilitated, and have acted as barriers to implementation of high quality recommendations. The identified contextual factors cannot be viewed in isolation as they represent the interaction between the individual, Kenyan healthcare system, and the overall context in which the person lives (WHO, 2013).

An evidence-based, contextually sensitive CPG for stroke rehabilitation is likely to meaningfully influence individual factors, organizational factors and, in part, healthcare systems. An important contextual factor that spans across individual, and organizational contexts relates to availability of comprehensive interdisciplinary members, and use of outcome measure. In Chapter 3 and 4, assessment of patients with stroke emerged as an important factor, influencing individual the physical therapist intervention.

Continuous medical Educational for the physical therapist, which include training on use of

recommended tools for assessment can lead to behavior change and enhanced healthcare literacy (Hillier, et al., 2011). However, experts participating in this research said that public health facilities do not have all the recommended healthcare service provider recommended in a stroke management team. This lack of staff is in agreement with (Miseda, Were, Murianki, Mutuku, & Mutwiwa, 2017).

Therefore, feasible strategies for improving staff establishment are needed to optimise outcomes for stroke rehabilitation. The unavailability of speech therapist is one example of the need for staff to enhance rehabilitation.

7.6. CONCLUSION

With the use of the Delphi technique it was possible to get the opinion and input of experts regarding the content of a contextualized clinical practice guideline that could ultimately be implementable in Kenya, among physiotherapists, in all healthcare settings. The results and observations following the Delphi study indicate that the Delphi technique can be a very helpful tool during the process of contextualization. This is particularly vital when experts' input is of high priority, and creatively advises on crucial areas.

In this study the researcher, through utlilization of the Delphi technique, included important stakeholders who have the expertise that is needed to improve stroke rehabilitation. In the current study one participant was lost to follow up during the process at the third stage, which reflects a possible weakness in the Delphi process.

This notwithstanding, through this process the researcher was able to obtain consensus on the assessment of stroke patients, timing, frequency, duration and intensity of therapy, discharge plan, management of lower extremity and management of the upper extremity.

More important aspects have been highlighted that should affect the implementability of the guideline for stroke rehabilitation. These include:

i. Use of certain outcome measures for assessment
ii. Use of a rehabilitation team that is available in all healthcare setting

The Delphi study has played an important role in adding substance and meaning to the way forward for stroke rehabilitation in Kenya.

SUMMARY OF CHAPTER

This chapter has discussed the method and results of the Delphi study aimed at designing the content for a physiotherapy stroke rehabilitation guideline. Consensus was reached on the various elements of rehabilitation that are not directly implementable in Kenya. Appendix 23 presents a core set of contextualized recommendations.

CHAPTER EIGHT

CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

8.0. SUMMARY OF OVERALL STUDY

The goal of this study was to review the existing stroke rehabilitation clinical guidelines and contextualize a clinical guideline for stroke rehabilitation in Kenya, which will equip physiotherapists with evidence-based knowledge to effectively manage post stroke related challenges. The study was conceptualized using Philippines Academy of Rehabilitative Medicine as a theoretical framework that highlights the process in three phases, as reflected in Figure 8.1 below.

The core aims per phase were as follows:

i. Understanding the context through a mixed approach;
ii. Search and synthesis of evidence-based recommendations through a systematic review;
iii. Seeking consensus through a Delphi study with experts in stroke rehabilitation.

This executive summary aims to provide an integrated overview of the different phases. The chapter concludes with the contribution that the study makes to the field of stroke rehabilitation, with recommendations for external review and public participation for implementation of the guidelines. Lastly, the limitations of the study are highlighted.

8.1 SUMMARY OF PHASES

8.1.1. PHASE ONE: UNDERSTANDING THE CONTEXT

Understanding the stroke patient journey is crucial to implementation of recommendations for people being rehabilitated from stroke, and the physiotherapists treating them. Phase One of the study aimed at understanding the stroke patient rehabilitation journey. This was achieved through one qualitative and two quantitative studies (mixed study), (Guion, Diehl and McDonald, 2011). This mixed study investigated contextual factors influencing stroke rehabilitation experienced by a sample of stroke survivors, caregivers and healthcare practitioners caring for patients with stroke. The results of Phase One included the following:

Rehabilitation settings

The results indicated that stroke patients are admitted to the neurological, medical and general ward after the onset of the disease, and are rehabilitated during their stay in the hospital (Lee, Chang, Chen, & Wei, 2010; Duncan et al.., 2005). The primary aim of a hospital stay is to stabilize the risk factors associated with a stroke and manage the outcome of the stroke.

Interdisciplinary team

Stroke rehabilitation requires coordinated interdisciplinary care (American Clinical Practice Guideline, 2010). Participants in this study showed that rehabilitation of stroke patients in Kenya involves an inter-disciplinary approach (American Clinical Practice Guideline, 2010; Duncan et al., 2005). This team provides individual assessment, treatment, regular review, discharge planning and follow-up. The stroke rehabilitation team includes doctors/clinical officers, nurses,

physiotherapist, occupational therapist, social workers, orthotic, dieticians, counselors and speech therapists (American Clinical Practice Guideline, 2010; Van Peppen et al., 2004).

Likewise, data showed family participation throughout therapy process. These are motivated, accessible and low-cost sources of therapy. They provide services to the patient especially in cases where the cost of physiotherapy services is overwhelming, which is consistent with the literature.

Assessment

Analysis indicated evaluation of stroke patients using validated, standardized instruments for reliable documentation of the patient's neurological condition, levels of disability, functional independence, family support, quality of life and progress over time (Agency for Health Care Policy and Research, AHCPR, 1995). However, a minority of the physiotherapists did not use standardized instruments due to lack of knowledge. This indicates the needs for continuous medical education to ensure that physiotherapists in Kenya are on par with international assessment tools and procedures.

Data indicates that a minority (13.4%) of physiotherapists, use the National Institute of Health Stroke Scale (NIHSS), which is contrary to American Clinical Practice Guideline (2010) recommendations. Clinical practice guideline recommends that the National Institutes of Health Stroke Scale (NIHSS) should be used at the time of presentation/hospital admission, or at least within the first 24 hours following admission.

Analysis revealed various ICF components assessed in stroke patients prior to the implementation of the treatment plan. These include assessment of impairment, particularly

communication, cognitive function, muscle performance and sensation (National Clinical Guideline Centre, 2013; Jorgesen et al. (2000).

A pattern of impairments reduces and occasionally destroys the patient's ability to perform ADLs; therefore the patient's ability to perform ADLs is evaluated by the physiotherapists on admission. This finding is consistent with secondary literature (McKevitt et al, 2011; Miller et al., 2010; Pan, Lien, & Chen, 2010). Some of the activity limitations assessed include dressing, eating, grooming and bathing.

The last component for assessment, in line with ICF, is participation. Analysis presented assessment of activities such as religious responsibilities, employment, leisure time, recreational activities, reading and problem solving (Miller, et al. (2010).

Rehabilitation of stroke patients

Physiotherapy rehabilitation emerged significantly across the study to maximize self-determination and optimize choices for those with stroke. Data indicated the importance of improving function, prevention of further deterioration and reintegration into the community (Duncan, et al., 2005; Jorgensen et al., 2000). Data revealed physiotherapy management to starts once the patient is stable (Sorbelloet al., 2009; Bernhardt, et al., 2008; Gagnon, et al., 2006).

With regard to frequency of rehabilitation, analysis showed that stroke patients are rehabilitated five times a week as in-patients (Barker et al., 2007; Cifu & Stewart, 1999); while out-patients present at a frequency of three times a week. The frequency in out-patient visits is reduced, contrary to CPGs recommendations. This is due to difficulty in transferring to the out-patient clinic. Decrease in the frequency of physiotherapy sessions will ultimately decrease the intensity of physiotherapy and has a risk of affecting the outcome (Teasell, Foley, Salter, Bhogal and

Jutai). The average length of physiotherapy sessions was reported to be one hour (Warner & Kessler, 1996).

Patient discharge

Results highlighted that the Kenyan healthcare system encourages early discharge once medical stability is achieved, to continue with physiotherapy as out-patients, (institutions, homes, or community-based rehabilitation) (Teasell et al., 2009). Early discharge is advised in order to reduce the cost of hospital care and infection prevention (Hu et al., 2010); Chang et al. (2002); Cifu & Stewart (1999).

Rehabilitation after discharge is undertaken in a Hospital/Center (Lee, Chang, Chen and Wei, 2010), or at community level (Miller et al., 2010; Duncan et al., 2005; Lee, Huber, & Starson 1996); depending on stroke survivor and family/caregivers wishes, local resources and availability of transport (Gonzalez-Suarez, et al. 2012: Miller et al., 2010).

8.1.2. PHASE TWO: EVIDENCE SEARCH AND SYNTHESIS

The phase determined that there are well-credentialed guidelines with international standards supporting evidence-based practice developed by policy-makers and clinicians, with experts on the topic (Field & Lohr 1992). The qualified guidelines used the WHO's International Classification of Functioning Disability and Health's (ICF) framework (Gonzalez-Suarez, et al., 2012; American Clinical Practice Guideline, 2010; National Stroke Foundation, 2010). Eight guidelines were retrieved while three qualified for inclusion. Evidence-based recommendations were extracted from the three guidelines.

Recommendations were put into context using the PARM framework. Evidence- based recommendation and contextual linkage is important for the development of a practical guideline (Gonzalez-Suarez, et al2012). Thus this phase of the study was important as it highlighted additional aspects that needed to be considered in order to achieve a practical guideline.

8.1.3. PHASE THREE: CONSENSUS

An important aspect of a clinical guideline is that its practicality must be established. The Third Phase of this study sought consensus on contentious items (context and decision points) of the contextualized clinical guidelines, aimed at exploring practicality. This process resonates with the literature.

The Delphi method provided the opportunity for experts to contextualize the guidelines. This method allowed the participants to reach consensus on all context and decision points of the clinical guidelines, without influence or bias of face-to-face consensus where such interactions may lead to a stronger voice influencing the decision-making process (Hasson, Keeney & McKenna, 2008). The response rate to our Delphi survey for the three rounds was high (70%).

8.2. CONCLUSION OF THE OVERALL STUDY

What are the current practices and processes for stroke rehabilitation in Kenya?

What does the Clinical Practice Guideline for physiotherapists entail in the context of the multidisciplinary team management of the stroke patient in Kenya?

This study achieved its overall aim by understanding the context, sourcing for evidence-based CPGs for stroke rehabilitation, synthesis of the recommendations and contextualizing

recommendations. The objectives were achieved in a stepwise process by determining contextual factors in stroke rehabilitation and integrating them with a core set of evidence-based clinical recommendations.

This study is important as it contributes to the knowledge base of how to address the burden of stroke within the current constraints of the healthcare system in Kenya. The findings of the study shows that the delivery of optimum healthcare for stroke rehabilitation, by implementing CPG, will require changes in practice; some change in content and delivery of physiotherapy; and changes in healthcare organization and policy.

Optimal rehabilitation of stroke requires an understanding of contextual and non-contextual factors that influence rehabilitation. The project findings confirmed that CPG contextualization as opposed to the adoption, adaption or *de novo* development of CPGs is a feasible process in resource scarce settings. As part of the contextualizing process, a framework of contextual factors should be established.

8.3. RECOMMENDATIONS DERIVED FROM THE OVERALL STUDY

What are the current practices and processes for stroke rehabilitation in Kenya?

What does the Clinical Practice Guideline for physiotherapists, in the context of the multidisciplinary team management of the stroke patient in Kenya entail?

Based on the lessons learned from this study, the following recommendations are made:

Recommendations following the survey, interviews and archival data

The major observation that emerges from this part of the study is that most of the clinicians do not engage in either the use of validated outcome measures for assessment of stroke patients, or

in evaluation assessment. As a result, the review of patients' progress is not objective. This makes patients' follow-up difficult for other healthcare providers and researchers. The main recommendation to clinicians is to engage in the use of validated outcome measure tools as well as to ensure continuous medical education to ensure up to date information. This will facilitate understanding patient assessment, re-assessment and continuity of therapy.

Even though most physiotherapists have gone through training and would seem to understand assessment of strokes, all too often many lack the deeper understanding of outcome measures that would allow them to effectively assess and manage the impact of stroke. If physiotherapists aim to integrate use of outcome measures into stroke management, care should be taken so as not to make assumptions that the use of the tool equates to the understanding of it. The advancement in physiotherapy in Kenya must take into account access to outcome measures, as well as their understanding of how to use those tools within the context of stroke rehabilitation.

Recommendations from systematic review

The findings of Part Two of this research points at several indicators for guideline development. For example, the scarcity of CPGs recommendations on pertinent aspects such as the use of cost effective equipment in rehabilitation, indicates that guideline developers could extend the scope and coverage of the CPGs, possibly by inclusion of the diverse resource settings in guideline development, to ensure holistic CPGs on stroke rehabilitation. Additionally, there is a need to include contextual factors during guideline development, to develop and document strategies to facilitate the successful uptake and implementation of CPGs into the intended setting. Guideline developers are encouraged to use well-developed frameworks, such as GRADE and FORM, to

communicate the level of evidence and strength of the recommendation.

The PARM guide for merging recommendation had different levels of grading: high, moderate, or low. High evidence was described as Levels One or Two, A or B. Moderate evidence was described as Levels TWO or THREE, B or C, while, low quality evidence was described as Levels THREE or FOUR, C or D. This grading does not give a clear distinction on classification of Level TWO and THREE, B and C. Further research should be done to clear the grey areas.

Likewise, the PARM guide for merging recommendation considered different aspects in each recommendation during merging. This included levels of evidence, volume of recommendations, consistency of recommendation content and currency of literature. Further research needs to be done on the importance of currency of literature in rating of evidence.

The finding of Part Three of this research provides a contextualized guideline. It is recommended that an external review be conducted before the implementation of the contextualized guideline. The external review of the contextualized guideline is beyond the scope of this PhD study. External review will evaluate whether the contextualized clinical practice guideline for rehabilitation of adults with stroke is applicable and acceptable to the intended setting. Subsequently, an implementation plan needs to be developed and piloted to ensure the successful uptake of the contextualized CPG for stroke rehabilitation.

The implementation plan should address the contextual factors influencing stroke rehabilitation identified in this study as patient factors, practitioner factors, the social and environmental circumstances within which the patient lives and healthcare system factors. The implementation of the contextualized CPG for stroke rehabilitation would necessitate training of the key stakeholders to support and facilitate a change in practice. Additionally, a range of end-user

support documents is proposed to facilitate the application of the CPG for quality stroke-care. An example of this end-user document is the evidence summaries. The implementation plan for the contextualized CPG would need a staff development plan. Furthermore, there is a need for more information on the inclusion of functional-based interventions as part of the care plan for stroke rehabilitation. Additionally, the delivery and feasibility of coordinated integrated stroke rehabilitation programs, which combine a bio psychosocial approach in this context, should be explored. Community-based rehabilitation programs need to be developed and their feasibility explored.

Novel ways to address system challenges should be developed and investigated. These could include factors such as the number of treatment sessions in a week and continuity of rehabilitation after discharge. Further examples are the development of clear care pathways, clear lines for referral, rehabilitation and follow up. Additionally, innovative ways on how to integrate stroke rehabilitation within policies and initiatives for non-communicable diseases needs to be advocated, developed, and evaluated. Stroke needs to be included in the priority of non-communicable diseases to address its considerable burden on the healthcare system and on the patient.

Further studies can elaborate on the content and adequacy of education and training about stroke rehabilitation in undergraduate healthcare curriculums.

8.4. LIMITATIONS OF THE STUDY

The studies conducted as part of this research project had limitations, which should be taken into account when interpreting the findings. The results should be interpreted in the light of the following limitations:

Limitations of the mixed approach

The healthcare provider sample for the interviews included various members of the multi-disciplinary team, with good representation of those active in the patient journey. The interviews were relatively heterogeneous, however, not all healthcare disciplines involved in stroke rehabilitation were included, as some were hired on contract basis, notably the speech therapist. Generalizing findings to other populations is also limited.

The role of the interviewer in qualitative research is also acknowledged. The interviewer is a physiotherapist and participants' knowledge about the occupation of the interviewer could have influenced their responses. The participants' honest discussions about positives and negatives of treatment, and the agreement with international literature, indicate that the interviewer as physiotherapist had little effect on this aspect.

The survey was conducted in 17 public healthcare facilities; most of the public health facilities operate with minimal resources, therefore the process of care factored in may not give a clear reflection of the private facilities.

Limitations of the systematic Review

Clinical Practice Guidelines were excluded if they were not available in English; and were not published. This might have excluded quality guidelines published in other languages.

Quality assessment of the clinical guidelines in the second part of the study used the AGREE II tool. This tool is so meticulous and easily disqualified many CPGs. Therefore, few guidelines qualified for extraction of recommendations.

Recommendations were extracted only from high-quality CPGs. Permission was requested from CPG developers to use CPGs as part of the contextualization process. However, few responded.

Due to the relative novelty of CPG contextualization, there might be a need to communicate with recognized CPG development bodies (e.g. NICE, SIGN) about the process and purpose of contextualization.

The PARM standard writing guide was used to merge recommendations. One of the considerations for level of evidence classification was the reference for each recommendation, however, some of the included guidelines did not give the references, but had level of evidence instead (high, moderate, low). The lack of the reference likewise compromised the aspect of the volume of reference as a consideration for merging recommendations.

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APPENDIX 1: ETHICAL CLEARANCE UWC

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT

29 September 2014

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:
Ms NW Kingau (Physiotherapy)

Research Project:	Contextualization of physiotherapy clinical practice guideline for stroke rehabilitation in Kenya.
Registration no:	14/7/7

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Private Bag X17, Bellville 7535, South Africa
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APPENDIX 2: ETHICAL CLEARANCE KENYA

APPENDIX 3: CONSENT FORM

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959, Fax: 27 21-959

E-mail: nkwanjiru@yahoo.com

Title of Research Project:

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name…….

Participant's signature…….

Witness…….

Date……

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator Name: Naoimi Wanjiru Kingau

University of the Western Cape

Private Bag X17, Belville 7535

Cell: +27784745510/ +254721422899

Email: nkwanjiru@yahoo.com

APPENDIX 4: INFORMATION SHEET

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E-mail: **nkwanjiru@yahoo.com**

Project Title: Contextualization of physiotherapy clinical practice guideline for stroke rehabilitation in Kenya

This is a research project being conducted by Naomi Wanjiru Kingau at the University of the Western Cape. We are inviting you to participate in this research project because you are a physiotherapist involved in stroke rehabilitation. The purpose of this research project is to contextualize physiotherapy clinical practice guideline for stroke rehabilitation in Kenya

Kenya is a developing country that lack evidenced based clinical guidelines for stroke rehabilitation. This affects the efficiency and effectiveness of stroke rehabilitation hence poor outcome as earlier mentioned. Most clinical guidelines have been formulated in the western world and reflect a developed world health system and services, disease epidemiology and workforce (Gonzalez-suarez et al., 2012). These guidelines are hence not directly relevant or generalizable to developing countries. Guidelines are costly to produce. It is therefore cost effective for developing countries to contextualize or adapt available western guidelines (Gonzalez-suarez et al., 2012).

You will be asked to fill in a questionnaire. The study will be done in all county referral hospital with the physiotherapist. The questionnaire will be given out and is expected to be filled within 7 day; the researcher will collect them after 7 days

We will do our best to keep your personal information confidential. To help protect your confidentiality, no participant will be named during the process of filling in the questionnaire

To maintain the confidentiality of the data, the researcher will have locked filing cabinets and storage areas, will use identification codes only on data forms, and use password-protected computer files. The survey will be anonymous and will not contain information that may personally identify you. The following, if applicable (1) your name will not be included on the surveys and other collected data; (2) a code will be placed on the survey and other collected data; (3) through the use of an identification key, the researcher will be able to link your survey to your identity; and (4) only the researcher will have access to the identification key.

If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

There are no known risks associated with participating in this research project. This research is not designed to help you personally, but the results may help the investigator learn more about contextualization of clinical guidelines. We hope that, in the future, other people might benefit from this study through improved rehabilitation services for stroke management. Additionally, the results of this study may facilitate increase the awareness on evidenced based clinical practice amongst the service providers and the policy makers in Kenya as well as assist researchers intending to take up additional studies on stroke rehabilitation

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

This research is being conducted by *Naomi Wanjiru Kingau from department of physiotherapy* at the University of the Western Cape. If you have any questions about the research study itself, please contact *Naomi Wanjiru Kingau* at: +254721422899 email nkwanjiru@yahoo.com

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Department: Professor Anthea Rhoda

Dean of the Faculty of Community and Health Sciences: Professor Jose Frantz

University of the Western Cape

Private Bag X17

Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.

APPENDIX 5: INTERVIEW GUIDE FOR OTHER PROFESSIONALS ON STROKE PATIENTS PROCESS OF MANAGEMENT

Q1. I am aware that you have been involved in management of stroke patients. Please, let's talk the referral.

- Where do you get these patients from?

Q2Tell me about the role you play in management of stroke patient manage in stroke patients

- How long do you take with the patients?

Q3. Tell me how you go about management of stroke patient after discharge

- Where do you sent then to after management

Q4. What is the involvement of the family member in stroke management?

Is there any other information regarding stroke management you would like to share with me?

I am very grateful for your time and most importantly your information that you have shared with me. This information will be of immense support in improving stroke rehabilitation at this institution and the country at large.

APPENDIX 6: INTERVIEW GUIDE FOR STROKE PATIENTS ON PHYSIOTHERAPY MANAGEMENT

Q1. I am aware that you have been going through rehabilitation of stroke or taking care of a patient going through stroke rehabilitation; let's talk about what happened at the time the patient had the stroke till now?

- Assessment
- In-patient physiotherapy treatment
- Out-patient physiotherapy treatment
- time taken during treatment in physiotherapy
- amount of exercises done

Q2.Tell me about the problems you had after stroke and were managed after stroke.

Q3. Tell me about the involvement of other health service providers in your journey through rehabilitation

Q4. Tell me the type of setting you were referred to for rehabilitation after discharge

Q5. Let us discuss the participation of your family members in your rehabilitation process

Is there any other information regarding stroke rehabilitation you would like to share with me?

I am very grateful for your time and most importantly your information that you have shared with me. This information will be of immense support in improving stroke rehabilitation at this institution and the country at large.

APPENDIX 7: INTERVIEW GUIDE FOR PHYSIOTHERAPIST ON STROKE PATIENTS PROCESS OF MANAGEMENT

Q1. Explain your rehabilitation of patients with stroke"

- Assessment
    - Outcome measure tool used
- Treatment: out-patient and in-patient
    - Models of rehabilitation
    - content,
    - frequency
    - duration etc
- Referral

Q7. How is the involvement of the family member in stroke rehabilitation?

Is there any other information regarding stroke rehabilitation you would like to share with me?

I am very grateful for your time and most importantly your information that you have shared with me. This information will be of immense support in improving stroke rehabilitation at this institution and the country at large.

APPENDIX 8: INTERVIEW GUIDE FOR CAREGIVERS OF STROKE PATIENTS THROUGH REHABILITATION JOURNEY

Q1. Tell me about the changes if any you note in the person who has the stroke

Q2. Tell me about the treatment from physiotherapy the person has received if any

- Assessment
- In-patient physiotherapy treatment
- Out-patient physiotherapy treatment
- time taken during treatment in physiotherapy
- amount of exercises done

Q3. Tell me about the involvement of other health service providers in your patient's journey through rehabilitation

Q4. After your patient was discharged from the hospital, what type of setting were you referred to?

Q5. Let us discuss the participation of family members in the process

Is there any other information regarding stroke rehabilitation you would like to share with me?

I am very grateful for your time and most importantly your information that you have shared with me. This information will be of immense support in improving stroke rehabilitation at this institution and the country at large.

APPENDIX 9: DATA CAPTURING SHEET
FOR PHYSIOTHERAPY MANAGEMENT FOR STROKE PATIENTS IN KENYA

ID/CODING.....

NUMBER OF THE DATA CAPTURING SHEET.....

DEMOGRAPHIC DATA

Age:…….....

Gender

Male

Female

Date of admission….....

Date of discharge….....

Side of body impaired/affected:

Left

Right

Others……Specify ……

MEDICAL DATA

ASSESSMENT

Outcome measure tool used for patients assessment post stroke e.g. Barthel Index

Gross motor function of Rivermead motor assessment

Barthel index

National institute of health stroke scale

Ashworth Modified Scale

Others……specify……
……..……
……..

Patient was assessed for neglect

Yes No

Patient was assessed for balance

Yes No

Patient was assessed for coordination

Yes No

Patient was assessed for tone

Yes No

The patient was assessed on the risk of fall

Yes No

Patient was assessed for bedsores?

Yes No

The patient was assessed on respiratory fitness

Yes No

Types of impairment and functional loss identified from patients assessment (tick all that apply)

Muscle Weakness

Pain

Spasticity

Poor Posture

Limited Range of motion

Neglect

Poor coordination

Poor balance

Contractures

Sensation loss

Other.....Specify:…….....
.....
.....
.....
.....

Team members involved in patient management:

Counsellor	Yes	No
Psychologist	Yes	No
Physiotherapist	Yes	No
Occupational therapist	Yes	No
Speech and language therapist	Yes	No
Dietician	Yes	No
Social worker	Yes	No
Medical doctor	Yes	No
Nurse	Yes	No
Orthotist	Yes	No
Radiographer	Yes	No
Pharmacist	Yes	No

INPATIENT REHABILITATION

Timing of Physiotherapy

Patient was ambulated immediately after getting stable

Patient was ambulated after a week

Patient was ambulated after a month

Patient was ambulated after more than one month

Number of physiotherapy treatment sessions in a week

less than 1 1 2 3 >4

Duration of treatment physiotherapy treatment

< 45 min 45 min - 1hour >1 hour

The amount of exercises increases with improvement of various outcome

Yes No

The patients was reassessed for impairment and functional loss after

Daily weekly monthly >2 months

Level of assistant used for mobility and self-care of the patient post stroke

Independent

With assistance

Dependent

OUTPATIENT STROKE REHABILITATION

Referral

Type of stroke rehabilitation facility the patient was referred to

Hospital/centre cased

Community based

Other……please specify:
……
……
……..

Number of physiotherapy sessions in a week

< 1 1 2 3 >4

Duration of Physiotherapy Treatment

< 45 min 45min - 1hour

There was use of electrotherapeutic modalities

Yes No

MANAGEMENT

Therapeutic approach used for rehabilitation of the lower extremity

Bobath/NDT/

PNF/Brunnstrom

Davies

Carr and Shepherd

Mirror therapy

Passive /active exercises

Circuit therapy

Use functional oriented activities

Conventional stroke rehabilitation program

Combination

Other……specify……
……
……
…….

Therapeutic approach used for rehabilitation of the upper extremity

Constrained Induced Movement Therapy

Passive /active exercises

Circuit therapy

Use functional oriented activities

Conventional techniques for the rehabilitation

others……specify……..

……

……

Management of various components of functions

The patient was managed to improve tone

Yes No

The patient was managed to improve strength

Yes No

The patient was managed to improve balance

Yes No

The patient was managed to improve coordination

Yes No

The patient was managed to improve gait

Yes No

The patient used an ambulatory/walking aid for mobility

Yes No

There was us of assistive devices

Yes No

COMMUNITY BASED REHABILITATION AND INTEGRATIONS

Was the patient referred to any community based rehabilitation unit or out patients units?

Yes No

If Yes, specify the management plan at the community based rehabilitation centre

……
……
……
……
……
……

APPENDIX 10: SURVEY QUESTIONNAIRE FOR PHYSIOTHERAPY MANAGEMENT FOR STROKE PATIENTS IN KENYA

BACKGROUND

Which year did you complete your school training as a physiotherapist ……

What is your degree?

Bachelors of Science in physical therapy

Masters of Science Physical therapy

Doctor in Physical therapy,

Doctor in Philosophy

Within which type(s) of setting have you worked with CVA/stroke patients? (Please select ALL that apply)

Acute care

Nursing home

Rehabilitation unit

Home health

Outpatient clinic

Other……specify:
……
……
……

What health service providers are available for stroke rehabilitation in your institution?

Physiotherapist

Occupational therapists

Speech therapist

Counselor

Psychologist

Dietician

Social worker

Medical doctor

Nurse

Orthotist

Radiographer

Pharmacist

Other ……Specify ……..

……

……

……...

ASSESSMENT

Which outcome measure tools do you use for patients assessment post stroke e.g. Barthel Index

Gross motor function of Rivermead motor assessment

Barthel index

National institute of health stroke scale

Ashworth Modified Scale

Motor activity log (MAL)

Functional ability rating scale of the Wolf motor function test (WMFT)

Short form 36

Others……specify……
……..……
…….

When you assess your patients, do you assess for neglect Yes No

When you assess your patients, do you assess for balance Yes No

When you assess your patients, do you assess for coordination Yes No

When you assess your patients, do you assess for tone Yes No

When you assess your patients, do you assess for fall Yes No

When you assess your patients, do you assess for bedsores? Yes No

When you assess your patients, do you assess for respiratory fitness Yes No

TREATMENT

Which method(s) of CVA/stroke Rehabilitation are you using in your institution? (Please Select ALL that apply)

Bobath/NDT

PNF/Brunnstrom

Davies

Carr and Shepherd

Passive /active exercises

Circuit therapy

Use functional oriented activities

Conventional stroke rehabilitation program

Constrained Induced movement therapy

Other……please, specify……

……
……

……..

Which types of impairment and functional loss do you manage at your institution (tick all that apply)

(a) Management of sensory and motor impairments

Visual field loose

Hemi-neglect

Motor strength

Spasticity

Post stroke pain

Posture

Poor coordination

Poor balance

(b) Management of communication disorders

Aphasia

Dyspraxia

Dysarthria

Cognitive/communication deficit

(c) Managing post stroke complications that are pertinent to rehabilitation

Contractures

Reflex sympathetic dystrophy

Bladder and bowel dysfunction

Decubitus ulcers

Limited Range of motion

Decrease in cardiovascular and muscular endurance

Deep venous thrombosis

Sexual dysfunction

Depression

Other.....Specify:…….....
.....
.....
.....
.....

Prevention of recurrent stroke

Exercises

Medication

Other.....Specify:…….....
.....
.....

What equipments are available in your facilities for stroke rehabilitation?

TENS

Hot packs

Pulley system

Parallel bars

Quadriceps drill

Table fine motor exercisers

Static bicycle

Other ……Specify ……..

……

……

……...

……..

INPATIENT REHABILITATION

When do you mobilize your patients after strike

Patient are mobilized immediately after getting stable

Patient are mobilized after a week

Patient are mobilized after a month

Patient are mobilized after more than one month

How many physiotherapy treatment sessions does a patient get in a week?

1 2 3 >4 less than 1

How long does one session of physiotherapy treatment take?

< 45 min 45 min - 1hour >1 hour

How is the progression of Intensity of physiotherapy treatment

Increased with improvement of various outcome measures

Reduce with improvement of various outcome measures

Intensity of treatment is unaltered

Others……..specify……
……
……

How often do you re-assess your patients?

Weekly

Monthly

>Month

Other ……Specify ……

……

……

What type of stroke rehabilitation facility/setting do you refer your patients to during discharge (tick all that apply)

Hospital/centre cased

Community based

Other……..please specify:
……
……
……

OUTPATIENT STROKE REHABILITATION

Number of physiotherapy sessions in a week

1 2 3 >4 < 1

Duration of Physiotherapy Treatment

< 45 min 45min - 1hour > 1hour

Do you use any electrotherapeutic modalities for rehabilitationof stroke patients?

APPENDIX 11: A REVIEW PROTOCOL

SYSTEMATIC APPRAISAL

Review Topic:

Clinical guidelines for stroke rehabilitation

Background

Clinical guidelines are systematically developed statements derived from the current best-evidenced based practice (Gonzalez-suarez, et al., 2012). Clinical guidelines assist the service provider and the patient make decisions about suitable health care for specific clinical circumstances (Gonzalez-Suarez et al., 2012; National Stroke Foundation, 2010).

Why the need for CPGs ? there has been gap between research and policy/practice, 20% to 30% of patients get care that is not needed or potentially harmful. Likewise, patients are exposed to unnecessary risks of iatrogenic harms. According toSchuster, McGlynn and Brook (2005), quality if care varies by medical condition. Lastly healthcare systems are exposed to unnecessary expenditure seondary to care that is not needed (McGlynn, et al., 2003).

Guidelines help to widen the scope of services, optimize treatment and facilitate the practitioner in improving the quality of the care they provide (National Institute for Health and Care Excellence, 2013). The application of evidence to guide clinical practice has been a challenge globally for nearly all health profesionals (Grol, Cluzeau, & Burgers, 2003) and mainly in

developing countries such as Kenya where scarce resources and occasionally even outdated practice are still being delivered (Kalita, Misra, & Kumar, 2007). Guidelines can be acquired through three strategies: developing, adaptation and contextualization.

Aim of the review

To identify the clinical guidelines for stroke rehabilitation and contextualize

Question

What are the clinical guidelines for stroke rehabilitation?

Inclusion criteria

- Guidelines published in English Language.
- Guidelines include rehabilitation as part of stroke management.
- Date of publication 1995-2015 (medicine is dynamic, article before this period might have out of date practice)

Search strategy

The search strategy will be implemented as follows. The search strategy will include search terms, and resources (Jesson & Lacey, 2006). The key words will include: “stroke”, “clinical guideline”, “physiotherapy”, “rehabilitation”, “management” “transient ischemic attack” and “cardiovascular accident”. Resources will include published and unpublished documents (Da Silveiraa, Borenstein & Fogliatto, 2001). The following databases will be used to search for clinical guidelines; Scottish International Guidelines Network (SIGN), New Zealand Guidelines Group (NZGG), National Health and Research Medical Council (NHRMC), National Institute For Clinical Excellence (NICE), National Guideline Clearing House, Science Direct, Medical

Literature on Line (MEDLINE), Allied Health Literature (CINAHL), Google scholar, Master File Premier, Psychology Information (PsycINFO), Health Source-Consumer Edition, Public Medline (PubMed), Embase, ERIC, ASSIA and Cochrane Library.

The search will be restricted to full text English publications, guidelines published between 1st January 1995 to 31st December 2014. Guidelines will be excluded if they do not focus on rehabilitation.

Quality assessment

The methodological quality assessment will be done using the Appraisal of Guidelines for Research & Evaluation (AGREE II) instrument (Brouwers et al., 2010). Complete assessment will include the scoring of the overall quality of the guideline and whether the guideline would be recommended for use in practice.

Three reviewers will separately review the guidelines and select the guidelines that meet the inclusion criteria. The percentages of quality scores will be calculated for each of the six AGREE II domains. The score cut off will be adopted from the quality improvement portfolio.

Quality assessment form

The researcher, based on the AGREE II tool domains and items will formulate quality assessment form (APPENDIX 11)

Pilot study

A pilot study for quality assessment form will be conducted to test adequacy of research instruments and to assess the feasibility of the full study (Van Teijlingen, Rennie, Hundley, & Graham, 2001).

Data extraction

Guidelines that will be used will include rehabilitation of stroke patient.

Merging recommendation

A PARM writing guide that provides a uniform framework for summarizing differently worded recommendations and differently reported strengths of evidence will be used to merge recommendation (Table 1).

Table 1: PARM standard writing guide.

KEY FOR GRADINGRECOMMENDATION

High quality evidence: Described in the included guidelines, as Levels I or 2, A or B.

Moderate quality evidence: Described in the included guidelines as Levels 2 or 3, B or C

Low quality evidence*:* Described in the included guidelines as Levels III or IV, C or D.

Key:

The volume of literature underpinning the recommendations was classified as:

Low volume- 3 references or less

Moderate volume- 4-7 references

High volume- 8 OR more references.

GPP- where a recommendation in the included guidelines was supported only by Good Practice Points (expert opinion in the absence of evidence, or inconsistent evidence), these were noted in the summary table as GPPs, and not given a level of evidence.

Each relevant recommendation from each included guideline was assessed using the following parameters: level of evidence, uniformity of thought, and volume, consistency and age of references. The level of evidence was rated as consistent or inconsistent based on the homogeneity of the evidence level assigned by the different clinical practice guidelines. Uniformity of thought was graded as uniform or variable based on similarity of the findings of the different clinical practice guidelines as to the effectiveness or ineffectiveness of a treatment modality and reliability of diagnostic procedure or physical examination. The volume of references was graded as low if the number of references was less than or equal to three, moderate if the number was between four and seven, and high if the volume was greater than eight. The age of the references was assessed as current if 50% of the papers cited were published later than 2006 and non-current if the majority of the papers were published prior to 2006

All the recommendations for a particular aspect of the stroke journey, from the included guidelines will be rated for evidence strength (e.g. Consistent level of evidence – Moderate volume – Non-current – Uniform thought) and summarized. All the relevant recommendations will be collated in a table with the summary of the strength of evidence (APPENDIX 13)

Contexualization

The process will apply the fourth and fifth elements of the NHMRC form (APPENDIX 14) (Hillier et al., 2011) to assess the generalizability and applicability of the included recommendations to Kenyan settings. The process will focus on, generalizability and applicability of summarized recommendations, to determine whether endorsement is sufficient to guide practice decisions, or whether decision point will also be required to contextualize the endorsed recommendation(s) within the patient journey. During the process of contextualization information will be placed into the Kenyan context by translating existing evidence statements from the selected guidelines into local practice and establishing their applicability. All relevant recommendations along with the supporting levels of evidence, and the guideline reference from which the recommendation had been obtained, will then be rated according to PARM guide (table 2) for summarizing the underpinning strength of the body of evidence of included recommendations. All the rated recommendation will be collated in a table

Table. PARM guide for summarizing the underpinning strength of the body of evidence of included recommendations

There is strong evidence	Consistent grades of high quality evidence with uniform thought1, and at least a moderate volume of references to support the recommendation(s)

There is evidence	A mix of moderate and high quality evidence with uniform thought and at least a low volume of references OR A mix of high and low quality evidence with uniform thought, and high volume of references OR High level evidence coupled with GPPs, and at least moderate volume of references OR One Level I paper with at least moderate volume references
There is some evidence	Single level II (A) paper OR Inconsistent grades of high and low evidence with uniform thought and moderate volume references OR Consistent grades of low level evidence with uniform thought and at least a moderate volume of references
There is conflicting evidence	A mix of levels of evidence with non-uniform thought, irrespective of the volume of references with or without GPPs
There is insufficient evidence	Low or inconsistent levels of evidence with low volume references with or without GPPs
There is no evidence	Absence of evidence for any aspect of the patient journey

Endorsements

A PARM guide, for writing recommendations will be adopted, (Outlined in Table 3).

Table 3: GUIDES FOR WRITING RECOMMENDATIONS

1. Strongly endorses	When there is strong evidence

2. Endorses	When there is evidence
3. Recommends	When there is some evidence
4. Suggests	When there is conflicting evidence
5. Does not endorse	There is insufficient or no evidence

All relevant recommendations (to the patient journey) will be endorse and collated in a table (APPENDX 16)

CONTEXT POINTS

During this process, the endorsed recommendation will be placed into the Kenyan context, and their applicability established. Generalizability and applicability will be addressed using an adopted framework, (PARM Context Point) (Gonzalez-suarez, et al., 2012) (Table 4). PARM Context Point provides a framework in which the endorsed recommendation can be applied.

Context Points outlines the elements that need to be in place for minimum best practice care to be provided equitably across the Kenya. Elements that address additional standard care of practice are likewise considered in this framework. Context points of all relevant recommendations (to the patient journey) will be written and collated in a table (APPENDX 17)

Table 4: Context Point For Minimum and Additional Standard of Care

	Minimum standard care of practice	Additional standard care of practice
Equipment	Parallel bars, walking frame	Biodex machine frame
Workforce	Trained personnel (physical therapist, occupational therapist, nurse)	Trained personnel (Physical therapist, occupational

		therapist, speech therapist, nurse)
Resources	None	None
Training	Within competency	Within competency
When is it done	Within 24 after onset of symptoms or when medically stable	Within 24 after onset of symptoms or when medically stable
Reassessment using at least one standard outcome measure	Everyday *Discharge planning should be documented in a discharge document	Everyday *Discharge planning should be documented in a discharge document

Implementability

This process will involved confirming whether relevant endorsed recommendations mapped within stroke patient journey are applicable in Kenya. Elements, which will be identified from the source guidelines that are not directly implementable in Kenya, will be listed. A Delphi study will be conducted to get consensus from the expert concerning the implementability of these elements.

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APPENDIX 12: AGREE II TOOL APPRAISAL FORM

Each of the AGREE II items are rated on a 7-point scale (1– strongly disagree to 7–strongly agree).

Tick below the available content and indicate the total score on a 7-point scale for every item

DOMAIN 1: SCOPE AND PURPOSE									
ITEMS	**WHAT TO LOOK FOR**								**TOTA SCOR**
1. The overall objective of the guideline is specifically described	Health intent	Expected benefit	Target (patients)	Items well written	Content easy to find in the guideline?				
2. The health question covered by the guideline is specifically described	Target population	Intervention	Compariso n	Outcome	Healthcare setting	Items well written	Content easy to find in the guideline	Enough info. Provided in the questions	
3. The population to whom the guideline is meant to apply is specifically described	Target pop (Age & gender)	Clinical condition	Severity	Comorbiditie s	Excluded population	Items well written	Content easy to find in the guideline	Population information for action recommended	

DOMAIN 2: STAKEHOLDERS INVOLVEMENT			
ITEMS	**WHAT TO LOOK FOR**		**T sc**

4. Guideline development group included all relevant professionals	Names.	Discipline.	Institutions.	Geographical location	Descriptions of members' role	Items well written	Content easy to find in the guideline	Member appropriate for topic	methodology expert included in the development group	
5. The views and preference of the target population have been sought	Statement used to capture patient/public views	Methods by which preferences and views were sought	Information gathered on patient/public information	Description of how information gathered informed guideline development process	Items well written	Content easy to find in the guideline				
6. The target user of the guideline are clearly defined	Clear description of intended guideline audience	Description of how the guideline may be used	Items well written	Content easy to find in the guideline						

DOMAIN 3: RIGOR OF DEVELOPMENT		
ITEM	**WHAT TO LOOK FOR**	**Total score**

7. Systematic method were used to search for the evidence	Database(s) or evidence source(s)	Time/periods searched	Search terms used	Full search strategy included	Item well written	Item content easy to find	Search relevant and appropriate	Enough information provided to replicate	
8. The criteria for selecting the evidence are clearly described	Target population	Study design	Comparison	Outcome	Language	Context	Item well written	Item content easy to find	
9. The strength and limitation of the body of evidence are clearly defined	Study design included in evidence	Methodoly limitation	Appropriateness/relevance	Consistency of results across studies	Direction of results across studies	Benefit versus harm	Well written and content easy to find	Descriptions appropriate, & unbiased	
10. The method of formulating recommendation was clearly described	Recommendation on development process	Outcomes of the recommendation	Process influenced the recommendations	Item well written	Item content easy to find	Formal process used to arrive at the recommendations?		Were the methods appropriate	
11. The health benefit, risk and side effect are have been considering when formulating the recommendations	Supporting data and report of benefits	Report of harms/side effects/risks	Balance/trade-off between benefits and harms/side effects/risks		Item well written	Item content easy to find	Discussion an integral part of the guideline development process	Guideline development considered the benefits & harms	

							equally	
12. There is an explicit link between recommendation and the supporting evidence	Describes how the guideline development group linked & evidence to recommendations	Recommendation is linked to a key evidence description	Recommendations linked to evidence summaries	Congruency between the evidence and recommendations		Recommendations and supporting evidence easy to find	When evidence is lacking or a recommendation is informed primarily by consensus of opinion	
13. The guidelines have been externally reviewed by expert prior to publication	Purpose and intent of the external review	Methods taken to undertake the external review	Description of the external reviewers	Outcomes/information gathered from the external review	Information gathered was used to inform the guideline development process	Well written and content easy to find	External reviewers relevant and appropriate to the scope	External review info. used by the guideline development group
14. A procedure for updating the guideline is addressed	A statement that the guideline will be updated	Time interval or criteria to guide decisions about when an update will occur	Methodology for the updating procedure is reported	Well written	Content easy to find	Information provided to know when an update will occur		

DOMAIN 4: CLARITY OF PRESENTATION								
ITEM	**WHAT TO LOOK FOR**							**Total score**
15. The recommendation are specific and unambiguous	Statement of the recommended action	Identification of the intent or purpose of the recommended action	Identification of the relevant population	Caveats or qualifying statements, if relevant	is there clarity regarding to whom each recommendation applies for multiple recommendation	If there is uncertainty in the interpretation and discussion of the evidence		
16. The deference options for management of condition or health issues are clearly presented	Description of options	Description of population or clinical situation most appropriate to each option	Is the item well written	Is the item content easy to find	Is this pertaining to a guideline broad or narrow in scope			
17. Key recommendation are easily identifiable	Description of recommendations in a summarized box, typed in bold, underlined, or presented as flow charts		Specific recommendations are grouped together in one section	Is the item well written	Is the item content easy to find	Recommendations appropriately selected and do they reflect the key messages of the guideline	Specific recommendations grouped in a section near the summary of the key evidence	

DOMAIN 5: APPLICABILITY									
ITEM	**WHAT TO LOOK FOR**								**Total score**
18. The guideline describes facilitators and barriers to its application	Identification of the types of facilitators and barriers that were considered	Methods which information regarding the facilitators and barriers to implementing recommendations were sought		Information of the types of facilitators & barriers that emerged from the inquiry	Description of how the information influenced the guideline development process	Item well written	Content easy to find	Guideline suggest specific strategies to overcoming the barriers?	
19. The guidelines provides advice and/or tools on how the recommendation can be put into practice	Guideline summary documents	Links to check lists, algorithms	Links to how-to manuals	Solutions linked to barrier analysis	Tools to capitalize on guideline facilitators	Outcome of pilot test and lessons learned	Item well written & content easy to find	Information about the developme nt of the implementa tion tools and validation procedures	
20. The potential resource implication of applying the recommendation have been considered	Types of cost information that were considered	Methods by which the cost information was sought	Descript ion of the cost informat ion emerged from the	Information gathered was used to inform the guideline development	Item well written	Content easy to find	Were appropriate experts involved in finding and analyzing the cost information?		

			inquiry	process				
21. The guidelines provide monitoring and/or auditing criteria	Identification of criteria to assess guideline implementation	Criteria for assessing impact of implementation	Advice on frequency & interval of measurement	Operational definitions of how the criteria should be measured	Item well written	Item content easy to find	Range of criteria provided including process measures, behavioral measures, and clinical or health outcomes?	

DOMAIN 6: EDITORIAL INDEPENDENCE								
ITEM	**WHAT TO LOOK FOR**							**Total score**
22. The view of the funding body have not influenced the content of the guidelines	The name of the funding body or source of funding	Statement that the funding body did not influence the content	Item well written	Item content easy to find	Potential influence from the funding body addressed			
23. Competing interest of guideline development group members have been	Description of the types of competing	Methods by which potential competing	Description of the competing	How competing interests influenced	Item well written	Item content	What measures were taken to minimize the	

recorded and addressed	interests considered	interests were sought	interests	guideline development & recommendations		easy to find	influence of competing interests on guideline development	

APPENDIX 13: RECOMMENDATIONS EXTRACTED FROM THE GUIDELINES

ASSESSMENT AND OUTCOME MEASURE

	Guidelines	**Body of evidence**	**Reference**
There are indications that systematic measurements (monitoring) using reliable and valid measurement instruments enhance the process of clinical argumentation	KNFG	3	

and the continuity of care for patients with a stroke. (Level 3)			
Moderate quality evidence			
Measurement instruments always to be administered: < 48 hours in acute rehabilitation	KNFG	1	
High level evidence			
Acute stroke with any residual stroke-related impairment that are not admitted to hospital should undergo a comprehensive outpatient assessment(s) for functional impairment, which includes a cognitive evaluation, screening for depression, screening for fitness to drive, as well as functional assessments for potential rehabilitation treatment.	DoD	A	
High quality evidence			
Measurement instruments to be administered if prognosis <48 hours is unfavorable: Weekly during the first month, monthly thereafter up to the 6th month after a stroke in early rehabilitation and late rehabilitation	KNFG	2	
High quality evidence			
Monitoring changes (if recovery after 6 months incomplete): biannually in chronic phase	KNGF		
In the opinion of the guideline development team, patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence of the above determinants, using reliable and valid measurement Instruments. This remains necessary as long as a patient remains unable to walk independently. (Level 4)	KNGF	4	
Low level evidence			
It has been demonstrated that establishing an estimated prognosis for the patient's dexterity 6 months after the stroke requires their capacity for finger extension (assessed with the Fugl-Meyer Assessment) and shoulder abduction (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (Level 1)	KNGF	1	
High quality evidence			
In the opinion of the guideline development team, patients who initially have an unfavorable prognosis for dexterity should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence of the above determinants, using reliable and valid measurement instruments. This remains	KNFG	4	

necessary as long as a patient lacks dexterity. (Level 4)			
Low quality evidence			
It has been demonstrated that the ideal moment to estimate a patient's chances of performing basic ADL activities 6 months after the stroke is to determine their Barthel Index at the end of the first week after the stroke, but preferably on day 5. The Barthel Index records what a patients actually does at the time of the assessment, not what they could potentially do. (Level 1)	KNGF	1	

TIMING, DURARUION AND INTENSITY

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
There are indications that the duration of the pre-mobilization phase may vary from a few hours to many weeks, and depends on aspects like the presence of fever, cardiac instability and general malaise, and a reduced level of consciousness. (Level 3)	KNFG	3	
Moderate quality evidence			
Upper limb training using constraint-induced movement therapy (CIMT) can commence within the first week of stroke for highly-selected patients; however, early high-intensity CIMT may be harmful	NZCG	C	(Dromerick et al, 2009).
Moderate quality evidence			
It is plausible that starting rehabilitation as early as possible (preferably within 24 hours after the stroke occurred) accelerates and enhances functional recovery. (Level 2)	KNFG NZCG	2 B	Bernhardt et al, 2009. Bernhardt et al. 2008 Langhorne et al.

			2007 Gagnon et al. 2006 Maulden et al. 2005 Musicco et al. 2003 Paolucci et al. 2000 Wade et al. 1992 Sorbello et al. 2009
Consistent level of evidence – High volume –-Current – Uniform thought			
Task-specific circuit class training or video self-modelling should be used to increase the amount of practice in rehabilitation	NZCG	B	(Wevers et al, 2009; McClellan & Ada, 2004).
High level of evidence – Low volume –-Non Current			
Rehabilitation should be structured to provide as much practice as possible within the first six months after stroke	NZCG KNGF DoD	A 1 A	(Kwakkel et al, 2004). (Kwakkel et al, 2004). (Wevers et al, 2009; McClellan & Ada, 2004). (Bhogal et al, 2003b; Bakheit et al, 2007; Godecke, 2009; Carnaby et al, 2006). Van Peppen et al. 2004 Kwakkel et al. 1997

Consistent level of evidence – High volume –-Non Current – Uniform thought			
For patients undergoing active rehabilitation, physical therapy (physiotherapy and occupational therapy) should be provided as much as possible but should be a minimum of one hour active practice per day (at least five days a week).	NZCG	GPP	

INPATIENT REHABILITATION

The rehabilitation interventions described in this section should apply regardless of the specific rehabilitation setting and may be applicable during inpatient

The medical team, including the patient and family, must analyze the patient's medical and functional status, as well as expected prognosis in order to establish the most appropriate rehab setting. [I]	DoD	GPP	
The severity of the patient's impairment, the rehabilitation needs, the availability of family/social support and resources, the patient/family goals and preferences and the availability of community resources will determine the optimal environment for care. [I]	DoD	GPP	
Where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available, early supported discharge services may be provided for people with mild to moderate disability. [B]	DoD	B	Donnelly et al., 2004 Langhorne et al., 2005 Teasell et al., 2003 Anderson et al., 2002 Brady et al., 2005 Patel, et al., 2004 Askim, Morkved, et al., 2006

			Bautz-Holtert, Sveen, 2002 Diserens, Michel, et al, 2006 Fjaertoft, Indredavik, et al., 2004
High level of evidence –high volume –Non Current			
Patients should receive as much therapy as they are able to tolerate in order to adapt, recover, and/or reestablish their premorbid or optimal level of functional independence. [B]	DoD	B	Kwakkel et al., 1999 Langhorne et al., 1996 Lincoln et al., 1999 Parry et al., 1999 Rapoport & Eerd, 1989 Richards et al., 1993 Sivenius et al., 1985 Smith et al., 1981 Sunderland et al., 1992 Van der Lee & Snels, 2001
High level of evidence –high volume –Non Current			
People with disability after stroke should receive rehabilitation in a dedicated stroke inpatient unit and subsequently from a specialist stroke team within the community.	DoD	A	
High level of evidence			
An inpatient stroke rehabilitation service should consist of the following: ▪ Dedicated stroke rehabilitation environment	DoD	B	
High level of evidence			

▪ Core multidisciplinary team who have the knowledge, skills and behaviors to work in partnership with people with stroke and their families and carers to manage the changes experienced as a result of a stroke.	DoD	B	
High level of evidence			
▪ Access to other services that may be needed, for example: ▪ Continence advice	DoD	B	
High level of evidence			
▪ Dietetics	DoD	A	
High level of evidence			
▪ Psychiatric	DoD	A	
High level of evidence			
▪ Orthotics	DoD	A	
High level of evidence			
▪ Wheelchair services	DoD	C	
Moderate level of evidence			
▪ Pharmacy	DoD	B	
Moderate level of evidence			
▪ Electronic aids (for example, remote controls for doors, lights and heating, and communication aids)	DoD	C	
Moderate level of evidence			
Each stroke rehabilitation unit and service should be organized as a single team of staff with specialist knowledge and experience of stroke and neurological rehabilitation including: ▪ Consultant physician(s) ▪ Nurses ▪ Physiotherapists ▪ Occupational therapists	DoD	A	

▪ Speech and language therapists ▪ Dietitians ▪ Psychologists ▪ Social workers			
High level of evidence			
The clinical team and family/caregiver should reach a shared decision regarding the rehabilitation program.	DoD	A	
High level of evidence			
The rehabilitation program should be guided by specific goals developed in consensus with the patient, family, and rehabilitation team.	DoD	B	
High level of evidence			
Document the detailed treatment plan in the patient's record to provide integrated rehabilitation care.	DoD	A	
High level of evidence			
The patient's family/caregiver should participate in the rehabilitation sessions, and should be trained to assist patient with functional activities, when needed.	DoD	C	
Moderate level of evidence			
As patient's progress, additional important educational topics include subjects such as the resumption of driving, sexual activity, adjustment and adaptation to disability, patient rights/responsibilities, and support group information		A	
The treatment plan should include documentation of the following: ➢ Patient's strengths, impairments, and current level of functioning	DoD	A	
High level of evidence			
➢ Psychosocial resources and needs, including caregiver capacity and availability	DoD	B	
High level of evidence			

➢ Goals: ▪ Personal goals (e.g., I want to play baseball with my grandson) ▪ Functional goals (e.g., ADL, IADL, mobility) ▪ Short term and long term goals	DoD	B	
High level of evidence			
❖ Strategies for achieving these goals including: 1. Resources and disciplines required 2. Estimations of time for goal achievement	DoD	B	
High level of evidence			
➢ Educational needs for patient/family	DoD	C	
High level of evidence			
Plans and timeline for re-evaluation		B	

DISCHARGE PLAN

Where comprehensive interdisciplinary community rehabilitation services and caregiver supportservices are available, early supported discharge services may be provided for people with mild tomoderate disability. [B	DoD	B	
High level of evidence			
All patients including those with severe stroke, a specific rehabilitation team prior should assess who are not receiving palliative care should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation.	DoD	A	
High level of evidence			
Discharge planning should be initiated as soon as possible after the patient is admitted to hospital (emergency department or inpatient care) [Evidence Level B]. A process should be established to ensure that patients, families and caregivers are	KNGF	B	(Barras, 2005). (Schedlbauer et al, 2004).

high level of evidence –low volume			
Involved in the development of the care plan, which needs to include discharge planning ➢ Discharge planning discussions should be ongoing throughout hospitalization to support a smooth transition from acute care [Evidence Level B].	DoD	B	
High level of evidence			
➢ Information about discharge issues and possible needs of patients following discharge should be provided to patients and caregivers soon after admission	DoD	C	
Moderate level of evidence			
Discharge planning activities should include patient, family and team meetings, discharge and transition care plans, a pre-discharge needs assessment, caregiver training, post discharge follow-up plan, and review of patient and family psychosocial needs [Evidence Level B].	DoD	B	
High level of evidence			
Early Supported Discharge			
Stroke survivors should continue to have access to specialized stroke services after leaving hospital, whether from acute care or inpatient rehabilitation [Evidence Level A Early supported discharge services provided by a well resourced, coordinated specialized interprofessional team are an acceptable alternative to more prolonged hospital stroke rehabilitation unit care and can reduce the length of hospital stay for selected patients [Evidence Level A].	DoD	A	
High level of evidence			
Stroke patients with mild to moderate disability may be offered early supported discharge if all of the following criteria are met;	DoD	B	
High level of evidence			
They are able to participate in rehabilitation from the date of transfer [Evidence Level B	DoD	B	
High level of evidence			
They can be safely managed at home [Evidence Level B].	DoD	B	
High level of evidence			

They have access to comprehensive inter-professional community rehabilitation services and caregiver or support services [Evidence Level A].	DoD	A	
High level of evidence			
Early supported discharge should not be offered to patients with moderately severe to severe stroke [Evidence Level A	DoD	A	
High level of evidence			
To work effectively, early supported discharge services must have elements similar to those of coordinated inpatient stroke teams including: A case coordination approach [Evidence Level B].	DoD	A	
High level of evidence			
An inter-professional team of specialists in stroke care and rehabilitation working in collaboration with community-based healthcare professionals [Evidence Level B].	DoD	B	
High level of evidence			
Emphasis on client- and family-centered practice, setting client goals and ongoing review of goal attainment [Evidence Level C].	DoD	C	
Moderate level of evidence			
Stroke rehabilitation services with intensity established based on individual client needs and goals [Evidence Level B].	DoD	B	
High level of evidence			
Services that are delivered in the most suitable environment based on client issues and strengths [Evidence Level C].	DoD	C	
Moderate level of evidence			
Regular team meetings to discuss assessment of new clients, review client management, goals, and plans for discharge [Evidence LevelA	DoD	A	
High level of evidence			
Family meetings to ensure patient and family involvement in management, goal setting, and planning for discharge from the early supported discharge program [Evidence Level A].	DoD	A	
High level of evidence			
Negotiated withdrawal and discharge from early supported discharge program [Evidence Level C].	DoD	C	
Moderate level of evidence			

OUTPATIENT REHABILITATION

Recommendation	Guidelines	Body of evidence	Reference
After leaving hospital, stroke survivors must have access to specialized stroke care and rehabilitation services appropriate to their needs (acute and/or inpatient rehabilitation) [Evidence Level A].	DoD	A	
High level of evidence			
Early supported discharge should be considered for patients discharged to the community [Evidence Level A].	DoD	A	
High level of evidence			
People who have difficulty in activities of daily living, including self-care, productivity and leisure, should receive occupational therapy or inter-professional interventions targeting activities of daily living [Evidence Level A for adults; Evidence Level C for pediatrics].	DoD	A	
High level of evidence			
Patients who are identified as high risk for falls in the community should have a comprehensive set of interventions implemented, such as an individually prescribed exercise program, in order to prevent or reduce the number and severity of falls [Evidence Level A].	DoD	A	
High level of evidence			
People with difficulties in mobility should be offered an exercise program specific to those difficulties and monitored throughout the program [Evidence Level B]	DoD	B	
High level of evidence			
Patients with aphasia should be taught supportive conversation techniques [Evidence Level A].	DoD	A	
High level of evidence			
Patients with dysphagia should be offered swallowing therapy and		A	

opportunity for reassessment as required [Evidence Level A			
Stroke survivors should be provided with a cardiovascular fitness program to maximize functional outcomes after stroke (and as part of overall vascular risk reduction). Patients should be prescribed modified activities to allow age appropriate target heart rates to be achieved for 20 to 30 minutes three times per week [Evidence B)	DoD	B	
High level of evidence			
Interdisciplinary community rehabilitation services and support services should be made available whenever possible to enable early supported discharge to be offered to all people with stroke who have mild to moderate disability	DoD	A	(Larsen et al, 2006; ESD Trialists, 2005)
High level of evidence, Low volume, non current			
Rehabilitation services after hospital discharge should be offered to all stroke patients as needed and where available, delivered in the home setting	DoD	A	(Larsen et al, 2006; ESD Trialists, 2005); Hillier & Gakeemah, 2010)
High level of evidence, Low volume, current			
Contact with and education by trained staff should be offered to all people with stroke and family/carers after discharge	DoD	C	(Middleton et al, 2005; Boter, 2004).
High level of evidenc,e Low volume, non current			
outpatient stroke rehabilitation after discharge of stroke survivors to an organized rehabilitation team (physiatrist, physical therapist, occupational therapist, and speech and language pathologist).	DoD	B	
High level of evidence			

FAMILY/CARER INVOLVEMENT

It is plausible that self-management programs are effective in improving the self-efficacy, participation, and quality of life of patients with a stroke. (Level 2)	KNGF	2	

High level of evidence			
There are indications that the rehabilitation process can be optimized by informing the stroke patient's informal caregiver at the earliest possible occasion about what the patient can and cannot do. (Level 3)	KNGF	3	
Moderate level of evidence			
People with stroke and family/carers should be provided with information about the availability and potential benefits of a local stroke support group and/or other sources of peer support prior to discharge from the hospital or in the community.	NZCG	GPP	
Carers should be provided with tailored information and support during all stages of the recovery process. This includes (but is not limited to) information provision and opportunities to talk with relevant health practitioners about the stroke, stroke team members and roles, test or assessment results, intervention plans, discharge planning, community services and appropriate contact details	NZCG DoD	B B	(Brereton et al, 2007; Smith et al, 2008). Smith et al., 2008 Forster, 2001 (§) Clark et al., 2003
Consistent level of evidence – moderate volume –Current – Uniform thought			
Where it is the wish of the person with stroke (and their family/carer), carers should be actively involved in the recovery process by assisting with goal setting, therapy sessions, discharge planning, and long-term activities.	NZCG	GPP	
Carers of people with stroke should be provided with information about the availability and potential benefits of local stroke support groups and services, at or before the person's return to the community	NZCG DoD	C C	(Brereton et al, 2007; Lee et al, 2007; Eldred & Sykes, 2008; Visser-Meily et al, 2005).
Carers of people with stroke should be offered services to support them after the person's return to the community. Such services can use a problem-solving or educational-counseling approach	NZCG	C	(Lee et al, 2007; Eldred& Sykes, 2008; Lui et al, 2005; Bhogal et al, 2003a).
Moderate level of evidence –moderate volume —Non Current			
Assistance should be provided for family/carers to manage people with stroke who have behavioral problems.	NZCG	GPP	

Advice about the financial support available should be provided for family/carers of people with stroke prior to discharge and as needs emerge and circumstances change.	NZCG	GPP	
Caregivers should be provided in a variety of methods of training based on their specific needs, cognitive capability, and local resources; Training may be provided in individual or group format, and in community-based programs. [B]	DoD	B	Bhogal et al., 2003 (§) Smith et al., 2008 (§) Kalra, 2004 Bjorkdahl et al., 2007
High level of evidence – moderate volume –-Non Current			

RE-ASSESSMENT

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
▪ Patients should be re-evaluated intermittently during their rehabilitation progress. Particular attention should be paid to interval change and progress towards stated goals. ▪ Patients who show a decline in functional status may no longer be candidates for rehabilitation interventions. Considerations about the etiology of the decline and its prognosis can help guide decisions about when/if further rehabilitation evaluation should occur. ▪ Psychosocial status and community integration needs should be re-assessed, particularly for patients who've experienced a functional	DoD	B	

decline or reached a plateau. ▪ Consider reassessing severity using the NIHSS at the time of acute care discharge to validate the first assessment or identify neurological changes.			
High level of evidence			
The rehabilitation needs of survivors of a severe or moderate stroke should be reassessed weekly for the first month, and then at intervals as indicated by their health status [Evidence Level C].	NZCG	C	
High level of evidence			
The rehabilitation needs of survivors of a severe or moderate stroke should be reassessed weekly for the first month, and then at intervals as indicated by their health status ***High level of evidence***	NZCG	C	

CONTENT OF PHYSIOTHERAPY			
Walking Therapies	**Guidelines**	**Body of evidence**	**Reference**
It has been demonstrated that establishing an estimated prognosis for the patient's walking ability 6 months after the stroke requires their sitting balance (assessed with the sitting balance item of the Trunk Control Test) and the motor function of the leg (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (Level 1)	KNGF	I	
High level of evidence			
In the opinion of the guideline development team, patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence of the above determinants, using reliable and valid measurement instruments. This remains necessary as long as a patient remains unable to walk independently.	KNGF	4	

(Level 4)			
Low level of evidence			
In the opinion of the guideline development team, an indication of possible further changes in walking ability for patients during the chronic phase who have a Functional Ambulation Categories (FAC) score of 3 or more at 6 months after the stroke can be obtained by having them do the 10-meter walk test at comfortable speed every 6 months. A meaningful change can be defined as a change in the walking speed of at least 0.16 m/s relative to the speed attained 6 months after the stroke. (Level 4)	KNGF	4	
Low level of evidence			
In the opinion of the guideline development team, patients in the chronic phase who still have a limited walking ability in the period following the first 6 months after the stroke should be monitored for their functional performance regularly (every 6 months). (Level 4)	KNGF	4	
Low level of evidence			
After thorough assessment and goal setting by a trained clinician, all people with difficulty walking should be given the opportunity to undertake tailored, repetitive practice of walking (or components of walking) as much as possible	NZCG	A	(French et al, 2007).
High level of evidence			
In the opinion of the guideline development team, the fact that a patient in the chronic phase shows significant functional changes at the level of activities justifies continuation or resumption of physical therapy. (Level 4)		4	
Low level of evidence			
It has been demonstrated that body-weight supported treadmill training improves the comfortable walking speed and walking distance of patients with a stroke. (Level 1)	KNGF NZCG	1 B	(Mehrholz et al, 2007)
Inconsistent level of evidence –low volume –- Current – Uniform thought			
It has been demonstrated that robot-assisted gait training for stroke patients who are unable to walk independently improves their comfortable walking speed, maximum walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living, compared to conventional therapy (including over ground walking). (Level 1)	KNGF NZCG DOD	1 B B	(Mehrholz et al, 2007)

Inconsistent level of evidence –low volume –- Current – Uniform thought			
It has been demonstrated that combining robot-assisted gait training with functional electro stimulation of the paretic leg improves the sitting and standing balance and walking ability of patients with a stroke, compared to conventional therapy (including over ground walking). (Level 1)	KNGF NZCG	1 B	(Mehrholz et al, 2007)
Inconsistent level of evidence –low volume –- Current – Uniform thought			
It has been demonstrated that over ground gait training by stroke patients who are able to walk without physical support is more effective in increasing walking distance and reducing anxiety than walking on a treadmill. (Level 1)	KNGF	1	
High level of evidence			
It remains unclear whether virtual reality mobility training is more effective than other interventions for patients with a stroke in terms of comfortable and maximum walking speed, spatiotemporal gait parameters and walking ability. (Level 1)		1	
High level of evidence			
It has been demonstrated that exercising walking and other mobility-related functions and activities under the supervision of an informal caregiver improves the performance of basic activities of daily living for the patient with a stroke, and reduces the perceived burden of care for the informal caregiver. (Level 1)		1	
High level of evidence			
It has been demonstrated that circuit class training (CCT) for walking and other mobility-related functions and activities improves walking distance/speed, sitting and standing balance and walking ability, and reduces inactivity in patients with a stroke. (Level 1)		1	
High level of evidence			
One or more of the following interventions can be used in addition to conventional walking therapy:			
1. Use Cueing of cadence	NZCG	B	(Langhorne et al, 2009)
High level of evidence –low volume			
2. Use Joint position biofeedback	NZCG	B	(Langhorne et al, 2009)
High level of evidence –low volume			

3. Use virtual reality training	NZCG	C	(You et al, 2005; Mirelman et al, 2009; Kim et al, 2009; Yang et al, 2008; Jaffe et al, 2004).
Moderate level of evidence –moderate volume –- Current – Uniform thought			
Recommend Functional electrical stimulation (FES) as an adjunctive treatment for patients with impaired muscle contraction, specifically for patients with impaired gait due to ankle/knee motor impairment. FES can be utilized for individuals with acute or chronic deficits after stroke. [B]	DoD	B	
Moderate level of evidence			
Consider Transcutaneous electrical nerve stimulation (TNS or TENS) as an adjunctive treatment for enhancing recovery of gait function after stroke. [C]	DoD	C	
Low level of evidence			
Consider using Virtual Reality (VRT) to enhance gait recovery following stroke. [B]	DoD	B	

UPPER EXTRIMITY THERAPY

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
For people with difficulty using their upper limb one or more of the following interventions should be given in order to encourage using their upper limb as much as possible: ▪ Constraint-induced movement therapy (Langhorne et al, 2009; Sirtori et al, 2009)	NZCG DoD	A A	(Langhorne et al, 2009; Sirtori et al, 2009) Brogardh et al., 2006 Hakkennes et al., 2005 Lin et al., 2007 Page et al., 2008

			Taub et al., 2007 Wolf et al., 2006, 2008 Wu et al., 2007a and b
Consistent level of evidence –High volume –- Current – Uniform thought			
▪ Mechanical assisted training (Mehrholz et al, 2008)	NZCG	B	Mehrholz et al, 2008)
High level of evidence –low volume			
▪ Repetitive task-specific training (French et al, 2007).	NZCG	B	French et al, 2007).
High level of evidence –low volume			
It has been demonstrated that original CIMT improves the dexterity, perceived use of arm and hand, quality of arm and hand movements, and quality of life of patients with a stroke. (Level 1)	KNGF	1	
High level of evidence			
It has been demonstrated that unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke improves the selective movements and muscle strength of the paretic arm and reduces atypical pain in the paretic arm. (Level 1)	KNGF DoD	1 B	Daly, 2005 Hesse, 2005 Lum, 2002 Lum ,2006 Masiero, 2006, 2007 Prange, 2006 Volpe, 2008a & b
Inconsistent, high level of evidence –High volume - Current – Uniform thought			
It has been demonstrated that bilateral training of the elbow and wrist improves the selective movements and muscle strength of the arm of patients with a stroke. (Level 1)	KNGF NZCG DoD	1 A A	Lewis, Byblow Whitall, et al., 2000 Mudie; Mudie & Matyas, Cauraugh & Kim, 2002 (Stewart et al, 2006).
Consistent, high level of evidence –High volume - Current – Uniform thought			

It has been demonstrated that virtual reality training of the paretic arm and hand as an add-on to regular exercise therapy for patients with a stroke improves the performance of basic activities of daily living. (Level 1)	KNGF DoD	1 C	
Inconsistent level of evidence			
It has been demonstrated that neuromuscular stimulation (NMS) of the paretic wrist and finger flexors and extensors of patients with a stroke improves selective movements and muscle strength. (Level 1)	KNGF NZCG DoD	1 B B	(Langhorne et al, 2009)
Inconsistent, high level of evidence –low volume - Current – Uniform thought			
It has been demonstrated that EMG-triggered neuromuscular electrostimulation (EMG-NMS) of the paretic wrist and finger extensors of patients with a stroke improves selective movements, active range of motion, and dexterity. (Level 1)	KNGF NZCG	1 C	(Langhorne et al, 2009; Meilink et al, 2008) Hara, 2008, Kimberley, 2004 McDonnell et al., 2007 Pomeroy, 2006 Daly et al., 2005 Alon et al., 2007
Inconsistent, level of evidence –High volume - Current – Uniform thought			
It has been demonstrated that interventions to improve the somatosensory functions of the paretic arm and hand of patients with a stroke improve the somatosensory functions and reduce the resistance to passive movements. (Level 1)	KNGF	1	
High level of evidence			
It is plausible that circuit class training with workstations for the paretic arm improves selective movements and dexterity of patients with a stroke. (Level 2)	KNGF	2	
High level of evidence			
It is plausible that passive bilateral arm training improves neurophysiological outcome measures like excitation of the ipsilateral motor cortex of patients with a stroke. (Level 2)	KNGF	2	
High level of evidence			
It is plausible that the use of a mechanical arm trainer improves the dexterity of patients with a stroke. (Level 2)	KNGF	2	

High level of evidence			
Consider strengthening exercises in addition to functional task practice. [C]	DoD	C	
Moderate level of evidence			

NEGLECT

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
Any patient with suspected or actual impairment of spatial awareness eg, hemi-inattention or neglect should have a full assessment with appropriate tests	NZCG	C	(Bowen & Lincoln, 2007; Jehkonen et al, 2006).
Moderate level of evidence –low volume - Current			
It has been demonstrated that visual scanning training has a favorable effect on the attention for the neglected side of patients with a stroke in the right hemisphere. (Level 1)	KNGF	1	
high level of evidence			
There are indications that the following neglect-oriented training forms have a favorable effect in terms of the attention for the neglected side of patients with a stroke in the right hemisphere: combined training for visual scanning, reading, copying, and describing figures, activation of the extremities on the neglected side, stimulating the neck muscles, wearing hemispatial sunglasses, wearing prism glasses, video feedback, aids and environmental adaptations. [. (Level 3)	KNGF NZCG DoD	3 C B	(Luaute et al, 2006; Polanowska et al, 2009)
Inconsistent level of evidence –low volume - Current – Uniform thought			
Use simple cues to draw attention to the affected side	NZCG	GPP	
Use Mental imagery training or structured feedback	NZCG	D	(Luaute et al, 2006)
Low level of evidence –low volume - Current			
Use half-field eye patching	NZCG	C	Luaute et al, 2006; Tsang 2009).
Moderate level of evidence –low volume - Current			
Nursing and therapy sessions (e.g., for shoulder pain, postural control, feeding) need to be modified to cue attention to the impaired side in-patient with impaired	DoD	GPP	

spatial awareness.			

SHOULDER PAIN

Recommendation	Guidelines	Body of evidence	Reference
For people with severe weakness who are at risk of developing shoulder pain, management can include			
shoulder strapping	NZCG	B	(Ada et al, 2005; Griffith & Bernhardt, 2006)
high level of evidence –low volume – non Current			
Interventions to educate staff, carers and people with stroke to prevent trauma to the shoulder.	NZCG	GPP	
For people with severe weakness who are at risk of developing shoulder pain or who have already developed shoulder pain, the following interventions are NOT recommended: ▪ Ultrasound	NZCG	C	(Inaba & Piorkowski, 1972).
Low level of evidence –low volume – non Current			
As there is no clear evidence for effective interventions once shoulder pain is already present in people with stroke, management should be based on other guidelines for acute musculoskeletal pain (eg, AAMPGG, 2003).	NZCG	GPP	

SPASTICITY

Recommendation	Guidelines	Body of evidence	Reference

In addition to general therapy (eg, task specific practice) other interventions to decrease spasticity should NOT be routinely provided for people with stroke who have mild to moderate spasticity (ie, spasticity that does not interfere with their activity or personal care).	NZCG	GPP	
In people with stroke who have persistent, moderate to severe spasticity (ie, spasticity that interferes with their activity or personal care):			
▪ botulinum toxin A should be trialled in conjunction with rehabilitation therapy which includes setting clear goals	NZCG DoD	B B	(Rosales & Chua-Yap, 2008; Elia et al, 2009; Garces et al, 2006)
Consistent, high level of evidence –low volume - Current – Uniform thought			
▪ Electrical stimulation in combination with EMG biofeedback can be used	NZCG	C	(Bakhtiary & Fatemy, 2008; Yan & Hui-Chan, 2009).
Low level of evidence –low volume - Current			
Consider deterring spasticity with anti-spastic positioning, range of motion exercises, stretching and splinting. Contractures may need to be treated using splinting, serial casting, or surgical correction.	DoD	C	
Moderate level of evidence			
Consider use of oral agents such as tizanidine and oral baclofen for spasticity especially if the spasticity is associated with pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients.	DoD	B	
High level of evidence			
Intrathecal baclofen treatments may be considered for stroke patients with chronic lower extremity spasticity that cannot be effectively managed by oral medication or botulinum toxin. [B]	DoD	B	
High level of evidence			

CONTRACTURES

Recommendation	**Guidelines**	**Body of evidence**	**Reference**

For people at risk of developing contractures undergoing active rehabilitation, the addition of prolonged positioning of muscles in a lengthened position to maintain range of motion is NOT recommended	NZCG	B	(Turton & Britton, 2005; Gustafsson & McKenna, 2006).
High level of evidence –low volume - Current			
Overhead pulley exercise should NOT be used to maintain range of motion of the shoulder	NZCG	C	
Low level of evidence			
For people who have contracture, management can include the following interventions to increase range of motion:			
▪ Electrical stimulation	NZCG	C	(Pandyan et al, 1997) (Kumar et al, 1990).
Moderate level of evidence –low volume –non Current			
▪ Casting/serial casting	NZCG	C	(Mortenson & Eng, 2003).
Moderate level of evidence –low volume –non Current			

STRENGTH

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
It has been demonstrated that training the muscle strength of the paretic leg or both legs of stroke patients increases their muscle strength, and improves the patient's gait in terms of cadence, symmetry, and stride length. (Level 1)	KNGF DoD	1 B	Ada et al., 2006 [SR] Winstein et al., 2004 Stein et al., 2004 Pack et al., 2008
Inconsistent level of evidence –moderate volume – On current – Uniform thought			
It has been demonstrated that hydrotherapy increases the muscle strength of the paretic leg of patients with a stroke. (Level 1)	KNGF	1	

high level of evidence			
It has been demonstrated that a combination of aerobic endurance training and strength training improves selective movements, muscle strength of the paretic leg, comfortable and maximum walking speed, walking distance, maximum oxygen consumption, heart rate in exertion, balance, level of physical activity in everyday life, and quality of life for patients with a stroke. (Level 1)	KNGF	1	
high level of evidence			
It has been demonstrated that transcutaneous electrical nerve stimulation (TENS) of the paretic leg improves muscle strength and walking ability and related activities for patients with a stroke. (Level 1)	KNGF	1 A	Glinsky et al, 2007; Ada et al, 2006).
Consistent, high level of evidence –low volume			
One or more of the following interventions should be used for people who have reduced strength: 1. progressive resistance exercises	NZCG	B	(Ada et al, 2006; Pak & Pattern, 2008; Harris & Eng, 2010)
High level of evidence –low volume - Current			
2. electromyographic biofeedback in conjunction with conventional therapy	NZCG	C	(Ada et al, 2006)
High level of evidence –low volume - Current			

SHOULDER SUBLUXATION

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
It has been demonstrated that neuromuscular electro stimulation (NMS) of the	KNGF	1	(Ada &

paretic shoulder muscles of patients with a stroke reduces glenohumeral subluxation. (Level 1)	NZCG	A	Foongchomcheay, 2002) Price & Pandyan, 2001 Van Peppen et al., 2004 Chae et al., 2005
Consistent, high level of evidence –Moderate volume – Non Current – Uniform thought			
For people who have developed a subluxed shoulder, management can include firm support devices (eg, lap trays, arm troughs and triangular slings) to prevent further subluxation	NZCG	C	(Ada et al, 2005).
Moderate level of evidence			
People with stroke, carers and staff should receive appropriate training in the care of the shoulder and use of support devices to prevent/minimise subluxation.	NZCG	GPP	

CARDIOVASCULAR FITNESS

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
Secondary prevention: lifestyle programs involving physical training. It is possible that lifestyle programs involving aerobic exercising favorably influence the risk factors for stroke in patients with a history of TIA or 'minor stroke'. (Level 2)	KNGF	2	
High level of evidence			
It is plausible that aerobic training has a favorable effect on conditional learning and implicit learning by patients with a stroke. (Level 2)	KNGF	2	
High level of evidence –low volume			
Rehabilitation should include interventions to increase cardiorespiratory fitness once the person with stroke has sufficient strength in the large lower limb muscle groups	NZCG	A	(Sanders et al, 2009; Pang et al, 2006).
High level of evidence –low volume			
People with stroke should be encouraged to undertake regular, ongoing fitness	NZCG	GPP	

training.			

RANGE OF MOTION

Recommendation	Guidelines	Body of evidence	Reference
Consider active and passive ROM prolonged stretching program to decrease risk of contracture development (night splints, tilt table) in early period following stroke. [C]	DoD	C	
Moderate level of evidence			
Joint movement and positioning needs to be carefully monitored during rehabilitation to prevent the development of maladaptive activity patterns ***High level of evidence***	KNGF	B	

BALANCE & POSTURE

Recommendation	Guidelines	Body of evidence	Reference
It has been demonstrated that exercising postural control with visual feedback while standing on a force platform improves the postural sway in stance of patients with a stroke. (Level 1)	KNGF	1	
High level of evidence			
It has been demonstrated that exercising balance during various activities results in improved sitting and standing balance and improved performance of basic activities of daily living by stroke patients. (Level 1)	KNGF	1	
High level of evidence			

Recommend that patients demonstrating balance impairments following stroke should be provided a balance-training program.	DoD	C	
Moderate level of evidence			

SWELLING OF THE EXTREMITIES

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
For people who are immobile, management can include the following interventions to prevent swelling in the hand and foot:			
▪ Dynamic pressure garments for the upper limb (Gracies et al, 2000)	DoD	C	
Moderate level of evidence			
▪ Electrical stimulation (Faghri & Rodgers, 1997)		C	
Moderate level of evidence			
▪ Elevation of the limb when resting.	DoD	GPP	
For people who have swollen extremities, management can include the following interventions to reduce swelling of the hand and foot			
➢ Dynamic pressure garments for the upper limb	DoD	C	(Gracies et al, 2000)
➢ Electrical stimulation	DoD	C	(Faghri & Rodgers, 1997)
➢ Continuous passive motion with elevation	DoD	C	(Giudice, 1990)
Low level of evidence –low volume – Non Current			
➢ Elevation of the limb when resting.	DoD	GPP	

ORTHOSIS

Recommendation	Guidelines	Body of evidence	Reference
It is plausible that the use of a device* to influence the range of motion of the ankle is not more effective for patients with a stroke in terms of active and passive range of motion, resistance to passive movements, muscle strength, walking distance, walking speed, balance, walking ability, activities of daily living and quality of life than other interventions (Level 2)	KNGF	2	
High level of evidence			
It is plausible that walking with a leg orthosis results in greater improvements to the walking speed and energy consumption of patients with a stroke than walking without such a leg orthosis. (Level 2)	KNGF	2	
High level of evidence			
Recommend for patient with foot drop, ankle foot orthoses (AFO) to prevent foot drop and improve knee stability during walking. [B]	DoD	B	
High level of evidence			
It has been demonstrated that gait training with the help of a leg orthosis along a bar, supported by a physical therapist, is just as effective for patients with a stroke in terms of walking speed and walking distance as body-weight supported treadmill training. (Level 1)	KNGF	1	
High level of evidence			
Ankle-foot orthoses can be used for people with persistent drop foot. If used, the ankle-foot orthosis should be individually fitted	NZCG	C	(Leung & Moseley, 2003; Bleyenheuft et al, 2008; de Wit et al, 2004; Pohl & Mehrholz, 2006; Sheffler et al, 2006; Wang et al, 2005; Wang et al, 2007; Tyson & Rogerson, 2009; Chen et al, 1999).
Moderate level of evidence –high volume - Current			
Recommend adaptive devices be used for safety and function if other methods of performing the task are not available or cannot be learned or if the patient's safety is a concern. [C]	DoD	C	

Moderate level of evidence			
Recommend lower extremity orthotic devices be considered, if ankle or knee stabilization is needed to improve the patient's gait and prevent falls. [C]	DoD	C	
Moderate level of evidence			
Recommend wheelchair prescriptions be based on careful assessment of the patient and the environment in which the wheelchair will be used. [C]	DoD	C	
Moderate level of evidence			
Recommend walking assistive devices be used to help with mobility efficiency and safety, when needed. [C] ***Moderate level of evidence***	DoD	C	

ACTIVITIES OF DAILY LIVING

Recommendation	**Guidelines**	**Body of evidence**	**Reference**
It is plausible that mirror therapy for the paretic leg improves selective movements and the performance of basic ADL activities by patients with a stroke. (Level 2)	KNGF	2	
High level of evidence			
It is plausible that providing systematic feedback on walking speed is not more effective in terms of the duration of hospitalization, walking distance, and walking ability of patients with a stroke than other interventions. (Level 2)	KNGF	2	
High level of evidence			
In the opinion of the guideline development team, the use of walking aids is beneficial to patients with a stroke in terms of safety, independence, and efficiency of walking, as well as confidence. (Level 4)	KNGF	4	
Low level of evidence			
It is plausible that the treatment of dyspraxia using gestural training has a favorable effect on the basic activities of daily living of patients with a left hemisphere stroke. The effects persist in the longer term. (Level 2)	KNGF	2	
High level of evidence			
It has been demonstrated that therapy to learn/re-learn leisure or social activities at	KNGF	1	

home, such as gardening or painting, have a favorable effect on the participation in leisure time activities of patients with a stroke. (Level 1)			
High level of evidence			
It is plausible that memory strategy training in functional situations, using external strategies, has a favorable effect on patients with a stroke who have moderate to severe memory deficits, in terms of learning functional skills in these situations. (Level 1)	KNGF	1	
High level of evidence			
Patients with difficulties in performance of daily activities should be assessed by a trained clinician	NZCG	A	(Legg et al, 2006; OST, 2003).
High level of evidence, Low volume			
Patients with confirmed difficulties in personal or extended activities of daily living should have specific therapy (eg, task-specific practice and trained use of appropriate aids) to address these issues	NZCG	B	(Legg et al, 2006; Walker et al, 2004).
High level of evidence, Low volume			
Other staff members, the person with stroke and carer/family should be advised regarding techniques and equipment to maximise outcomes relating to performance of daily activities and life roles, and to optimise sensorimotor, perceptual and cognitive capacities.	NZCG	GPP	
People with difficulties in community transport and mobility should set individualised goals and undertake tailored strategies such as multiple escorted outdoor journeys (ie, up to seven) which may include practice crossing roads, visits to local shops, bus or train travel, help to resume driving, aids and equipment, and written information about local transport options/alternatives	NZCG	B	(Logan et al, 2004).
High level of evidence, Low volume			
Recommend all patients receive ADL training [A]	DoD	A	Landi, 2006 Leg, 2006 Trombly, 2002 Soderstrom, 2006 Akinwuntan, 2005 Teasell, 2005 Liu and colleagues, 2004
High level of evidence –high volume –Non Current			
Recommend all patients receive IADL training in areas of need [C	DoD	A	Landi, 2006

			Leg, 2006 Trombly, 2002 Soderstrom, 2006 Akinwuntan, 2005 Teasell, 2005 Liu and colleagues, 2004
High level of evidence high volume, non current			
Recommend those individuals with stroke who exhibit ADL /IADL deficits should be given a training program that is tailored to the individual needs and anticipated discharge setting. [I] ***High level of evidence***	DoD	A	

APPENDIX: PARM GUIDE FOR SUMMARIZING THE UNDERPINNING STRENGTH OF THE BODY OF EVIDENCE OF INCLUDED RECOMMENDATIONS

There is strong evidence	Consistent grades of high quality evidence with uniform thought1, and at least a moderate volume of references to support the recommendation(s)

There is evidence	A mix of moderate and high quality evidence with uniform thought and at least a low volume of references OR A mix of high and low quality evidence with uniform thought, and high volume of references OR High level evidence coupled with GPPs, and at least moderate volume of references OR One Level I paper with at least moderate volume references
There is some evidence	Single level II (A) paper OR Inconsistent grades of high and low evidence with uniform thought and moderate volume references OR Consistent grades of low level evidence with uniform thought and at least a moderate volume of references
There is conflicting evidence	A mix of levels of evidence with non-uniform thought, irrespective of the volume of references with or without GPPs

There is insufficient evidence	Low or inconsistent levels of evidence with low volume references with or without GPPs
There is no evidence	Absence of evidence for any aspect of the patient journey

Endorsements

A PARM guide, for writing recommendations will be adopted, (Outlined in Table 3).

Table 3: GUIDES FOR WRITING RECOMMENDATIONS

1. Strongly endorses	When there is strong evidence
2. Endorses	When there is evidence
3. Recommends	When there is some evidence
4. Suggests	When there is conflicting evidence
5. Does not endorse	There is insufficient or no evidence

All relevant recommendations (to the patient journey) will be endorse and collated in a table (APPENDX 16)

APPENDIX 14: RATED RECOMMENDATIONS

ASSESSMENT AND OUTCOME MEASURE

	Guidelines	Body of evidence	Strength of body of evidence	Reference
There are indications that systematic measurements (monitoring) using reliable and valid measurement instruments enhance the process of clinical argumentation and the continuity of care for patients with a stroke. (Level 3)	KNFG	3	There is some evidence	
Moderate quality evidence				
Measurement instruments always to be administered: < 48 hours in acute rehabilitation	KNFG	1	There is some evidence	
High level evidence				
Acute stroke with any residual stroke-related impairment that are not admitted to hospital should undergo a comprehensive outpatient assessment(s) for functional impairment, which includes a cognitive evaluation, screening for depression, screening for fitness to drive, as well as functional assessments for potential rehabilitation treatment.	DoD	A	There is some evidence	
High quality evidence				
Measurement instruments to be administered if prognosis <48 hours is unfavorable: Weekly during the first month, monthly thereafter up to the 6th month after a stroke in early rehabilitation and late rehabilitation	KNFG	2	There is some evidence	
High quality evidence				
Monitoring changes (if recovery after 6 months incomplete): biannually in chronic phase	KNGF		There is some evidence	
In the opinion of the guideline development team, patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence of the above determinants, using reliable and valid measurement Instruments. This remains necessary as long as a patient remains unable to walk independently. (Level 4)	KNGF	4	There is insufficient evidence	
Low level evidence				
It has been demonstrated that establishing an estimated prognosis for the patient's	KNGF	1	There is some	

dexterity 6 months after the stroke requires their capacity for finger extension (assessed with the Fugl-Meyer Assessment) and shoulder abduction (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (Level 1)			evidence	
High quality evidence				
In the opinion of the guideline development team, patients who initially have an unfavorable prognosis for dexterity should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence of the above determinants, using reliable and valid measurement instruments. This remains necessary as long as a patient lacks dexterity. (Level 4)	KNFG	4	There is some evidence	
Low quality evidence				
It has been demonstrated that the ideal moment to estimate a patient's chances of performing basic ADL activities 6 months after the stroke is to determine their Barthel Index at the end of the first week after the stroke, but preferably on day 5. The Barthel Index records what a patients actually does at the time of the assessment, not what they could potentially do. (Level 1)	KNGF	1	There is some evidence	
	High quality evidence			

TIMING, DURARUION AND INTENSITY

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
There are indications that the duration of the pre-mobilization phase may vary from a few hours to many weeks, and depends on aspects like the presence of fever, cardiac instability and general malaise, and a reduced level of consciousness. (Level 3)	KNFG	3	There is some evidence	

Moderate quality evidence				
Upper limb training using constraint-induced movement therapy (CIMT) can commence within the first week of stroke for highly-selected patients; however, early high-intensity CIMT may be harmful	NZCG	C	There is some evidence	(Dromerick et al, 2009).
Moderate quality evidence				
It is plausible that starting rehabilitation as early as possible (preferably within 24 hours after the stroke occurred) accelerates and enhances functional recovery. (Level 2)	KNFG NZCG	2 B	There is strong evidence	Bernhardt et al, 2009. Bernhardt et al. 2008 Langhorne et al. 2007 Gagnon et al. 2006 Maulden et al. 2005 Musicco et al. 2003 Paolucci et al. 2000 Wade et al. 1992 Sorbello et al. 2009
Consistent level of evidence – High volume –-Current – Uniform thought				
Task-specific circuit class training or video self-modelling should be used to increase the amount of practice in rehabilitation	NZCG	B	There is evidence	(Wevers et al, 2009; McClellan & Ada, 2004).
High level of evidence – Low volume –-Non Current				
Rehabilitation should be structured to provide as much practice as possible within the first six months after stroke	NZCG KNGF DoD	A 1 A	There is strong evidence	(Kwakkel et al, 2004). (Kwakkel et al, 2004). (Wevers et al, 2009; McClellan & Ada, 2004). (Bhogal et al,

				2003b; Bakheit et al, 2007; Godecke, 2009; Carnaby et al, 2006). Van Peppen et al. 2004 Kwakkel et al. 1997
Consistent level of evidence – High volume –-Non Current – Uniform thought			There is strong evidence	
For patients undergoing active rehabilitation, physical therapy (physiotherapy and occupational therapy) should be provided as much as possible but should be a minimum of one hour active practice per day (at least five days a week).	NZCG	GPP	There is insufficient evidence	

INPATIENT REHABILITATION

The rehabilitation interventions described in this section should apply regardless of the specific rehabilitation setting and may be applicable during inpatient

The medical team, including the patient and family, must analyze the patient's medical and functional status, as well as expected prognosis in order to establish the most appropriate rehab setting. [I]	DoD	GPP	There is insufficient evidence	

The severity of the patient's impairment, the rehabilitation needs, the availability of family/social support and resources, the patient/family goals and preferences and the availability of community resources will determine the optimal environment for care. [I]	DoD	GPP	There is insufficient evidence	
Where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available, early supported discharge services may be provided for people with mild to moderate disability. [B]	DoD	B	There is strong evidence	Donnelly et al., 2004 Langhorne et al., 2005 Teasell et al., 2003 Anderson et al., 2002 Brady et al., 2005 Patel, et al., 2004 Askim, Morkved, et al., 2006 Bautz-Holtert, Sveen, 2002 Diserens, Michel, et al, 2006 Fjaertoft, Indredavik, et al., 2004
High level of evidence –high volume –Non Current				
Patients should receive as much therapy as they are able to tolerate in order to adapt, recover, and/or reestablish their premorbid or optimal level of functional independence. [B]	DoD	B	There is strong evidence	Kwakkel et al., 1999 Langhorne et al., 1996 Lincoln et al., 1999 Parry et al., 1999 Rapoport & Eerd, 1989 Richards et al., 1993 Sivenius et al., 1985 Smith et al., 1981

				Sunderland et al., 1992 Van der Lee & Snels, 2001
High level of evidence –high volume –Non Current				
People with disability after stroke should receive rehabilitation in a dedicated stroke inpatient unit and subsequently from a specialist stroke team within the community.	DoD	A	There is some evidence	
High level of evidence				
An inpatient stroke rehabilitation service should consist of the following: 3. Dedicated stroke rehabilitation environment	DoD	B	There is some evidence	
High level of evidence				
4. Core multidisciplinary team who have the knowledge, skills and behaviors to work in partnership with people with stroke and their families and carers to manage the changes experienced as a result of a stroke.	DoD	B	There is some evidence	
High level of evidence				
5. Access to other services that may be needed, for example: ▪ Continence advice	DoD	B	There is some evidence	
High level of evidence				
▪ Dietetics	DoD	A	There is some evidence	
High level of evidence				
▪ Psychiatric	DoD	A	There is some evidence	
High level of evidence				
▪ Orthotics	DoD	A	There is some evidence	
High level of evidence				
▪ Wheelchair services	DoD	C	There is some evidence	

Moderate level of evidence				
▪ Pharmacy	DoD	B	There is some evidence	
Moderate level of evidence				
▪ Electronic aids (for example, remote controls for doors, lights and heating, and communication aids)	DoD	C	There is some evidence	
Moderate level of evidence				
Each stroke rehabilitation unit and service should be organized as a single team of staff with specialist knowledge and experience of stroke and neurological rehabilitation including: ➢ Consultant physician(s) ➢ Nurses ➢ Physiotherapists ➢ Occupational therapists ➢ Speech and language therapists ➢ Dietitians ➢ Psychologists ➢ Social workers	DoD	A		
High level of evidence				
The clinical team and family/caregiver should reach a shared decision regarding the rehabilitation program.	DoD	A	There is some evidence	
High level of evidence				
The rehabilitation program should be guided by specific goals developed in consensus with the patient, family, and rehabilitation team.	DoD	B	There is some evidence	
High level of evidence				
Document the detailed treatment plan in the patient's record to provide integrated rehabilitation care.	DoD	A	There is some evidence	
High level of evidence				

The patient's family/caregiver should participate in the rehabilitation sessions, and should be trained to assist patient with functional activities, when needed.	DoD	C	There is some evidence	
Moderate level of evidence				
As patient's progress, additional important educational topics include subjects such as the resumption of driving, sexual activity, adjustment and adaptation to disability, patient rights/responsibilities, and support group information		A		
The treatment plan should include documentation of the following: 1. Patient's strengths, impairments, and current level of functioning	DoD	A	There is some evidence	
High level of evidence				
2. Psychosocial resources and needs, including caregiver capacity and availability	DoD	B	There is some evidence	
High level of evidence				
3. Goals: ▪ Personal goals (e.g., I want to play baseball with my grandson) ▪ Functional goals (e.g., ADL, IADL, mobility) ▪ Short term and long term goals	DoD	B	There is some evidence	
High level of evidence				
1. Strategies for achieving these goals including: ❖ Resources and disciplines required ❖ Estimations of time for goal achievement	DoD	B	There is some evidence	
High level of evidence				
4. Educational needs for patient/family	DoD	C	There is some evidence	
High level of evidence				
Plans and timeline for re-evaluation		B	There is some evidence	

DISCHARGE PLAN

Where comprehensive interdisciplinary community rehabilitation services and caregiver supportservices are available, early supported discharge services may be provided for people with mild tomoderate disability. [B	DoD	B	There is some evidence	
High level of evidence				
All patients including those with severe stroke, a specific rehabilitation team prior should assess who are not receiving palliative care should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation.	DoD	A	There is some evidence	
High level of evidence				
Discharge planning should be initiated as soon as possible after the patient is admitted to hospital (emergency department or inpatient care) [Evidence Level B]. A process should be established to ensure that patients, families and caregivers are	KNGF	B	There is evidence	(Barras, 2005). (Schedlbauer et al, 2004).
high level of evidence –low volume				
Involved in the development of the care plan, which needs to include discharge planning 1. Discharge planning discussions should be ongoing throughout hospitalization to support a smooth transition from acute care [Evidence Level B].	DoD	B	There is some evidence	
High level of evidence				
2. Information about discharge issues and possible needs of patients following discharge should be provided to patients and caregivers soon after admission	DoD	C	There is some evidence	
Moderate level of evidence				
Discharge planning activities should include patient, family and team meetings, discharge and transition care plans, a pre-discharge needs assessment, caregiver training, post discharge follow-up plan, and review of patient and family psychosocial needs [Evidence Level B].	DoD	B	There is some evidence	
High level of evidence				
Early Supported Discharge				

Stroke survivors should continue to have access to specialized stroke services after leaving hospital, whether from acute care or inpatient rehabilitation [Evidence Level A Early supported discharge services provided by a well resourced, coordinated specialized interprofessional team are an acceptable alternative to more prolonged hospital stroke rehabilitation unit care and can reduce the length of hospital stay for selected patients [Evidence Level A].	DoD	A	There is some evidence	
High level of evidence				
Stroke patients with mild to moderate disability may be offered early supported discharge if all of the following criteria are met;	DoD	B	There is some evidence	
High level of evidence				
They are able to participate in rehabilitation from the date of transfer [Evidence Level B	DoD	B	There is some evidence	
High level of evidence				
They can be safely managed at home [Evidence Level B].	DoD	B	There is some evidence	
High level of evidence				
They have access to comprehensive inter-professional community rehabilitation services and caregiver or support services [Evidence Level A].	DoD	A	There is some evidence	
High level of evidence				
Early supported discharge should not be offered to patients with moderately severe to severe stroke [Evidence Level A	DoD	A	There is some evidence	
High level of evidence				
To work effectively, early supported discharge services must have elements similar to those of coordinated inpatient stroke teams including: A case coordination approach [Evidence Level B].	DoD	A	There is some evidence	
High level of evidence				
An inter-professional team of specialists in stroke care and rehabilitation working in collaboration with community-based healthcare professionals [Evidence Level B].	DoD	B	There is some evidence	
High level of evidence				
Emphasis on client- and family-centered practice, setting client goals and ongoing review of goal attainment [Evidence Level C].	DoD	C	There is some evidence	

Moderate level of evidence				
Stroke rehabilitation services with intensity established based on individual client needs and goals [Evidence Level B].	DoD	B	There is some evidence	
High level of evidence				
Services that are delivered in the most suitable environment based on client issues and strengths [Evidence Level C].	DoD	C	There is some evidence	
Moderate level of evidence				
Regular team meetings to discuss assessment of new clients, review client management, goals, and plans for discharge [Evidence LevelA	DoD	A	There is some evidence	
High level of evidence				
Family meetings to ensure patient and family involvement in management, goal setting, and planning for discharge from the early supported discharge program [Evidence Level A].	DoD	A	There is some evidence	
High level of evidence				
Negotiated withdrawal and discharge from early supported discharge program [Evidence Level C].	DoD	C	There is some evidence	
Moderate level of evidence				

OUTPATIENT REHABILITATION

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
After leaving hospital, stroke survivors must have access to specialized stroke care and rehabilitation services appropriate to their needs (acute and/or inpatient rehabilitation) [Evidence Level A].	DoD	A	There is some evidence	
High level of evidence				
Early supported discharge should be considered for patients discharged to the community [Evidence Level A].	DoD	A	There is some evidence	
High level of evidence				
People who have difficulty in activities of daily living, including self-care, productivity and leisure, should receive occupational therapy or inter-	DoD	A	There is some evidence	

professional interventions targeting activities of daily living [Evidence Level A for adults; Evidence Level C for pediatrics].				
High level of evidence				
Patients who are identified as high risk for falls in the community should have a comprehensive set of interventions implemented, such as an individually prescribed exercise program, in order to prevent or reduce the number and severity of falls [Evidence Level A].	DoD	A	There is some evidence	
High level of evidence			There is some evidence	
People with difficulties in mobility should be offered an exercise program specific to those difficulties and monitored throughout the program [Evidence Level B]	DoD	B	There is some evidence	
High level of evidence				
Patients with aphasia should be taught supportive conversation techniques [Evidence Level A].	DoD	A	There is some evidence	
High level of evidence				
Patients with dysphagia should be offered swallowing therapy and opportunity for reassessment as required [Evidence Level A		A	There is some evidence	
Stroke survivors should be provided with a cardiovascular fitness program to maximize functional outcomes after stroke (and as part of overall vascular risk reduction). Patients should be prescribed modified activities to allow age appropriate target heart rates to be achieved for 20 to 30 minutes three times per week [Evidence B)	DoD	B	There is some evidence	
High level of evidence				
Interdisciplinary community rehabilitation services and support services should be made available whenever possible to enable early supported discharge to be offered to all people with stroke who have mild to moderate disability	DoD	A	There is some evidence	(Larsen et al, 2006; ESD Trialists, 2005)
High level of evidence, Low volume, non current				
Rehabilitation services after hospital discharge should be offered to all stroke patients as needed and where available, delivered in the home setting	DoD	A	There is evidence	(Larsen et al, 2006; ESD Trialists, 2005); Hillier & Gakeemah, 2010)

High level of evidence, Low volume, current				
Contact with and education by trained staff should be offered to all people with stroke and family/carers after discharge	DoD	C	There is some evidence	(Middleton et al, 2005; Boter, 2004).
High level of evidenc,e Low volume, non current				
outpatient stroke rehabilitation after discharge of stroke survivors to an organized rehabilitation team (physiatrist, physical therapist, occupational therapist, and speech and language pathologist).	DoD	B	There is some evidence	
High level of evidence				

FAMILY/CARER INVOLVEMENT

It is plausible that self-management programs are effective in improving the self-efficacy, participation, and quality of life of patients with a stroke. (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
There are indications that the rehabilitation process can be optimized by informing the stroke patient's informal caregiver at the earliest possible occasion about what the patient can and cannot do. (Level 3)	KNGF	3	There is some evidence	
Moderate level of evidence				
People with stroke and family/carers should be provided with information about the availability and potential benefits of a local stroke support group and/or other sources of peer support prior to discharge from the hospital or in the community.	NZCG	GPP	There is some evidence	
Carers should be provided with tailored information and support during all stages of the recovery process. This includes (but is not limited to) information provision and opportunities to talk with relevant health practitioners about the stroke, stroke team members and roles, test or assessment results, intervention plans, discharge planning, community services and appropriate contact details	NZCG DoD	B B		(Brereton et al, 2007; Smith et al, 2008). Smith et al., 2008 Forster, 2001 (§) Clark et al., 2003
Consistent level of evidence – moderate volume –Current – Uniform thought			There is some	

			evidence	
Where it is the wish of the person with stroke (and their family/carer), carers should be actively involved in the recovery process by assisting with goal setting, therapy sessions, discharge planning, and long-term activities.	NZCG	GPP		
Carers of people with stroke should be provided with information about the availability and potential benefits of local stroke support groups and services, at or before the person's return to the community	NZCG DoD	C C	There is some evidence	(Brereton et al, 2007; Lee et al, 2007; Eldred & Sykes, 2008; Visser-Meily et al, 2005).
Inconsistent level of evidence – Moderate volume –-Current – Uniform thought				
Carers of people with stroke should be offered services to support them after the person's return to the community. Such services can use a problem-solving or educational-counseling approach	NZCG	C	There is evidence	(Lee et al, 2007; Eldred& Sykes, 2008; Lui et al, 2005; Bhogal et al, 2003a).
Moderate level of evidence –moderate volume –-Non Current				
Assistance should be provided for family/carers to manage people with stroke who have behavioral problems.	NZCG	GPP	There is insufficient evidence	
Advice about the financial support available should be provided for family/carers of people with stroke prior to discharge and as needs emerge and circumstances change.	NZCG	GPP	There is insufficient evidence	
Caregivers should be provided in a variety of methods of training based on their specific needs, cognitive capability, and local resources; Training may be provided in individual or group format, and in community-based programs. [B]	DoD	B	There is some evidence	Bhogal et al., 2003 (§) Smith et al., 2008 (§) Kalra, 2004 Bjorkdahl et al., 2007
High level of evidence – moderate volume –-Non Current				

RE-ASSESSMENT

Recommendation	Guidelines	Body of evidence		Reference
1. Patients should be re-evaluated intermittently during their rehabilitation progress. Particular attention should be paid to interval change and progress towards stated goals. 2. Patients who show a decline in functional status may no longer be candidates for rehabilitation interventions. Considerations about the etiology of the decline and its prognosis can help guide decisions about when/if further rehabilitation evaluation should occur. 3. Psychosocial status and community integration needs should be re-assessed, particularly for patients who've experienced a functional decline or reached a plateau. 4. Consider reassessing severity using the NIHSS at the time of acute care discharge to validate the first assessment or identify neurological changes.	DoD	B	There is some evidence	
High level of evidence				
The rehabilitation needs of survivors of a severe or moderate stroke should be reassessed weekly for the first month, and then at intervals as indicated by their health status [Evidence Level C].	NZCG	C	There is some evidence	
High level of evidence				
The rehabilitation needs of survivors of a severe or moderate stroke should be reassessed weekly for the first month, and then at intervals as indicated by their health status ***High level of evidence***	NZCG	C	There is some evidence	

CONTENT OF PHYSIOTHERAPY				
Walking Therapies	**Guidelines**	**Body of evidence**		**Reference**
It has been demonstrated that establishing an estimated prognosis for the patient's walking ability 6 months after the stroke requires their sitting balance (assessed with the sitting balance item of the Trunk Control Test) and the motor function of the leg (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (Level 1)	KNGF	I	There is some evidence	
High level of evidence				
In the opinion of the guideline development team, patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence of the above determinants, using reliable and valid measurement instruments. This remains necessary as long as a patient remains unable to walk independently. (Level 4)	KNGF	4	There is some evidence	
Low level of evidence				
In the opinion of the guideline development team, an indication of possible further changes in walking ability for patients during the chronic phase who have a Functional Ambulation Categories (FAC) score of 3 or more at 6 months after the stroke can be obtained by having them do the 10-meter walk test at comfortable speed every 6 months. A meaningful change can be defined as a change in the walking speed of at least 0.16 m/s relative to the speed attained 6 months after the stroke. (Level 4)	KNGF	4	There is some evidence	
Low level of evidence				
In the opinion of the guideline development team, patients in the chronic phase who still have a limited walking ability in the period following the first 6 months after the stroke should be monitored for their functional performance regularly (every 6 months). (Level 4)	KNGF	4	There is some evidence	
Low level of evidence				

After thorough assessment and goal setting by a trained clinician, all people with difficulty walking should be given the opportunity to undertake tailored, repetitive practice of walking (or components of walking) as much as possible	NZCG	A	There is some evidence	(French et al, 2007).
High level of evidence				
In the opinion of the guideline development team, the fact that a patient in the chronic phase shows significant functional changes at the level of activities justifies continuation or resumption of physical therapy. (Level 4)		4	There is some evidence	
Low level of evidence				
It has been demonstrated that body-weight supported treadmill training improves the comfortable walking speed and walking distance of patients with a stroke. (Level 1)	KNGF NZCG	1 B	There is some evidence	(Mehrholz et al, 2007)
Inconsistent level of evidence –low volume –- Current – Uniform thought				
It has been demonstrated that robot-assisted gait training for stroke patients who are unable to walk independently improves their comfortable walking speed, maximum walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living, compared to conventional therapy (including over ground walking). (Level 1)	KNGF NZCG DOD	1 B B	There is evidence	(Mehrholz et al, 2007)
Inconsistent level of evidence –low volume –- Current – Uniform thought				
It has been demonstrated that combining robot-assisted gait training with functional electro stimulation of the paretic leg improves the sitting and standing balance and walking ability of patients with a stroke, compared to conventional therapy (including over ground walking). (Level 1)	KNGF NZCG	1 B	There is evidence	(Mehrholz et al, 2007)
Inconsistent level of evidence –low volume –- Current – Uniform thought				
It has been demonstrated that over ground gait training by stroke patients who are able to walk without physical support is more effective in increasing walking distance and reducing anxiety than walking on a treadmill. (Level 1)	KNGF	1	There is evidence	
High level of evidence				
It remains unclear whether virtual reality mobility training is more effective than other interventions for patients with a stroke in terms of comfortable and maximum walking speed, spatiotemporal gait parameters and walking ability. (Level 1)		1	There is some evidence	
High level of evidence				

It has been demonstrated that exercising walking and other mobility-related functions and activities under the supervision of an informal caregiver improves the performance of basic activities of daily living for the patient with a stroke, and reduces the perceived burden of care for the informal caregiver. (Level 1)		1	There is some evidence	
High level of evidence				
It has been demonstrated that circuit class training (CCT) for walking and other mobility-related functions and activities improves walking distance/speed, sitting and standing balance and walking ability, and reduces inactivity in patients with a stroke. (Level 1)		1	There is some evidence	
High level of evidence				
One or more of the following interventions can be used in addition to conventional walking therapy:				
▪ Use Cueing of cadence	NZCG	B	There is some evidence	(Langhorne et al, 2009)
High level of evidence –low volume				
▪ Use Joint position biofeedback	NZCG	B	There is some evidence	(Langhorne et al, 2009)
High level of evidence –low volume				
▪ Use virtual reality training	NZCG	C	There is some evidence	(You et al, 2005; Mirelman et al, 2009; Kim et al, 2009; Yang et al, 2008; Jaffe et al, 2004).
Moderate level of evidence –moderate volume –- Current – Uniform thought				
Recommend Functional electrical stimulation (FES) as an adjunctive treatment for patients with impaired muscle contraction, specifically for patients with impaired gait due to ankle/knee motor impairment. FES can be utilized for individuals with acute or chronic deficits after stroke. [B]	DoD	B	There is some evidence	
Moderate level of evidence				
Consider Transcutaneous electrical nerve stimulation (TNS or TENS) as an adjunctive treatment for enhancing recovery of gait function after stroke. [C]	DoD	C	There is some evidence	
Low level of evidence				
Consider using Virtual Reality (VRT) to enhance gait recovery following stroke.	DoD	B	There is some	

[B]			evidence	

UPPER EXTRIMITY THERAPY

Recommendation	Guidelines	Body of evidence		Reference
For people with difficulty using their upper limb one or more of the following interventions should be given in order to encourage using their upper limb as much as possible: ▪ Constraint-induced movement therapy (Langhorne et al, 2009; Sirtori et al, 2009)	NZCG DoD	A A	There is sstrong evidence	(Langhorne et al, 2009; Sirtori et al, 2009) Brogardh et al., 2006 Hakkennes et al., 2005 Lin et al., 2007 Page et al., 2008 Taub et al., 2007 Wolf et al., 2006, 2008 Wu et al., 2007a and b
Consistent level of evidence –High volume –- Current – Uniform thought				
▪ Mechanical assisted training (Mehrholz et al, 2008)	NZCG	B	There is evidence	Mehrholz et al, 2008)
High level of evidence –low volume				
▪ Repetitive task-specific training (French et al, 2007).	NZCG	B	There is evidence	French et al, 2007).
High level of evidence –low volume				
It has been demonstrated that original CIMT improves the dexterity, perceived use of arm and hand, quality of arm and hand movements, and quality of life of patients with a stroke. (Level 1)	KNGF	1	There is some evidence	

High level of evidence				
It has been demonstrated that unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke improves the selective movements and muscle strength of the paretic arm and reduces atypical pain in the paretic arm. (Level 1)	KNGF DoD	1 B	There is evidence	Daly, 2005 Hesse, 2005 Lum, 2002 Lum ,2006 Masiero, 2006, 2007 Prange, 2006 Volpe, 2008a & b
Inconsistent, high level of evidence –High volume - Current – Uniform thought				
It has been demonstrated that bilateral training of the elbow and wrist improves the selective movements and muscle strength of the arm of patients with a stroke. (Level 1)	KNGF NZCG DoD	1 A A		Lewis, Byblow Whitall, et al., 2000 Mudie; Mudie & Matyas, Cauraugh & Kim, 2002 (Stewart et al, 2006).
Consistent, high level of evidence –High volume - Current – Uniform thought			There is strong evidence	
It has been demonstrated that virtual reality training of the paretic arm and hand as an add-on to regular exercise therapy for patients with a stroke improves the performance of basic activities of daily living. (Level 1)	KNGF DoD	1 C	There is some evidence	
Inconsistent level of evidence				
It has been demonstrated that neuromuscular stimulation (NMS) of the paretic wrist and finger flexors and extensors of patients with a stroke improves selective movements and muscle strength. (Level 1)	KNGF NZCG DoD	1 B B	There is some evidence	(Langhorne et al, 2009)
Inconsistent, high level of evidence –low volume - Current – Uniform thought				
It has been demonstrated that EMG-triggered neuromuscular electrostimulation (EMG-NMS) of the paretic wrist and finger extensors of patients with a stroke improves selective movements, active range of motion, and dexterity. (Level 1)	KNGF NZCG	1 C	There is evidence	(Langhorne et al, 2009; Meilink et al, 2008) Hara, 2008, Kimberley, 2004

				McDonnell et al., 2007 Pomeroy, 2006 Daly et al., 2005 Alon et al., 2007
Inconsistent, level of evidence –High volume - Current – Uniform thought				
It has been demonstrated that interventions to improve the somatosensory functions of the paretic arm and hand of patients with a stroke improve the somatosensory functions and reduce the resistance to passive movements. (Level 1)	KNGF	1	There is some evidence	
High level of evidence				
It is plausible that circuit class training with workstations for the paretic arm improves selective movements and dexterity of patients with a stroke. (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
It is plausible that passive bilateral arm training improves neurophysiological outcome measures like excitation of the ipsilateral motor cortex of patients with a stroke. (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
It is plausible that the use of a mechanical arm trainer improves the dexterity of patients with a stroke. (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
Consider strengthening exercises in addition to functional task practice. [C]	DoD	C	There is some evidence	
Moderate level of evidence				

NEGLECT

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
Any patient with suspected or actual impairment of spatial awareness eg, hemi-inattention or neglect should have a full assessment with appropriate tests	NZCG	C	There is some evidence	(Bowen & Lincoln, 2007; Jehkonen et al, 2006).

Moderate level of evidence –low volume - Current				
It has been demonstrated that visual scanning training has a favorable effect on the attention for the neglected side of patients with a stroke in the right hemisphere. (Level 1)	KNGF	1	There is some evidence	
high level of evidence				
There are indications that the following neglect-oriented training forms have a favorable effect in terms of the attention for the neglected side of patients with a stroke in the right hemisphere: combined training for visual scanning, reading, copying, and describing figures, activation of the extremities on the neglected side, stimulating the neck muscles, wearing hemispatial sunglasses, wearing prism glasses, video feedback, aids and environmental adaptations. [. (Level 3)	KNGF NZCG DoD	3 C B	There is evidence	(Luaute et al, 2006; Polanowska et al, 2009)
Inconsistent level of evidence –low volume - Current – Uniform thought				
Use simple cues to draw attention to the affected side	NZCG	GPP	There is conflicting evidence	
Use Mental imagery training or structured feedback	NZCG	D	There is some evidence	(Luaute et al, 2006)
Low level of evidence –low volume - Current				
Use half-field eye patching	NZCG	C	There is some evidence	Luaute et al, 2006; Tsang 2009).
Moderate level of evidence –low volume - Current				
Nursing and therapy sessions (e.g., for shoulder pain, postural control, feeding) need to be modified to cue attention to the impaired side in-patient with impaired spatial awareness.	DoD	GPP	There is conflicting evidence	

SHOULDER PAIN

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
For people with severe weakness who are at risk of developing shoulder pain, management can include				

shoulder strapping	NZCG	B	There is some evidence	(Ada et al, 2005; Griffith & Bernhardt, 2006)
high level of evidence –low volume – non Current				
Interventions to educate staff, carers and people with stroke to prevent trauma to the shoulder.	NZCG	GPP	There is conflicting evidence	
For people with severe weakness who are at risk of developing shoulder pain or who have already developed shoulder pain, the following interventions are NOT recommended: ▪ Ultrasound	NZCG	C	There is conflicting evidence	(Inaba & Piorkowski, 1972).
Low level of evidence –low volume – non Current				
As there is no clear evidence for effective interventions once shoulder pain is already present in people with stroke, management should be based on other guidelines for acute musculoskeletal pain (eg, AAMPGG, 2003).	NZCG	GPP	There is conflicting evidence	

SPASTICITY

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
In addition to general therapy (eg, task specific practice) other interventions to decrease spasticity should NOT be routinely provided for people with stroke who have mild to moderate spasticity (ie, spasticity that does not interfere with their activity or personal care).	NZCG	GPP	There is conflicting evidence	
In people with stroke who have persistent, moderate to severe spasticity (ie, spasticity that interferes with their activity or personal care):			There is some evidence	
▪ botulinum toxin A should be trialled in conjunction with rehabilitation therapy which includes setting clear goals	NZCG DoD	B B	There is strong evidence	(Rosales & Chua-Yap, 2008; Elia et al, 2009; Garces et al, 2006)
Consistent, high level of evidence –low volume - Current – Uniform thought				
▪ Electrical stimulation in combination with EMG biofeedback can	NZCG	C	There is some evidence	(Bakhtiary & Fatemy, 2008; Yan

be used				& Hui-Chan, 2009).
Low level of evidence –low volume - Current				
Consider deterring spasticity with anti-spastic positioning, range of motion exercises, stretching and splinting. Contractures may need to be treated using splinting, serial casting, or surgical correction.	DoD	C	There is some evidence	
Moderate level of evidence				
Consider use of oral agents such as tizanidine and oral baclofen for spasticity especially if the spasticity is associated with pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients.	DoD	B	There is some evidence	
High level of evidence				
Intrathecal baclofen treatments may be considered for stroke patients with chronic lower extremity spasticity that cannot be effectively managed by oral medication or botulinum toxin. [B]	DoD	B	There is some evidence	
High level of evidence				

CONTRACTURES

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
For people at risk of developing contractures undergoing active rehabilitation, the addition of prolonged positioning of muscles in a lengthened position to maintain range of motion is NOT recommended	NZCG	B	There is evidence	(Turton & Britton, 2005; Gustafsson & McKenna, 2006).
High level of evidence –low volume - Current				
Overhead pulley exercise should NOT be used to maintain range of motion of the shoulder	NZCG	C	There is some evidence	
Low level of evidence				
For people who have contracture, management can include the following interventions to increase range of motion:				
▪ Electrical stimulation	NZCG	C	There is evidence	(Pandyan et al, 1997)

				(Kumar et al, 1990).
Moderate level of evidence –low volume –non Current				
▪ Casting/serial casting	NZCG	C	There is some evidence	(Mortenson & Eng, 2003).
Moderate level of evidence –low volume –non Current				

STRENGTH

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
It has been demonstrated that training the muscle strength of the paretic leg or both legs of stroke patients increases their muscle strength, and improves the patient's gait in terms of cadence, symmetry, and stride length. (Level 1)	KNGF DoD	1 B	There is evidence	Ada et al., 2006 [SR] Winstein et al., 2004 Stein et al., 2004 Pack et al., 2008
Inconsistent level of evidence –moderate volume – On current – Uniform thought				
It has been demonstrated that hydrotherapy increases the muscle strength of the paretic leg of patients with a stroke. (Level 1)	KNGF	1	There is some evidence	
high level of evidence				
It has been demonstrated that a combination of aerobic endurance training and strength training improves selective movements, muscle strength of the paretic leg, comfortable and maximum walking speed, walking distance, maximum oxygen consumption, heart rate in exertion, balance, level of physical activity in everyday life, and quality of life for patients with a stroke. (Level 1)	KNGF	1	There is some evidence	
high level of evidence				
It has been demonstrated that transcutaneous electrical nerve stimulation (TENS) of the paretic leg improves muscle strength and walking ability and related activities for patients with a stroke. (Level 1)	KNGF	1 A	There is evidence	Glinsky et al, 2007; Ada et al, 2006).
Consistent, high level of evidence –low volume				
One or more of the following interventions should be used for people who have reduced strength:	NZCG	B	There is evidence	(Ada et al, 2006; Pak & Pattern,

▪ progressive resistance exercises				2008; Harris & Eng, 2010)
High level of evidence –low volume - Current				
▪ electromyographic biofeedback in conjunction with conventional therapy	NZCG	C	There is evidence	(Ada et al, 2006)
High level of evidence –low volume - Current				

SHOULDER SUBLUXATION

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
It has been demonstrated that neuromuscular electro stimulation (NMS) of the paretic shoulder muscles of patients with a stroke reduces glenohumeral subluxation. (Level 1)	KNGF NZCG	1 A	There is strong evidence	(Ada & Foongchomcheay, 2002) Price & Pandyan, 2001 Van Peppen et al., 2004 Chae et al., 2005
Consistent, high level of evidence –Moderate volume – Non Current – Uniform thought				
For people who have developed a subluxed shoulder, management can include firm support devices (eg, lap trays, arm troughs and triangular slings) to prevent further subluxation	NZCG	C	There is some evidence	(Ada et al, 2005).

Moderate level of evidence				
People with stroke, carers and staff should receive appropriate training in the care of the shoulder and use of support devices to prevent/minimise subluxation.	NZCG	GPP	There is conflicting evidence	

CARDIOVASCULAR FITNESS

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
Secondary prevention: lifestyle programs involving physical training. It is possible that lifestyle programs involving aerobic exercising favorably influence the risk factors for stroke in patients with a history of TIA or 'minor stroke'. (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
It is plausible that aerobic training has a favorable effect on conditional learning and implicit learning by patients with a stroke. (Level 2)	KNGF	2	There is some evidence	
High level of evidence –low volume				
Rehabilitation should include interventions to increase cardiorespiratory fitness once the person with stroke has sufficient strength in the large lower limb muscle groups	NZCG	A	There is some evidence	(Sanders et al, 2009; Pang et al, 2006).
High level of evidence –low volume				
People with stroke should be encouraged to undertake regular, ongoing fitness training.	NZCG	GPP	There is conflicting evidence	

RANGE OF MOTION

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
Consider active and passive ROM prolonged stretching program to decrease risk	DoD	C	There is some	

of contracture development (night splints, tilt table) in early period following stroke. [C]			evidence	
Moderate level of evidence				
Joint movement and positioning needs to be carefully monitored during rehabilitation to prevent the development of maladaptive activity patterns ***High level of evidence***		B	There is some evidence	

BALANCE & POSTURE

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
It has been demonstrated that exercising postural control with visual feedback while standing on a force platform improves the postural sway in stance of patients with a stroke. (Level 1)	KNGF	1	There is some evidence	
High level of evidence				
It has been demonstrated that exercising balance during various activities results in improved sitting and standing balance and improved performance of basic activities of daily living by stroke patients. (Level 1)	KNGF	1	There is some evidence	
High level of evidence				
Recommend that patients demonstrating balance impairments following stroke should be provided a balance-training program.	DoD	C	There is evidence	
Moderate level of evidence				

SWELLING OF THE EXTREMITIES

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
For people who are immobile, management can include the following interventions				

to prevent swelling in the hand and foot:				
▪ Dynamic pressure garments for the upper limb (Gracies et al, 2000)		C	There is some evidence	
Moderate level of evidence				
▪ Electrical stimulation (Faghri & Rodgers, 1997)		C	There is some evidence	
Moderate level of evidence				
▪ Elevation of the limb when resting.		GPP	There is conflicting evidence	
For people who have swollen extremities, management can include the following interventions to reduce swelling of the hand and foot				
▪ Dynamic pressure garments for the upper limb		C	There is some evidence	(Gracies et al, 2000)
▪ Electrical stimulation		C	There is some evidence	(Faghri & Rodgers, 1997)
▪ Continuous passive motion with elevation		C	There is some evidence	(Giudice, 1990)
Low level of evidence –low volume – Non Current				
▪ Elevation of the limb when resting.		GPP	There is conflicting evidence	

ORTHOSIS

Recommendation	**Guidelines**	**Body of evidence**		**Reference**
It is plausible that the use of a device* to influence the range of motion of the ankle is not more effective for patients with a stroke in terms of active and passive range of motion, resistance to passive movements, muscle strength, walking distance, walking speed, balance, walking ability, activities of daily living and quality of life than other interventions (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
It is plausible that walking with a leg orthosis results in greater improvements to the walking speed and energy consumption of patients with a stroke than walking without such a leg orthosis. (Level 2)	KNGF	2	There is some evidence	

High level of evidence				
Recommend for patient with foot drop, ankle foot orthoses (AFO) to prevent foot drop and improve knee stability during walking. [B]	DoD	B	There is some evidence	
High level of evidence				
It has been demonstrated that gait training with the help of a leg orthosis along a bar, supported by a physical therapist, is just as effective for patients with a stroke in terms of walking speed and walking distance as body-weight supported treadmill training. (Level 1)	KNGF	1	There is some evidence	
High level of evidence				
Ankle-foot orthoses can be used for people with persistent drop foot. If used, the ankle-foot orthosis should be individually fitted	NZCG	C	There is evidence	(Leung & Moseley, 2003; Bleyenheuft et al, 2008; de Wit et al, 2004; Pohl & Mehrholz, 2006; Sheffler et al, 2006; Wang et al, 2005; Wang et al, 2007; Tyson & Rogerson, 2009; Chen et al, 1999).
Moderate level of evidence –high volume - Current				
Recommend adaptive devices be used for safety and function if other methods of performing the task are not available or cannot be learned or if the patient's safety is a concern. [C]	DoD	C	There is some evidence	
Moderate level of evidence				
Recommend lower extremity orthotic devices be considered, if ankle or knee stabilization is needed to improve the patient's gait and prevent falls. [C]	DoD	C	There is some evidence	
Moderate level of evidence				
Recommend wheelchair prescriptions be based on careful assessment of the patient and the environment in which the wheelchair will be used. [C]	DoD	C		
Moderate level of evidence				
Recommend walking assistive devices be used to help with mobility efficiency and safety, when needed. [C] ***Moderate level of evidence***	DoD	C	There is some evidence	

ACTIVITIES OF DAILY LIVING

Recommendation	Guidelines	Body of evidence		Reference
It is plausible that mirror therapy for the paretic leg improves selective movements and the performance of basic ADL activities by patients with a stroke. (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
It is plausible that providing systematic feedback on walking speed is not more effective in terms of the duration of hospitalization, walking distance, and walking ability of patients with a stroke than other interventions. (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
In the opinion of the guideline development team, the use of walking aids is beneficial to patients with a stroke in terms of safety, independence, and efficiency of walking, as well as confidence. (Level 4)	KNGF	4	There is conflicting evidence	
Low level of evidence				
It is plausible that the treatment of dyspraxia using gestural training has a favorable effect on the basic activities of daily living of patients with a left hemisphere stroke. The effects persist in the longer term. (Level 2)	KNGF	2	There is some evidence	
High level of evidence				
It has been demonstrated that therapy to learn/re-learn leisure or social activities at home, such as gardening or painting, have a favorable effect on the participation in leisure time activities of patients with a stroke. (Level 1)	KNGF	1	There is some evidence	
High level of evidence				
It is plausible that memory strategy training in functional situations, using external strategies, has a favorable effect on patients with a stroke who have moderate to severe memory deficits, in terms of learning functional skills in these situations. (Level 1)	KNGF	1	There is some evidence	
High level of evidence				
Patients with difficulties in performance of daily activities should be assessed by a trained clinician	NZCG	A	There is evidence	(Legg et al, 2006; OST, 2003).
High level of evidence, Low volume				

Patients with confirmed difficulties in personal or extended activities of daily living should have specific therapy (eg, task-specific practice and trained use of appropriate aids) to address these issues	NZCG	B	There is evidence	(Legg et al, 2006; Walker et al, 2004).
High level of evidence, Low volume				
Other staff members, the person with stroke and carer/family should be advised regarding techniques and equipment to maximise outcomes relating to performance of daily activities and life roles, and to optimise sensorimotor, perceptual and cognitive capacities.	NZCG	GPP	There is conflicting evidence	
People with difficulties in community transport and mobility should set individualised goals and undertake tailored strategies such as multiple escorted outdoor journeys (ie, up to seven) which may include practice crossing roads, visits to local shops, bus or train travel, help to resume driving, aids and equipment, and written information about local transport options/alternatives	NZCG	B	There is evidence	(Logan et al, 2004).
High level of evidence, Low volume				
Recommend all patients receive ADL training [A]	DoD	A	There is evidence	Landi, 2006 Leg, 2006 Trombly, 2002 Soderstrom, 2006 Akinwuntan, 2005 Teasell, 2005 Liu and colleagues, 2004
High level of evidence –high volume –Non Current				
Recommend all patients receive IADL training in areas of need [C	DoD	A	There is evidence	Landi, 2006 Leg, 2006 Trombly, 2002 Soderstrom, 2006 Akinwuntan, 2005 Teasell, 2005 Liu and colleagues, 2004
High level of evidence high volume, non current				
Recommend those individuals with stroke who exhibit ADL /IADL deficits should be given a training program that is tailored to the individual needs and anticipated discharge setting. [I] ***High level of evidence***	DoD	A	There is conflicting evidence	

APPENDIX 15: WORDING OF RECOMMENDATIONS
ASSESSMENT AND OUTCOME MEASURE

Recommend	Patients admitted to hospital with acute stroke should have an initial assessment by rehabilitation professionals as soon as possible after admission, preferably within 48 hours (A) ***Moderate Level of evidence***
Recommend	There are indications that systematic measurements (monitoring) using reliable and valid measurement instruments enhance the process of clinical argumentation and the continuity of care for patients with a stroke. (C) ***High level evidence***
Recommend	Valid, reliable and responsive instruments should include the following on admission and discharge always to be administered (A) ▪ National Institutes of Health Stroke Scale ▪ Barthel Index. ***High level evidence***
Recommend	Patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke, using reliable and valid measurement Instruments. This remains necessary as long as a patient remains unable to walk independently. (A) ***High level evidence***
Recommend	Establishing an estimated prognosis for the patient's dexterity 6 months after the stroke requires their capacity for finger extension (assessed with the Fugl-Meyer Assessment) and shoulder abduction (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (A)
Recommend	It has been demonstrated that the ideal moment to estimate a patient's chances of performing basic ADL activities 6 months after the stroke is to determine their Barthel Index at the end of the first week after the stroke, but preferably on day 5. The Barthel Index records what a patients actually does at the time of the assessment, not what they could potentially do. (A) ***High level evidence***
Recommend	Acute stroke with any residual stroke-related impairment that are not admitted to hospital should undergo a comprehensive outpatient assessment(s) for functional impairment, which includes a cognitive evaluation, screening for depression,

	screening for fitness to drive, as well as functional assessments for potential rehabilitation treatment (A) ***High level evidence***

TIMING, DURARUION AND INTENSITY

Recommend	Upper limb training using constraint-induced movement therapy (CIMT) can commence within the first week of stroke for highly selected patients; however, early high-intensity CIMT may be harmful (A) ***High level evidence***
Strongly endorse	Starting rehabilitation as early as possible once medical stability is reached (preferably within 24 hours after the stroke occurred) accelerates and enhances functional recovery. (A) ***Consistent level of evidence – High volume –-Current – Uniform thought***
Endorse	Task-specific circuit class training or video self-modeling should be used to increase the amount of practice in rehabilitation (B) ***Consistent level of evidence – low volume –- non Current***
Strongly endorse	Rehabilitation should be structured to provide as much practice as possible within the first six months after stroke (A) ***Consistent level of evidence – High volume –-Non Current – Uniform thought***
Suggest	For patients undergoing active rehabilitation, physical therapy (physiotherapy and occupational therapy) should be provided as much as possible but should be a minimum of one-hour active practice per day (at least five days a week) (GPP)

INPATIENT REHABILITATION

Suggest	The medical team, including the patient and family, must analyze the patient's medical and functional status, as well as expected prognosis in order to establish the most appropriate rehab setting. [GPP
Suggest	The severity of the patient's impairment, the rehabilitation needs, the availability of family/social support and resources, the patient/family goals and preferences and the availability of community resources will determine the optimal environment for care. (GPP)
Strongly endorse	Where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available, early supported discharge services may be provided for people with mild to moderate disability. [B] ***High level of evidence –high volume –Non Current***
Strongly endorse	Patients should receive as much therapy as they are able to tolerate in order to adapt, recover, and/or reestablish their

	premorbid or optimal level of functional independence. [B] ***High level of evidence –high volume –Non Current***
	Ensure all stroke patients receive early active rehabilitation by a dedicated stroke team.
Recommend	Healthy team should have a comprehensive services which includes and links the fundamentals of acute and rehabilitation care ***High level of evidence***
	Patients should be transferred to a stroke rehabilitation unit if ongoing rehabilitation is required
Recommend	All patients including those with severe stroke should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation. ***High level of evidence***
Recommend	People with disability after stroke should receive rehabilitation in a dedicated stroke inpatient unit and subsequently from a specialist stroke team within the community. ***High level of evidence***
Recommend	An inpatient stroke rehabilitation service should consist of the following: a) Dedicated stroke rehabilitation environment ***High level of evidence***
Recommend	Core multidisciplinary team who have the knowledge, skills and behaviors to work in partnership with people with stroke and their families and carers to manage the changes experienced as a result of a stroke. ***High level of evidence***
Recommend	Access to other services that may be needed, for example: Continence advice ***High level of evidence***
Recommend	▪ Dietetics ***High level of evidence***
Recommend	▪ Electronic aids (for example, remote controls for doors, lights and heating, and communication aids) ***High level of evidence***
Recommend	▪ Psychiatry ***High level of evidence***
Recommend	▪ Orthotics ***High level of evidence***
Recommend	▪ Pharmacy ***High level of evidence***
Recommend	▪ Wheelchair services ***High level of evidence***

Recommend	The clinical team and family/caregiver should reach a shared decision regarding the rehabilitation program. ***High level of evidence***
Recommend	The rehabilitation program should be guided by specific goals developed in consensus with the patient, family, and rehabilitation team. ***High level of evidence***
Recommend	Document the detailed treatment plan in the patient's record to provide integrated rehabilitation care. ***High level of evidence***
Recommend	The patient's family/caregiver should participate in the rehabilitation sessions, and should be trained to assist patient with functional activities, when needed. ***Moderate level of evidence***
Recommend	As patients progress, additional important educational topics include subjects such as the resumption of driving, sexual activity, adjustment and adaptation to disability, patient rights/responsibilities, and support group information.
Recommend	The treatment plan should include documentation of the following: ▪ Patient's strengths, impairments, and current level of functioning ***High level of evidence***
Recommend	▪ Psychosocial resources and needs, including caregiver capacity and availability ***High level of evidence***
Recommend	Short term and long term goals ▪ Patients personal goals (e.g., I want to play with my grandson)
Recommend	▪ Patients functional goals (e.g., ADL, IADL, mobility) ***High level of evidence***
Recommend	Strategies for achieving these goals including:
Recommend	▪ Resources and disciplines required
Recommend	▪ Estimations of time for goal achievement
Recommend	▪ Educational needs for patient/family ***High level of evidence***
Recommend	Plans and timeline for re-evaluation ***High level of evidence***

DISCHARGE PLAN

Strongly endorse	All patients including those with severe stroke, a specific rehabilitation team prior should assess who are not receiving palliative care should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation. ***High level of evidence –high volume –Non Current***
Recommend	Discharge planning should be initiated as soon as possible after the patient is admitted to hospital (emergency department or inpatient care) [Evidence Level B]. **High level of evidence**
Recommend	A process should be established to ensure that patients, families and caregivers are involved in the development of the care plan, which needs to include discharge planning [Evidence Level C].
Recommend	▪ Discharge planning discussions should be ongoing throughout hospitalization to support a smooth transition from acute care [Evidence Level B]. ***High level of evidence***
Recommend	▪ Information about discharge issues and possible needs of patients following discharge should be provided to patients and caregivers soon after admission [Evidence Level C]. ***Moderate evidence***
Recommend	▪ Discharge planning activities should include patient, family and team meetings, discharge and transition care plans, a pre-discharge needs assessment, caregiver training, post discharge follow-up plan, and review of patient and family psychosocial needs [Evidence Level B]. ***High level of evidence***
	Early supported discharge
Recommend	Stroke survivors should continue to have access to specialized stroke services after leaving hospital, whether from acute care or inpatient rehabilitation ***High level of evidence***
Recommend	Stroke survivors should continue to have access to specialized stroke services after leaving the hospital, whether from acute care or inpatient rehabilitation [Evidence Level A]. ***High level of evidence***
Recommend	Early supported discharge services provided by a well resourced, coordinated specialized interprofessional team are an acceptable alternative to more prolonged hospital stroke rehabilitation unit care and can reduce the length of hospital stay for selected patients [Evidence Level A]. ***High level of evidence***
	Stroke patients with mild to moderate disability may be offered early supported discharge if all of the following criteria are met:
Recommend	▪ They are able to participate in rehabilitation from the date of transfer [Evidence Level B].

	High level of evidence
Recommend	▪ They can be safely managed at home [Evidence Level B]. ***High level of evidence***
Recommend	▪ They have access to comprehensive interprofessional community rehabilitation services and caregiver or support services [Evidence Level A]. ***High level of evidence***
Recommend	Early supported discharge should not be offered to patients with moderately severe to severe stroke [Evidence Level A]. ***High level of evidence***
Recommend	To work effectively, early supported discharge services must have elements similar to those of coordinated inpatient stroke teams including:
Recommend	▪ A case coordination approach [Evidence Level B]. ***High level of evidence***
Recommend	▪ An inter-professional team of specialists in stroke care and rehabilitation working in collaboration with community-based healthcare professionals [Evidence Level B]. ***High level of evidence***
Recommend	▪ Emphasis on client- and family-centered practice, setting client goals and ongoing review of goal attainment [Evidence Level C]. ***Moderate evidence***
Recommend	▪ Stroke rehabilitation services with intensity established based on individual client needs and goals [Evidence Level B]. ***High level of evidence***
Recommend	▪ Services that are delivered in the most suitable environment based on client issues and strengths [Evidence Level C]. ***Moderate evidence***
Recommend	▪ Regular team meetings to discuss assessment of new clients, review client management, goals, and plans for discharge [Evidence Level A]. ***High level of evidence***
Recommend	▪ Family meetings to ensure patient and family involvement in management, goal setting, and planning for discharge from the early supported discharge program [Evidence Level A]. ***High level of evidence***
Recommend	▪ Negotiated withdrawal and discharge from early supported discharge program [Evidence Level C]. ***Moderate level of evidence***

OUTPATIENT REHABILITATION

Recommend	After leaving hospital, stroke survivors must have access to specialized stroke care and rehabilitation services appropriate to their needs (acute and/or inpatient rehabilitation) [Evidence Level A]. ***High level of evidence***
Recommend	Early supported discharge should be considered for patients discharged to the community [Evidence Level A]. ***High level of evidence***
Recommend	People who have difficulty in activities of daily living, including self-care, productivity and leisure, should receive occupational therapy or interprofessional interventions targeting activities of daily living [Evidence Level A for adults; Evidence Level C for pediatrics] ***High level of evidence***
Recommend	Patients who are identified as high risk for falls in the community should have a comprehensive set of interventions implemented, such as an individually prescribed exercise program, in order to prevent or reduce the number and severity of falls [Evidence Level A]. ***High level of evidence***
Recommend	People with difficulties in mobility should be offered an exercise program specific to those difficulties and monitored throughout the program [Evidence Level B]. ***High level of evidence***
Recommend	Patients with aphasia should be taught supportive conversation techniques [Evidence Level A]. ***High level of evidence***
Recommend	Patients with dysphagia should be offered swallowing therapy and opportunity for reassessment as required [Evidence Level A] ***High level of evidence***
Recommend	Stroke survivors should be provided with a cardiovascular fitness program to maximize functional outcomes after stroke (and as part of overall vascular risk reduction). Patients should be prescribed modified activities to allow age appropriate target heart rates to be achieved for 20 to 30 minutes three times per week [EvidenceB] ***High level of evidence***
	Interdisciplinary community rehabilitation services and support services should be made available whenever possible to enable early supported discharge to be offered to all people with stroke who have mild to moderate disability (A) ***High level of evidence, Low volume, non current***
Endorse	Rehabilitation services after hospital discharge should be offered to all stroke patients as needed and where available, delivered in the home setting (A)

	High level of evidence, Low volume, current
Endorse	Contact with and education by trained staff should be offered to all people with stroke and family/carers after discharge (A) ***High level of evidence Low volume, non current***
Recommend	Outpatient stroke rehabilitation after discharge of stroke survivors to an organized rehabilitation team (physiatrist, physical therapist, occupational therapist, and speech and language pathologist). ***High level of evidence***

FAMILY/CARER INVOLVEMENT

Recommend	Self-management programs are effective in improving the self-efficacy, participation, and quality of life of patients with a stroke. (Level 2) ***High level of evidence***
Recommend	Rehabilitation process can be optimized by informing the stroke patient's informal caregiver at the earliest possible occasion about what the patient can and cannot do (Level 3) ***High level of evidence***
Suggest	People with stroke and family/carers should be provided with information about the availability and potential benefits of a local stroke support group and/or other sources of peer support prior to discharge from the hospital or in the community (GPP)
Strongly endorse	Carers should be provided with tailored information and support during all stages of the recovery process. This includes (but is not limited to) information provision and opportunities to talk with relevant health practitioners about the stroke, stroke team members and roles, test or assessment results, intervention plans, discharge planning, community services and appropriate contact details (C) ***Consistent level of evidence – moderate volume –Current – Uniform thought***
Suggest	Where it is the wish of the person with stroke (and their family/carer), carers should be actively involved in the recovery process by assisting with goal setting, therapy sessions, discharge planning, and long-term activities (GPP)
	Carers of people with stroke should be provided with information about the availability and potential benefits of local stroke support groups and services, at or before the person's return to the community (B)
Endorse	Carers of people with stroke should be offered services to support them after the person's return to the community. Such services can use a problem-solving or educational-counseling approach (C) ***Moderate level of evidence – moderate volume –non Current***

Suggest	Assistance should be provided for family/carers to manage people with stroke who have behavioral problems (GPP)
Suggest	Advice about the financial support available should be provided for family/carers of people with stroke prior to discharge and as needs emerge and circumstances change (GPP)
Strongly endorse	Caregivers should be provided in a variety of methods of training based on their specific needs, cognitive capability, and local resources; Training may be provided in individual or group format, and in community-based programs (B) ***High level of evidence – moderate volume –-Non Current***

RE-ASSESSMENT

Recommend	Patients should be re-evaluated intermittently during their rehabilitation progress. Particular attention should be paid to interval change and progress towards stated goals. ***High level of evidence***
Recommend	Patients who show a decline in functional status may no longer be candidates for rehabilitation interventions. Considerations about the etiology of the decline and its prognosis can help guide decisions about when/if further rehabilitation evaluation should occur. ***High level of evidence***
Recommend	Psychosocial status and community integration needs should be re-assessed, particularly for patients who've experienced a functional decline or reached a plateau. ***High level of evidence***
Strongly endorse	Consider reassessing severity using the NIHSS at the time of acute care discharge to validate the first assessment or identify neurological changes. ***Consistent level of evidence – moderate volume –Current – Uniform thought***
Recommend	The rehabilitation needs of survivors of a severe or moderate stroke should be reassessed weekly for the first month, and then at intervals as indicated by their health status [C]. ***High level of evidence***

CONTENT OF PHYSIOTHERAPY

Walking Therapies

Recommend	Patient's walking ability, 6 months after the stroke requires their sitting balance (assessed with the sitting balance item of

	the Trunk Control Test) and the motor function of the leg (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (Level 1) ***High level of evidence***
Suggest	Patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence, using reliable and valid measurement instruments. This remains necessary as long as a patient remains unable to walk independently. (Level 4) ***Low level of evidence***
Suggest	An indication of possible further changes in walking ability for patients during the chronic phase who have a Functional Ambulation Categories (FAC) score of 3 or more at 6 months after the stroke can be obtained by having them do the 10-meter walk test at comfortable speed every 6 months. A meaningful change can be defined as a change in the walking speed of at least 0.16 m/s relative to the speed attained 6 months after the stroke. (Level 4) ***Low level of evidence***
Suggest	In the opinion of the guideline development team, patients in the chronic phase who still have a limited walking ability in the period following the first 6 months after the stroke should be monitored for their functional performance regularly (every 6 months) (Level 4) ***Low level of evidence***
Recommend	After thorough assessment and goal setting by a trained clinician, all people with difficulty walking should be given the opportunity to undertake tailored, repetitive practice of walking (or components of walking) as much as possible (A) ***High level of evidence***
Suggest	Patient in the chronic phase showing significant functional changes at the level of activities justifies continuation or resumption of physical therapy. (Level 4) ***Low level of evidence***
Recommend	Body-weight supported treadmill training improves the comfortable walking speed and walking distance of patients with a stroke. (Level 1) ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
Recommend	Robot-assisted gait training for stroke patients who are unable to walk independently improves their comfortable walking speed, maximum walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living, compared to conventional therapy (including over ground walking). (Level 1). ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
Recommend	Combining robot-assisted gait training with functional electro stimulation of the paretic leg improves the sitting and standing balance and walking ability of patients with a stroke, compared to conventional therapy (including over ground walking). (Level 1) ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
Recommend	Ground gait training by stroke patients who are able to walk without physical support is more effective in increasing walking distance and reducing anxiety than walking on a treadmill. (Level 1)

	High level of evidence
Recommend	Exercising walking and other mobility-related functions and activities under the supervision of an informal caregiver improves the performance of basic activities of daily living for the patient with a stroke, and reduces the perceived burden of care for the informal caregiver. (Level 1) ***High level of evidence***
Recommend	It has been demonstrated that circuit class training (CCT) for walking and other mobility-related functions and activities improves walking distance/speed, sitting and standing balance and walking ability, and reduces inactivity in patients with a stroke. (Level 1) ***High level of evidence***
Recommend	One or more of the following interventions can be used in addition to conventional walking therapy:
Recommend	Use Cueing of cadence (B) ***High level of evidence –low volume***
Recommend	Use Joint position biofeedback (B) ***High level of evidence –low volume***
Endorse	Use virtual reality training (C) ***Moderate level of evidence –moderate volume –- Current – Uniform thought***
Recommend	Functional electrical stimulation (FES) as an adjunctive treatment for patients with impaired muscle contraction, specifically for patients with impaired gait due to ankle/knee motor impairment. FES can be utilized for individuals with acute or chronic deficits after stroke. [B] ***High level of evidence***
Recommend	Use transcutaneous electrical nerve stimulation (TNS or TENS) as an adjunctive treatment for enhancing recovery of gait function after stroke. [C] ***Moderate level of evidence***

UPPER EXTRIMITY THERAPY

	The following interventions should be given in order to encourage using their upper limb as much as possible
Strongly endorse	Constraint-induced movement therapy to improves the dexterity, perceived use of arm and hand, quality of arm and hand movements, and quality of life of patients with a stroke. (A) ***Consistent level of evidence –High volume –- Current – Uniform thought***

Recommend	Mechanical assisted training (B) ***High level of evidence –low volume***
Recommend	Repetitive task-specific training (B). ***High level of evidence –low volume***
Endorse	Unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke improves the selective movements and muscle strength of the paretic arm and reduces atypical pain in the paretic arm. (Level 1) ***Inconsistent, high level of evidence –High volume - Current – Uniform thought***
Strongly endorse	Bilateral training of the elbow and wrist improves the selective movements and muscle strength of the arm of patients with a stroke. (Level 1) ***Consistent, high level of evidence –High volume - Current – Uniform thought***
	Virtual reality training of the paretic arm and hand as an add-on to regular exercise therapy for patients with a stroke improves the performance of basic activities of daily living. (Level 1) ***High level of evidence***
Endorse	Neuromuscular stimulation (NMS) of the paretic wrist and finger flexors and extensors of patients with a stroke improves selective movements and muscle strength. (Level 1) ***Inconsistent, high level of evidence –low volume - Current – Uniform thought***
Endorse	EMG-triggered neuromuscular electro stimulation (EMG-NMS) of the paretic wrist and finger extensors of patients with a stroke improves selective movements, active range of motion, and dexterity. (Level 1) ***Inconsistent, level of evidence –High volume - Current – Uniform thought***
Recommend	Interventions to improve the somatosensory functions of the paretic arm and hand of patients with a stroke improve the somatosensory functions and reduce the resistance to passive movements. (Level 1) ***High level of evidence***
Recommend	Circuit class training with workstations for the paretic arm improves selective movements and dexterity of patients with a stroke. (Level 2) ***High level of evidence***
Recommend	Passive bilateral arm training improves neurophysiological outcome measures like excitation of the ipsilateral motor cortex of patients with a stroke. (Level 2) ***High level of evidence***
Recommend	Mechanical arm trainer improves the dexterity of patients with a stroke. (Level 2) ***High level of evidence***
Recommend	Use strengthening exercises in addition to functional task practice. [C] ***High level of evidence***

NEGLECT

Endorse	Any patient with suspected or actual impairment of spatial awareness eg, hemi-inattention or neglect should have a full assessment with appropriate tests (C) ***Moderate level of evidence –low volume - Current***
Recommend	Visual scanning training has a favorable effect on the attention for the neglected side of patients with a stroke in the right hemisphere. (Level 1) ***High level of evidence***
Recommend	Neglect-oriented training forms have a favorable effect in terms of the attention for the neglected side of patients with a stroke in the right hemisphere: combined training for visual scanning, reading, copying, and describing figures, activation of the extremities on the neglected side, stimulating the neck muscles, wearing hemispatial sunglasses, wearing prism glasses, video feedback, aids and environmental adaptations. [. (Level 3) ***Inconsistent level of evidence –low volume - Current – Uniform thought***
Suggest	Use simple cues to draw attention to the affected side (GPP)
Suggest	Use Mental imagery training or structured feedback (D) ***Low level of evidence –low volume - Current***
	Use half-field eye patching (C) ***Moderate level of evidence –low volume - Current***
Suggest	Nursing and therapy sessions (e.g., for shoulder pain, postural control, feeding) need to be modified to cue attention to the impaired side in patient with impaired spatial awareness (GPP)

SHOULDER PAIN

Endorse	For people with severe weakness who are at risk of developing shoulder pain, management can include shoulder strapping

	High level of evidence –low volume – non Current
	Interventions to educate staff, carers and people with stroke to prevent trauma to the shoulder (GPP)
Recommend	For people with severe weakness who are at risk of developing shoulder pain or who have already developed shoulder pain use ultrasound is not recommended (C) ***Low level of evidence –low volume – non Current***
	As there is no clear evidence for effective interventions once shoulder pain is already present in people with stroke, management should be based on other guidelines for acute musculoskeletal pain (GPP)

SPASTICITY

Strongly endorse	In addition to general therapy (eg, task specific practice) other interventions to decrease spasticity should NOT be routinely provided for people with stroke who have mild to moderate spasticity (ie, spasticity that does not interfere with their activity or personal care). ***Consistent, high level of evidence –low volume - Current – Uniform thought***
Strongly endorse	In people with stroke who have persistent, moderate to severe spasticity (ie, spasticity that interferes with their activity or personal care): ***Consistent, high level of evidence –low volume - Current – Uniform thought***
Strongly endorse	Botulinum toxin A should be trialled in conjunction with rehabilitation therapy which includes setting clear goals ***Consistent, high level of evidence –low volume - Current – Uniform thought***
Suggest	Electrical stimulation in combination with EMG biofeedback can be used ***Low level of evidence –low volume - Current***
Recommend	Consider deterring spasticity with antispastic positioning, range of motion exercises, stretching and splinting. Contractures may need to be treated using splinting, serial casting, or surgical correction. ***Moderate level of evidence***
Endorse	Use of oral agents such as tizanidine and oral baclofen for spasticity especially if the spasticity is associated with pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients.

	High level of evidence –low volume - Current
Recommend	Intrathecal baclofen treatments may be considered for stroke patients with chronic lower extremity spasticity that cannot be effectively managed by oral medication or botulinum toxin. [B] ***High level of evidence***

CONTRACTURES

Endorse	For people at risk of developing contractures undergoing active rehabilitation, the addition of prolonged positioning of muscles in a lengthened position to maintain range of motion is NOT recommended (B) ***High level of evidence –low volume - Current***
Suggest	Overhead pulley exercise should NOT be used to maintain range of motion of the shoulder (C) ***Low level of evidence***
	For people who have contracture, management can include the following interventions to increase range of motion:
Endorse	▪ Electrical stimulation (C) ***Moderate level of evidence –low volume –non Current***
Endorse	▪ Casting/serial casting(C) ***Moderate level of evidence –low volume –non Current***

STRENGTH

Recommend	Training the muscle of the paretic leg or both legs of stroke patients increases their muscle strength, and improves the patient's gait in terms of cadence, symmetry, and stride length. (Level 1) ***Inconsistent level of evidence –moderate volume – On current – Uniform thought***
Recommend	Hydrotherapy increases the muscle strength of the paretic leg of patients with a stroke. (Level 1) ***High level of evidence***
Recommend	Combination of aerobic endurance training and strength training improves selective movements, muscle strength of the paretic leg, comfortable and maximum walking speed, walking distance, maximum oxygen consumption, heart rate in exertion, balance, level of physical activity in everyday life, and quality of life for patients with a stroke. (Level 1) ***High level of evidence***
Endorse	Transcutaneous electrical nerve stimulation (TENS) of the paretic leg improves muscle strength and walking ability and related activities for patients with a stroke. (Level 1) ***Consistent, high level of evidence –low volume***
	One or more of the following interventions should be used for people who have reduced strength:
Endorse	▪ Progressive resistance exercises (B)

	High level of evidence –low volume - Current
Endorse	▪ Electromyography biofeedback in conjunction with conventional therapy (C) ***High level of evidence –low volume - Current***

SHOULDER SUBLUXATION

Strongly endorse	Neuromuscular electro stimulation (NMS) of the paretic shoulder muscles of patients with a stroke reduces glenohumeral subluxation. (Level 1) ***Consistent, high level of evidence –Moderate volume – Non Current – Uniform thought***
Recommend	For people who have developed a subluxed shoulder, management can include firm support devices (eg, lap trays, arm troughs and triangular slings) to prevent further subluxation (C) ***Moderate level of evidence***
Suggest	People with stroke, carers and staff should receive appropriate training in the care of the shoulder and use of support devices to prevent/minimize subluxation(GPP)

CARDIOVASCULAR FITNESS

Recommend	Lifestyle programs involving aerobic exercising favorably influence the risk factors for stroke in patients with a history of TIA or 'minor stroke'. (Level 2) ***High level of evidence***
Endorse	Aerobic training has a favorable effect on conditional learning and implicit learning by patients with a stroke. (Level 2) ***High level of evidence –low volume***
Endorse	Rehabilitation should include interventions to increase cardiorespiratory fitness once the person with stroke has sufficient strength in the large lower limb muscle groups (A) ***High level of evidence –low volume***
Suggest	People with stroke should be encouraged to undertake regular, ongoing fitness training (GPP)

RANGE OF MOTION

Recommend	Active and passive ROM prolonged stretching program to decrease risk of contracture development (night splints, tilt table) in early period following stroke. [C] ***High level of evidence***
Recommend	Joint movement and positioning needs to be carefully monitored during rehabilitation to prevent the development of maladaptive activity patterns ***High level of evidence***

BALANCE & POSTURE

Recommend	Exercise postural control with visual feedback while standing on a force platform improves the postural sway in stance of patients with a stroke (Level 1) ***High level of evidence***
Recommend	Exercise balance during various activities results in improved sitting and standing balance and improved performance of basic activities of daily living by stroke patients. (Level 1) ***High level of evidence***
Recommend	Recommend that patients demonstrating balance impairments following stroke should be provided a balance training program (C) ***Moderate level of evidence***

SWELLING OF THE EXTREMITIES

	For people who are immobile, management can include the following interventions to prevent swelling in the hand and foot:
Recommend	Dynamic pressure garments for the upper limb (C) ***Moderate level of evidence***
Recommend	Electrical stimulation (C) ***Moderate level of evidence***
Suggest	Elevation of the limb when resting.
	For people who have swollen extremities, management can include the following interventions to reduce swelling of the hand and foot
	▪ Dynamic pressure garments for the upper limb

	▪ Electrical stimulation (C)
Suggest	▪ Continuous passive motion with elevation (C) ***Low level of evidence –low volume – Non Current***
Suggest	▪ Elevation of the limb when resting (GPP)

ORTHOSIS

Recommend	Use of a device to influence the range of motion of the ankle is not more effective for patients with a stroke in terms of active and passive range of motion, resistance to passive movements, muscle strength, walking distance, walking speed, balance, walking ability, activities of daily living and quality of life than other interventions (Level 2) ***High level of evidence***
Recommend	Walking with a leg orthosis results in greater improvements to the walking speed and energy consumption of patients with a stroke than walking without such a leg orthosis. (Level 2) ***High level of evidence***
Recommend	Recommend for patient with foot drop, ankle foot orthoses (AFO) to prevent foot drop and improve knee stability during walking. [B] ***High level of evidence***
Endorse	Gait training with the help of a leg orthosis along a bar, supported by a physical therapist, is just as effective for patients with a stroke in terms of walking speed and walking distance as body-weight supported treadmill training. (Level 1) ***High level of evidence –low volume - Current – Uniform thought***
Endorse	Ankle-foot orthoses can be used for people with persistent drop foot. If used, the ankle-foot orthosis should be individually fitted ***Moderate level of evidence –high volume - Current***
Recommend	Recommend adaptive devices be used for safety and function if other methods of performing the task are not available or cannot be learned or if the patient's safety is a concern. [C] ***Moderate level of evidence***
Recommend	Recommend lower extremity orthotic devices be considered, if ankle or knee stabilization is needed to improve the patient's gait and prevent falls. [C] ***Moderate level of evidence***
Recommend	Recommend wheelchair prescriptions be based on careful assessment of the patient and the environment in which the wheelchair will be used. [C] ***Moderate level of evidence***
Recommend	Recommend walking assistive devices be used to help with mobility efficiency and safety, when needed. [C] ***Moderate level of evidence***

ACTIVITIES OF DAILY LIVING

	Patients with difficulties in performance of daily activities should be assessed by a trained clinician (A)
Recommend	Mirror therapy for the paretic leg improves selective movements and the performance of basic ADL activities by patients with a stroke. (Level 2) ***High level of evidence***
Recommend	Providing systematic feedback on walking speed is not more effective in terms of the duration of hospitalization, walking distance, and walking ability of patients with a stroke than other interventions. (Level 2) ***High level of evidence***
Suggest	Use of walking aids is beneficial to patients with a stroke in terms of safety, independence, and efficiency of walking, as well as confidence. (Level 4) ***Low level of evidence***
Recommend	Therapy to learn/re-learn leisure or social activities at home, such as gardening or painting, have a favorable effect on the participation in leisure time activities of patients with a stroke. (Level 1) ***High level of evidence***
Recommend	Memory strategy training in functional situations, using external strategies, has a favorable effect on patients with a stroke who have moderate to severe memory deficits, in terms of learning functional skills in these situations. (Level 1) ***High level of evidence***
Recommend	Patients with confirmed difficulties in personal or extended activities of daily living should have specific therapy (eg, task-specific practice and trained use of appropriate aids) to address these issues (B) ***High level of evidence, Low volume***
Suggest	Other staff members, the person with stroke and carer/family should be advised regarding techniques and equipment to maximize outcomes relating to performance of daily activities and life roles, and to optimize sensorimotor, perceptual and cognitive capacities (GPP).
Endorse	People with difficulties in community transport and mobility should set individualized goals and undertake tailored strategies such as multiple escorted outdoor journeys (ie, up to seven) which may include practice crossing roads, visits to local shops, bus or train travel, help to resume driving, aids and equipment, and written information about local transport options/alternatives (B) ***High level of evidence, Low volume***
Strongly endorse	Recommend all patients receive ADL training [A] ***High level of evidence –high volume –Non Current***
Strongly endorse	Recommend all patients receive IADL training in areas of need [A] ***High level of evidence high volume, non current***
Recommend	Recommend those individuals with stroke who exhibit ADL /IADL deficits should be given a training program that is

	tailored to the individual needs and anticipated discharge setting. [A] ***High level of evidence***

APPENDIX: CONTEXT POINT FOR MINIMUM AND ADDITIONAL STANDARD OF CARE

	Minimum standard care of practice	Additional standard care of practice
Equipment	Parallel bars, walking frame	Biodex machine frame
Workforce	Trained personnel (physical therapist, occupational therapist, nurse)	Trained personnel (Physical therapist, occupational therapist, speech therapist, nurse)
Resources	None	None
Training	Within competency	Within competency
When is it done	Within 24 after onset of symptoms or when medically stable	Within 24 after onset of symptoms or when medically stable

Reassessment using at least one standard outcome measure	Everyday *Discharge planning should be documented in a discharge document	Everyday *Discharge planning should be documented in a discharge document

APPENDIX 16: CONTEXTUALIZED RECOMMENDATIONS
ASSESSMENT AND OUTCOME MEASURE

- **We recommend** that for patients admitted to hospital with acute stroke should have an initial assessment by rehabilitation professionals as soon as possible after admission, preferably within 48 hours
  [Moderate Level of evidence]

- **We recommend** systematic measurements (monitoring) using reliable and valid instruments for clinical argumentation and the continuity of care for patients with a stroke
  [High-level evidence]

- **We recommend** that National Institutes of Health Stroke Scale, and Barthel Index be always administered on admission and discharge

  [High-level evidence]

- **We recommend** that Patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke, using reliable and valid measurement Instruments. This remains necessary as long as a patient remains unable to walk independently.
  [High-level evidence]

- **We recommend** assessment of finger extension (using Fugl-Meyer), and shoulder abduction (using Motricity Index) soon as possible, but preferably on day 2 after the stroke. (A)
- Establishing an estimated prognosis for the patient's dexterity 6 months after the stroke requires their capacity for

- It has been demonstrated that the ideal moment to estimate a patient's chances of performing basic ADL activities 6 months after the stroke is to determine their Barthel Index at the end of the first week after the stroke, but preferably on day 5. The Barthel Index records what a patients actually does at the time of the assessment, not what they could potentially do. (A)

High level evidence

- Finger extension (assessed with the Fugl-Meyer Assessment) and shoulder abduction (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (A)
- **We recommend** that acute stroke patients with any residual stroke-related impairment who are not admitted to hospital to undergo a comprehensive outpatient assessment(s) for functional impairment, which includes a cognitive evaluation, screening for depression, screening for fitness to drive, as well as functional assessments for potential rehabilitation treatment

[High-level evidence]

Context points for assessment and re-assessment of stroke patients

	Minimum standard care of practice	Additional standard care of practice
Equipment	National Institutes of Health Stroke Scale Barthel Index Manual muscle testing	Fugl-Meyer Assessment Motricity Index FIM mobility items Berg Balance 10-meter walk, Functional Ambulation Classification
Workforce	Trained personnel (physical therapist, occupational therapist, nurse)	Trained personnel (Physical therapist, occupational therapist, nurse)
Resources	Printed copy of the tools	Printed copy of the tools

Training	Within competency	Within competency
When is it done	Upon hospital admission and during re-assessment	Upon hospital admission and during re-assessment
Reassessment	Weekly	Weekly

TIMING, DURARUION AND INTENSITY

- **We recommend** upper limb training using constraint-induced movement therapy (CIMT) to commence within the first week of stroke for highly selected patients; however, early high-intensity CIMT may be harmful.
  Dromerick et al, 2009: [Moderate-level evidence]

- We **strongly endorse** starting rehabilitation as early as possible once medical stability is reached (preferably within 24 hours after the stroke occurred) accelerates and enhances functional recovery.
  Bernhardt et al, 2009; Bernhardt et al. 2008; Langhorne et al. 2007; Gagnon et al. 2006; Maulden et al. 2005; Musicco et al. 2003; Paolucci et al. 2000; Wade et al. 1992; Sorbello et al. 2009: [High level of evidence]

- **We endorse** Task-specific circuit class training or video self-modeling should be used to increase the amount of practice in rehabilitation
  Wevers et al, 2009; McClellan & Ada, 2004: [High level of evidence]

- We **strongly endorse** that rehabilitation to be structured in order to provide as much practice as possible within the first six months after stroke
  Kwakkel et al, 2004; Wevers et al, 2009; McClellan & Ada, 2004; Bhogal et al, 2003b; Bakheit et al, 2007; Godecke, 2009; Carnaby et al, 2006; Van Peppen et al. 2004; Kwakkel et al. 1997: [High level of evidence]

- We suggest that for patients undergoing active rehabilitation, physical therapy be provided as much as possible but should be a

minimum of one-hour active practice per day (at least five days a week) *(GPP)*

Context points for timing, frequency, duration and intensity of rehabilitation

	Minimum standard care of practice	Additional standard care of practice
Equipment	Parallel bars, walking frame	Biodex machine frame
Workforce	Trained personnel (physical therapist, occupational therapist, nurse)	Trained personnel (Physical therapist, occupational therapist, speech therapist, nurse)
Resources	None	None
Training	Within competency	Within competency
When is it done	Within 24 after onset of symptoms or when medically stable	Within 24 after onset of symptoms or when medically stable
Reassessment using at least one standard outcome measure	Weekly *Discharge planning should be documented in a discharge document	Weekly *Discharge planning should be documented in a discharge document

INPATIENT REHABILITATION

- We suggest that medical team, including the patient and family, must analyze the patient's medical and functional status, as well as expected prognosis in order to establish the most appropriate rehab setting
  [GPP]

- We **strongly endorse** that where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available, early supported discharge services may be provided for people with mild to moderate disability

  Donnelly et al., 2004; Langhorne et al., 2005; Teasell et al., 2003; Anderson et al., 2002; Brady et al., 2005; Patel, et al., 2004; Askim, Morkved, et al., 2006; Bautz-Holtert, Sveen, 2002; Diserens, Michel, et al, 2006; Fjaertoft, Indredavik, et al., 2004: [High level of evidence]

- We **strongly endorse** stroke patients to receive as much therapy as they are able to tolerate in order to adapt, recover, and/or reestablish their premorbid or optimal level of functional independence

  Kwakkel et al., 1999; Langhorne et al., 1996; Lincoln et al., 1999; Parry et al., 1999; Rapoport & Eerd, 1989; Richards et al., 1993; Sivenius et al., 1985; Smith et al., 1981; Sunderland et al., 1992; Van der Lee & Snels, 2001: [High level of evidence]

- Ensure all stroke patients receive early active rehabilitation by a dedicated stroke team.
- Healthy team should have a comprehensive services which includes and links the fundamentals of acute and rehabilitation care

  High level of evidence

- Patients should be transferred to a stroke rehabilitation unit if ongoing rehabilitation is required

- All patients including those with severe stroke should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation.

  High level of evidence

- People with disability after stroke should receive rehabilitation in a dedicated stroke inpatient unit and subsequently from a specialist stroke team within the community.

High level of evidence

- An inpatient stroke rehabilitation service should consist of the following:
  b) Dedicated stroke rehabilitation environment
  High level of evidence

- **We recommend** that core multidisciplinary team who has the knowledge, skills and behaviors to work in partnership with people with stroke and their families and carers to manage the changes experienced as a result of a stroke.
  [Moderate evidence]

- **We recommend** stroke patients to have access to other services that may be needed, for example:
  - Continence advice
    [High level of evidence]
  - Dietetics
    [High level of evidence]
  - Electronic aids (for example, remote controls for doors, lights and heating, and communication aids)
    [High level of evidence]
  - Psychiatry
    [High level of evidence]
  - Orthotics
    [High level of evidence]
  - Pharmacy
    High level of evidence
  - Wheelchair services
    [High level of evidence]
- **We recommend** that clinical team and family/caregiver to reach a shared decision regarding the rehabilitation program.
  [High level of evidence]

- **We recommend** that rehabilitation program should be guided by specific goals developed in consensus with the patient, family, and rehabilitation team.
  [High level of evidence]

- **We recommend** the documentation of a detailed treatment plan in the patient's record to provide integrated rehabilitation care.
  [High level of evidence]

- **We recommend** that the patient's family/caregiver to participate in the rehabilitation sessions, and be trained to assist patient with functional activities, when needed.
  [Moderate level of evidence]

- **We recommend** that as patients' progress, additional important educational topics include subjects such as the resumption of driving, sexual activity, adjustment and adaptation to disability, patient rights/responsibilities, and support group information.
  [High level of evidence]
- **We recommend** that treatment plan should include documentation of the following:
  - Patient's strengths, impairments, and current level of functioning
    [High level of evidence]

  - Psychosocial resources and needs, including caregiver capacity and availability
    [High level of evidence]

- **We recommend that** treatment plan to have Short term and long-term goals
  - Patients personal goals (e.g., I want to play with my grandson)
  - Patients functional goals (e.g., ADL, IADL, mobility)
    [High level of evidence]

- **We recommend** that strategies to be put in place for achieving these goals including:
  - Resources and disciplines required
  - Estimations of time for goal achievement
  - Educational needs for patient/family
    [High level of evidence]

- **We recommend** Plans and timeline for re-evaluation
  [High level of evidence]

Context points for in patients

	Minimum standard care of practice	Additional standard care of practice

Equipment	Parallel bars, walking frame	Biodex machine frame
Workforce	Trained personnel (physical therapist, occupational therapist, nurse)	Trained personnel (physical therapist, occupational therapist, speech therapist, nurse)
Resources	None	None
Training	Within competency	Within competency
When is it done	Within 24 after onset of symptoms or when medically stable	Within 24 after onset of symptoms or when medically stable
Reassessment using at least one standard outcome measure	Everyday * Discharge planning should be documented in a discharge document	Everyday * Discharge planning should be documented in a discharge doc.

DISCHARGE PLAN

All patients including those with severe stroke, a specific rehabilitation team prior should assess who are not receiving palliative care should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation.

High level of evidence

- We **recommend** that discharge planning should be initiated as soon as possible after the patient is admitted to hospital (emergency department or inpatient care)

  Barras, 2005; Schedlbauer et al, 2004

  [High level of evidence]

- We **recommend** that a process be established to ensure that patients, families and caregivers are involved in the development of the care plan, which needs to include discharge planning

  [High level of evidence]

- We **recommend** that discharge planning discussions be ongoing throughout hospitalization to support a smooth transition from acute care

  [High level of evidence]

- We **recommend** that Information about discharge issues and possible needs of patients following discharge be provided to patients and caregivers soon after admission

  [Moderate evidence]

- We **recommend** that Discharge planning activities should include patient, family and team meetings, discharge and transition care plans, a pre-discharge needs assessment, caregiver training, post discharge follow-up plan, and review of patient and family psychosocial needs

  [High level of evidence]

Early supported discharge

- We **recommend** that Stroke survivors should continue to have access to specialized stroke services after leaving hospital, whether from acute care or inpatient rehabilitation

  [High level of evidence]

- We **recommend** that Stroke survivors should continue to have access to specialized stroke services after leaving the hospital, whether from acute care or inpatient rehabilitation

  [High level of evidence]

- We **recommend** that Early supported discharge services provided by a well resourced, coordinated specialized interprofessional team are an acceptable alternative to more prolonged hospital stroke rehabilitation unit care and can reduce the length of hospital stay for selected patients

  [High level of evidence]

- We **recommend** that stroke patients with mild to moderate disability may be offered early supported discharge if all of the following criteria are met:
  - They are able to participate in rehabilitation from the date of transfer

    [High level of evidence]

- They can be safely managed at home
  [High level of evidence]

- They have access to comprehensive interprofessional community rehabilitation services and caregiver or support services
  [High level of evidence]

- We **recommend** that Early supported discharge should not be offered to patients with moderately severe to severe stroke
  [High level of evidence]

- To work effectively, we **recommend** that early supported discharge to have elements similar to those of coordinated inpatient stroke teams including:
  - A case coordination approach
    [High level of evidence]

We **recommend** that an inter-professional team of specialists in stroke care and rehabilitation working in collaboration with community-based healthcare professionals

[High level of evidence}

- We **recommend** rehabilitation to emphasis on client- and family-centered practice, setting client goals and ongoing review of goal attainment
  [Moderate evidence]

- We **recommend** that in stroke rehabilitation services, intensity of rehabilitation be based on individual client needs and goals
  [High level of evidence]

- We **recommend** that rehabilitation services be delivered in the most suitable environment based on client issues and strengths
  [Moderate evidence]

- We **recommend** regular team meetings to discuss assessment of new clients, review client management, goals, and plans for discharge
  [High level of evidence]

- We **recommend** family meetings to ensure patient and family involvement in management, goal setting, and planning for discharge from the early supported discharge program
  [High level of evidence]

- We **recommend** negotiated withdrawal and discharge from early supported discharge program
  [Moderate level of evidence]

Context points for discharge plan

	Minimum standard care of practice	Additional standard care of practice
Equipment	None	None
Workforce	Trained personnel (physical therapist, occupational therapist, nurse, orthopaedic technologist, social worker)	Trained personnel (Physical therapist, occupational therapist, speech therapist, nurse, doctor, orthopaedic technologist, psychologist, neurologist)
Resources	General ward	Stroke rehabilitation unit Neurological unit
Training	Within competency	Within competency
When is it done	N/A	N/A

Reassessment using at least one standard outcome measure	N/A	N/A

OUTPATIENT REHABILITATION

- After leaving hospital, we **recommend** that stroke survivors to have access to specialized stroke care and rehabilitation services appropriate to their needs (acute and/or inpatient rehabilitation
  [High level of evidence]

- We **recommend** early supported discharge to be considered for patients discharged to the community
  [High level of evidence]

- We **recommend** that stroke survivors who have difficulty in activities of daily living, including self-care, productivity and leisure, to receive occupational therapy or interprofessional interventions targeting activities of daily living
  [High level of evidence]

- We **recommend** that patients who are identified as high risk for falls in the community to have a comprehensive set of interventions implemented, such as an individually prescribed exercise program, in order to prevent or reduce the number and severity of falls
  [High level of evidence]

- We **recommend** that people with difficulties in mobility to be offered an exercise program specific to those difficulties and monitored throughout the program
  [High level of evidence]

- We **recommend** that patients with aphasia to be taught supportive conversation techniques
  [High level of evidence]

- We **recommend** that patients with dysphagia to be offered swallowing therapy and opportunity for reassessment as required

[High level of evidence]

- We **recommend** that stroke survivors should be provided with a cardiovascular fitness program to maximize functional outcomes after stroke (and as part of overall vascular risk reduction). Patients should be prescribed modified activities to allow age appropriate target heart rates to be achieved for 20 to 30 minutes three times per week.
  [High level of evidence]

- We **recommend** Interdisciplinary community rehabilitation services and support services to be made available whenever possible to enable early supported discharge to be offered to all people with stroke who have mild to moderate disability
  Larsen et al, 2006; ESD Trialists, 2005: [High level of evidence]

- We **endorse** that rehabilitation services after hospital discharge to be offered to all stroke patients as needed and where available, delivered in the home setting
  Larsen et al, 2006; ESD Trialists, 2005: Hillier & Gakeemah, 2010*: [High level of evidence]*

- We **endorse** contact with, and education by trained staff to be offered to all people with stroke and family/carers after discharge
  Middleton et al, 2005; Boter, 2004 *[High level of evidence]*

- We **recommend** that outpatient rehabilitation after discharge of stroke survivors to an organized rehabilitation team (physical therapist, occupational therapist, and speech and language pathologist).

  High level of evidence

Context points for discharge plan

	Minimum standard care of practice	Additional standard care of practice
Equipment	Gym equipment:	Biodex machine frame
	Therapeutic exercises	Robotics
	Electrical stimulation	Virtual reality
Workforce	Trained personnel (physical therapist,	Trained personnel

	occupational therapist)	(physical therapist, occupational therapist, speech therapist)
Resources	None	None
Training	Wihin competency	Within competency
When is it done	After discharge up to optimum functional independence	After discharge up to a minimum of six months, progressing program to improve cardiovascular and muscular endurance
Reassessment using at least one standard outcome measure	Monthly	Monthly

FAMILY/CARER INVOLVEMENT

- We **recommend** self-management programs to effectively improve self-efficacy, participation, and quality of life of patients with a stroke
  [High level of evidence]

- We **recommend** that Rehabilitation process can be optimized by informing the stroke patient's informal caregiver at the earliest possible occasion about what the patient can and cannot do
  [High level of evidence]

- We **suggest** that people with stroke and family/carers to be provided with information about the availability and potential benefits of a local stroke support group and/or other sources of peer support prior to discharge from the hospital or in the community
  [GPP]

- We **strongly endorse** that carers to be provided with tailored information and support during all stages of the recovery process. This includes (but is not limited to) information provision and opportunities to talk with relevant health practitioners about the stroke, stroke team members and roles, test or assessment results, intervention plans, discharge planning, community services and appropriate contact details

Brereton et al, 2007; Smith et al, 2008; Smith et al., 2008; Forster, 2001; Clark et al., 2003; [High level of evidence]

- We **suggest** that, where it is the wish of the person with stroke (and their family/carer), carers should be actively involved in the recovery process by assisting with goal setting, therapy sessions, discharge planning, and long-term activities
  [GPP]

- We **strongly endorse** that carers of people with stroke to be provided with information about the availability and potential benefits of local stroke support groups and services, at or before the person's return to the community
  Lee et al, 2007; Eldred& Sykes, 2008; Lui et al, 2005; Bhogal et al, 2003a; [High level of evidence]

- We **recommend** that carers of people with stroke to be offered services to support them after the person's return to the community. Such services can use a problem-solving or educational-counseling approach
  Brereton et al, 2007; Lee et al, 2007; Eldred & Sykes, 2008; Visser-Meily et al, 2005; [Moderate level of evidence]

- We **suggest** assistance to be provided for family/carers to manage people with stroke who have behavioral problems
  [*GPP]*

- We **suggest** that advice about the financial support available should be provided for family/carers of people with stroke prior to discharge and as needs emerge and circumstances change
  [GPP]

- We **strongly endorse** that caregivers be provided in a variety of methods of training based on their specific needs, cognitive capability, and local resources; Training may be provided in individual or group format, and in community-based programs
  Bhogal et al., 2003; Smith et al., 2008; Kalra, 2004; Bjorkdahl et al., 2007; [High level of evidence]

RE-ASSESSMENT

- We **recommend** that patients be re-evaluated intermittently during their rehabilitation progress. Particular attention should be paid to interval change and progress towards stated goals.
  [High level of evidence]

- We **recommend** that patients who show a decline in functional status may no longer be candidates for rehabilitation interventions. Considerations about the etiology of the decline and its prognosis can help guide decisions about when/if further

rehabilitation evaluation should occur.
[High level of evidence]

- We **recommend** that psychosocial status and community integration needs to be re-assessed, particularly for patients who've experienced a functional decline or reached a plateau.
[High level of evidence]

- We **strongly endorse** re-assessment of severity using the NIHSS at the time of acute care discharge to validate the first assessment or identify neurological changes.
[High level of evidence}

- The rehabilitation needs of survivors of a severe or moderate stroke should be reassessed weekly for the first month, and then at intervals as indicated by their health status [C].
[High level of evidence]

NB: The context points for re-assessment are included in those mentioned on *assessment part.*

CONTENT OF PHYSIOTHERAPY

LOWER EXTRIMITY THERAPY

- We **recommend** that patient's walking ability, 6 months after the stroke requires their sitting balance (assessed with the sitting balance item of the Trunk Control Test) and the motor function of the leg (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (Level 1)
High level of evidence

- We **suggest** that patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence, using reliable and valid measurement instruments. This remains necessary as long as a patient remains unable to walk independently. (Level 4)
[Low level of evidence]

- An indication of possible further changes in walking ability for patients during the chronic phase who have a Functional

Ambulation Categories (FAC) score of 3 or more at 6 months after the stroke can be obtained by having them do the 10-meter walk test at comfortable speed every 6 months. We **suggest** that a meaningful change can be defined as a change in the walking speed of at least 0.16 m/s relative to the speed attained 6 months after the stroke.

[Low level of evidence]

- We **suggest** that In the opinion of the guideline development team, patients in the chronic phase who still have a limited walking ability in the period following the first 6 months after the stroke should be monitored for their functional performance regularly (every 6 months)

  [Low level of evidence]

- We **recommend** that after thorough assessment and goal setting by a trained clinician, all people with difficulty walking should be given the opportunity to undertake tailored, repetitive practice of walking (or components of walking) as much as possible

  French et al, 2007; [High level of evidence]

- We **suggest** that Patient in the chronic phase showing significant functional changes at the level of activities justifies continuation or resumption of physical therapy.

  [Low level of evidence]

- We **recommend** that Body-weight supported treadmill training improves the comfortable walking speed and walking distance of patients with a stroke.

  [High level of evidence]

- We **recommend** that Robot-assisted gait training for stroke patients who are unable to walk independently improves their comfortable walking speed, maximum walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living, compared to conventional therapy (including over ground walking). (Level 1).

  Inconsistent level of evidence –low volume –- Current – Uniform thought

- We **recommend** that Combining robot-assisted gait training with functional electro stimulation of the paretic leg improves the sitting and standing balance and walking ability of patients with a stroke, compared to conventional therapy (including over ground walking). (Level 1)

  Inconsistent level of evidence –low volume –- Current – Uniform thought

- We **recommend** ground gait training by stroke patients who are able to walk without physical support is more effective in increasing walking distance and reducing anxiety than walking on a treadmill.

  [High level of evidence]

- We **recommend** exercising walking and other mobility-related functions and activities under the supervision of an informal caregiver improves the performance of basic activities of daily living for the patient with a stroke, and reduces the perceived burden of care for the informal caregiver.
  [High level of evidence]

- We **recommend** circuit class training (CCT) for walking and other mobility-related functions and activities improves walking distance/speed, sitting and standing balance and walking ability, and reduces inactivity in patients with a stroke.
  [High level of evidence]

- One or more of the following interventions can be used in addition to conventional walking therapy:
  - We **recommend** use Cueing of cadence
    Langhorne et al, 2009: [High level of evidence]

  - We **recommend** that use Joint position biofeedback
    Langhorne et al, 2009: [High level of evidence]

  - We **endorse** use virtual reality training
    You et al, 2005; Mirelman et al, 2009; Kim et al, 2009; Yang et al, 2008; Jaffe et al, 2004: [Moderate level of evidence]

- We **recommend** use of functional electrical stimulation (FES) as an adjunctive treatment for patients with impaired muscle contraction, specifically for patients with impaired gait due to ankle/knee motor impairment. FES can be utilized for individuals with acute or chronic deficits after stroke.
  [High level of evidence]

- We **recommend** use of transcutaneous electrical nerve stimulation (TNS or TENS) as an adjunctive treatment for enhancing recovery of gait function after stroke.
  [Moderate level of evidence]

Context points for lower extremity in stroke patients

Minimum standard care of practice	Additional standard care of practice

Equipment	Gym equipment Therapeutic exercises Electrical stimulation	Biodex machine frame Robotics Virtual reality
Equipment	Gym equipment Therapeutic exercises Electrical stimulation	Biodex machine frame Robotics Virtual reality
Equipment	Gym equipment Therapeutic exercises Electrical stimulation	Biodex machine frame Robotics Virtual reality
Equipment	Gym equipment Therapeutic exercises Electrical stimulation	Biodex machine frame Robotics Virtual reality
Equipment	Gym equipment Therapeutic exercises Electrical stimulation	Biodex machine frame Robotics Virtual reality
Reassessment using at least one standard outcome measure	Monthly Assessment should include tests for strength, coordination, tone, ROM, pain; and evaluation of lower extremity impairment and the level of assistance needed for mobility and self-care such as Berg Balance Scale, Functional Instrument and 10 meter walk	Monthly

UPPER EXTRIMITY THERAPY

- The following interventions should be given in order to encourage using their upper limb as much as possible
  - We **strongly endorse** the use of constraint-induced movement therapy to improves the dexterity, perceived use of arm and hand, quality of arm and hand movements, and quality of life of patients with a stroke.
    Langhorne et al, 2009; Sirtori et al, 2009; Brogardh et al., 2006; Hakkennes et al., 2005; Lin et al., 2007; Page et al., 2008; Taub et al., 2007; Wolf et al., 2006, 2008; Wu et al., 2007a and b [High level of evidence]

  - **We recommend** use of mechanical assisted training (B)
    Mehrholz et al, 2008: [High level of evidence]

  - **We recommend** use of repetitive task-specific training
    French et al, 2007: [High level of evidence]

- We **strongly endorse** the use unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke improves the selective movements and muscle strength of the paretic arm and reduces atypical pain in the paretic arm.
  Daly, 2005; Hesse, 2005; Lum, 2002; Lum 2006; Masiero, 2006, 2007; Prange, 2006

  Volpe, 2008a & b: [high level of evidence]

- We **strongly endorse** the use bilateral training of the elbow and wrist improves the selective movements and muscle strength of the arm of patients with a stroke.
  Lewis, Byblow Whitall, et al., 2000; Mudie; Mudie & Matyas, Cauraugh & Kim, 2002; Stewart et al, 2006: [high level of evidence]

- We **recommend** the use Virtual reality training of the paretic arm and hand as an add-on to regular exercise therapy for patients with a stroke improves the performance of basic activities of daily living
  [High level of evidence]

- We **endorse** neuromuscular stimulation (NMS) of the paretic wrist and finger flexors and extensors of patients with a stroke improves selective movements and muscle strength.
  Langhorne et al, 2009: [High level of evidence]

- We **strongly endorse** the use of EMG-triggered neuromuscular electro stimulation (EMG-NMS) of the paretic wrist and finger extensors of patients with a stroke improves selective movements, active range of motion, and dexterity.
  Langhorne et al, 2009; Meilink et al, 2008; Hara, 2008; Kimberley, 2004; McDonnell et al., 2007; Pomeroy, 2006; Daly et al., 2005; Alon et al., 2007: [High level of evidence]

- We **recommend** the Interventions to improve the somatosensory functions of the paretic arm and hand of patients with a stroke improve the somatosensory functions and reduce the resistance to passive movements.
  [High level of evidence]

- We **recommend** the Circuit class training with workstations for the paretic arm to improve selective movements and dexterity of patients with a stroke. (Level 2)
  High level of evidence

- We **recommend** passive bilateral arm training improves neurophysiological outcome measures like excitation of the ipsilateral motor cortex of patients with a stroke
  [High level of evidence]

- We **recommend** use of mechanical arm trainer improves the dexterity of patients with a stroke
  [High level of evidence]

- We **recommend** strengthening exercises in addition to functional task practice.
  [High level of evidence]

Context points for upper extremity in stroke patients

	Minimum standard care of practice	Additional standard care of practice
Equipment	Occupational therapy equipment for hand and shoulder function Functional activities Electrical stimulation Assistive devices Oral medication for spasticity and pain	Robotics Virtual reality Botulinum toxin EMG biofeedback Intrathecal baclofen

	management	
	Upper extremity splint	
Workforce	Physical therapist	Physical therapist
	Occupational therapist	Pain management specialist
	Physical therapist (in absence of	Occupational therapist
	occupational therapy in the facility)	Orthotist
	Orthotist (under guidance of available health provider)	Psychologist (post stroke pain)
Resources	Room space suitable for rehabilitation program	Occupational therapy room
		Operating room
Training	Within competency	Training for botolinum injection and intrathecal baclofen for spasticity management
	Training for physical therapist in upper extremity training and splint fabrication	
When is it done	Upon hospital admission up to optimal functional independence in use of upper extremity	Upon hospital admission up to optimal functional independence in use of upper extremity

Reassessment using at least one standard outcome measure	Monthly Assessment tools such as Frenchay Activities Index and Canadian Occupational Performance Measure	Monthly

NEGLECT

- We **recommend** that any patient with suspected or actual impairment of spatial awareness eg, hemi-inattention or neglect to have a full assessment with appropriate tests.
  Bowen & Lincoln, 2007; Jehkonen et al, 2006: [Moderate level of evidence]

- We **recommend** visual scanning training, which has favorable effect on the attention for the neglected side of patients with a stroke in the right hemisphere.
  [High level of evidence]

- We **endorse** neglect-oriented training for favorable effect in terms of the attention for the neglected side of patients with a stroke in the right hemisphere: combined training for visual scanning, reading, copying, and describing figures, activation of the extremities on the neglected side, stimulating the neck muscles, wearing hemispatial sunglasses, wearing prism glasses, video feedback, aids and environmental adaptations.
  Luaute et al, 2006; Polanowska et al, 2009: [Inconsistent level of evidence]

- We **recommend** use of simple cues to draw attention to the affected side
  (GPP)

- We **recommend** use of mental imagery training or structured feedback
  Luaute et al, 2006: [Low level of evidence]

- We **recommend** use of half-field eye patching
  Luaute et al, 2006; Tsang 2009: [Moderate level of evidence]

- We **recommend** nursing and therapy sessions (e.g., for shoulder pain, postural control, feeding) need to be modified to cue attention to the impaired side in patient with impaired spatial awareness
  [GPP]

Context points for cognitive, perceptual disorders and apraxia in stroke patients

	Minimum standard care of practice	Additional standard care of practice
Equipment	Montreal cognitive assessment tool	Electronic organizer
	Naturalistic action test	Computers
	Methods used in the treatment of cognitive and perceptual disorders; and limb apraxia such as attention training, memory compensatory strategies, strategy training for apraxia, cueing and feedback strategies for unitalteral neglect, visual scanning, sensory stimulation and mental imagery techniques	Electronic tablet
Workforce	Physiatrist	Multidisciplinary team: standard care workforce plus psychiatrist, geriatrician, speech pathologist, social worker, psychologist
	Neurologist	
	Psychologist	
	Occupational therapist	
	Nurse (in the absence of occupational therapist in the facility)	

Resources	Room for counselling and assessment	Room for counselling and assessment
Training	-training to use and interpret the tools used -training for the methods used to treat the disorders	-training to use and interpret the tools used -training for the methods used to treat the disorders using electronic gadgets.
When is it done	After discharge up to optimum functional independence	After discharge up to optimum functional independence
Reassessment	Monthly	Monthly

SHOULDER PAIN

- We **endorse that** for people with severe weakness who are at risk of developing shoulder pain, management can include shoulder strapping
  Ada et al, 2005; Griffith & Bernhardt, 2006: [High level of evidence]

- We **recommend** for interventions to educate staff, carers and people with stroke to prevent trauma to the shoulder
  [GPP]

- We **endorse that** tor people with severe weakness who are at risk of developing shoulder pain or who have already developed shoulder pain use ultrasound is not recommended
  Inaba & Piorkowski, 1972: [high level of evidence]

NB: The context points for post-stroke shoulder pain are included in those mentioned on upper extremity interventions.

SPASTICITY

- We **suggest** In addition to general therapy (eg, task specific practice) other interventions to decrease spasticity should NOT be routinely provided for people with stroke who have mild to moderate spasticity (ie, spasticity that does not interfere with their

activity or personal care).
[GPP]

- We **strongly endorse** In people with stroke who have persistent, moderate to severe spasticity (ie, spasticity that interferes with their activity or personal care):
  Botulinum toxin A should be trialled in conjunction with rehabilitation therapy, which includes setting clear goals

  Rosales & Chua-Yap, 2008; Elia et al, 2009; Garces et al, 2006: [High level of evidence]

- We **endorse** electrical stimulation in combination with EMG biofeedback can be used
  Bakhtiary & Fatemy, 2008; Yan & Hui-Chan, 2009: [Low level of evidence]

- We **recommend** deterring spasticity with antispastic positioning, range of motion exercises, stretching and splinting. Contractures may need to be treated using splinting, serial casting, or surgical correction.
  [Moderate level of evidence]

- We **recommend** use of oral agents such as tizanidine and oral baclofen for spasticity especially if the spasticity is associated with pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients.
  [High level of evidence]

- We **recommend** intrathecal baclofen treatments for stroke patients with chronic lower extremity spasticity that cannot be effectively managed by oral medication or botulinum toxin.
  [High level of evidence]

NB: The context points for post-stroke spasticity are included in those mentioned on lower extremity interventions.

CONTRACTURES

- We **endorse** that for people at risk of developing contractures undergoing active rehabilitation, the addition of prolonged positioning of muscles in a lengthened position to maintain range of motion is NOT recommended
  Turton & Britton, 2005; Gustafsson & McKenna, 2006: [High level of evidence]

- We **suggest** Overhead pulley exercise should NOT be used to maintain range of motion of the shoulder (C)
  [Low level of evidence]

- We **recommend** that for people who have contracture, management can include the following interventions to increase range of

motion:

- Electrical stimulation (C)
  Pandyan et al, 1997; Kumar et al, 1990: [Moderate level of evidence]

- Casting/serial casting(C)
  Mortenson & Eng, 2003: [Moderate level of evidence]

NB: The context points for post-stroke contractures are included in those mentioned on lower extremity interventions

STRENGTH

- We **recommend** Training the muscle of the paretic leg or both legs of stroke patients increases their muscle strength, and improves the patient's gait in terms of cadence, symmetry, and stride length.
  Ada et al., 2006; Winstein et al., 2004; Stein et al., 2004; Pack et al., 2008 [High level of evidence]

- We **recommend** Hydrotherapy increases the muscle strength of the paretic leg of patients with a stroke
  [High level of evidence]

- We **recommend** Combination of aerobic endurance training and strength training improves selective movements, muscle strength of the paretic leg, comfortable and maximum walking speed, walking distance, maximum oxygen consumption, heart rate in exertion, balance, level of physical activity in everyday life, and quality of life for patients with a stroke. (Level 1)
  [High level of evidence]

- We **endorse** transcutaneous electrical nerve stimulation (TENS) of the paretic leg improves muscle strength and walking ability and related activities for patients with a stroke.
  Glinsky et al, 2007; Ada et al, 2006: [High level of evidence]

- We **recommend** one or more of the following interventions should be used for people who have reduced strength:
  - Progressive resistance exercises
    Ada et al, 2006; Pak & Pattern, 2008; Harris & Eng, 2010: [High level of evidence]

  - Electromyography biofeedback in conjunction with conventional therapy

Ada et al, 2006: *[High level of evidence]*

NB: The context points for post-stroke weaknes are included in those mentioned on lower extremity interventions

SHOULDER SUBLUXATION

- We **endorse** Neuromuscular electro stimulation (NMS) of the paretic shoulder muscles of patients with a stroke reduces glenohumeral subluxation.
  Ada & Foongchomcheay, 2002; Price & Pandyan, 2001; Van Peppen et al., 2004; Chae et al., 2005 [High level of evidence]

- We **recommend** that for people who have developed a subluxed shoulder, management can include firm support devices (eg, lap trays, arm troughs and triangular slings) to prevent further subluxation
  [Moderate level of evidence]

- We **suggest** that, carers and staff of stroke patient to receive appropriate training in the care of the shoulder and use of support devices to prevent/minimize subluxation
  [GPP]

Context Point: Standard care of practice is to prevent complications occurring during post stroke period.

This is particularly relevant for decubitus ulcer, subluxed shoulder, bladder and bowel incontinence, depression, deep venous thrombosis and sleep disturbances. It is everybody's responsibility to be alert for these complications and to actively educate the patient and relatives about these issues and how to prevent them.

The recommendations provide clear instruction about the management of these complications should they occur. Complications often result from poor medical and nursing care. Where complications are preventable, and occur through poor practices, they place unnecessary burdens on scarce health resources.

CARDIOVASCULAR FITNESS

- We **recommend** for lifestyle programs involving aerobic exercising which has favorably influence the risk factors for stroke in patients with a history of TIA or minor stroke
  [High level of evidence]

- We **recommend** for aerobic training since they have favorable effect on conditional learning and implicit learning by patients

with a stroke. (Level 2)
[High level of evidence]

- We **recommend** that rehabilitation to include interventions to increase cardiorespiratory fitness once the person with stroke has sufficient strength in the large lower limb muscle groups
Sanders et al, 2009; Pang et al, 2006: [High level of evidence]

- We **recommend** that people with stroke should be encouraged to undertake regular, ongoing fitness training
[GPP)

NB: The context points for post-stroke subluxation are included in those mentioned on lower extremity interventions

RANGE OF MOTION

- We **recommend** active and passive ROM, and prolonged stretching program to decrease risk of contracture development (night splints, tilt table) in early period following stroke.
[High level of evidence]

- We **recommend** joint movement and positioning needs to be carefully monitored during rehabilitation to prevent the development of maladaptive activity patterns
[High level of evidence]

BALANCE & POSTURE

- We **recommend** exercise postural control with visual feedback while standing on a force platform improves the postural sway in stance of patients with a stroke
[High level of evidence]

- We **recommend** exercise balance during various activities to improve sitting and standing balance, and to improve performance of basic activities of daily living by stroke patients.
[High level of evidence]

- We **recommend** that patients demonstrating balance impairments following stroke to be provided a balance-training program
[Moderate level of evidence]

SWELLING OF THE EXTREMITIES

- We **recommend** that for people who are immobile, management can include the following interventions to prevent swelling in the hand and foot:
    - Dynamic pressure garments for the upper limb
      [Moderate level of evidence]
    - Electrical stimulation
      [Moderate level of evidence]
    - Elevation of the limb when resting
      [GPP]
- We **recommend** that for people who have swollen extremities, management can include the following interventions to reduce swelling of the hand and foot
    - Dynamic pressure garments for the upper limb
      Gracies et al, 2000: [High level of evidence]
    - Electrical stimulation
      Faghri & Rodgers, 1997: [Low level of evidence]
    - Continuous passive motion with elevation
      Giudice, 1990: [Low level of evidence]

- We **recommend** Elevation of the limb when resting
  [GPP]

ORTHOSIS

- We **recommend** use of a device to influence the range of motion of the ankle is not more effective for patients with a stroke in terms of active and passive range of motion, resistance to passive movements, muscle strength, walking distance, walking speed, balance, walking ability, activities of daily living and quality of life than other interventions
  [High level of evidence]

- We **recommend** walking with a leg orthosis results in greater improvements to the walking speed and energy consumption of patients with a stroke than walking without such a leg orthosis.
  [High level of evidence]

- For patient with foot drop, we **recommend** ankle foot orthoses (AFO) to prevent foot drop and improve knee stability during walking.
  [High level of evidence]

- We **recommend** gait training with the help of a leg orthosis along a bar, supported by a physical therapist, is just as effective for patients with a stroke in terms of walking speed and walking distance as body-weight supported treadmill training.
  [High level of evidence]

- We **strongly endorse** ankle-foot orthoses for people with persistent drop foot. If used, the ankle-foot orthosis should be individually fitted
  Leung & Moseley, 2003; Bleyenheuft et al, 2008; De Wit et al, 2004; Pohl & Mehrholz, 2006; Sheffler et al, 2006; Wang et al, 2005; Wang et al, 2007; Tyson & Rogerson, 2009; Chen et al, 1999: [Moderate level of evidence]

- We **recommend** adaptive devices be used for safety and function if other methods of performing the task are not available or cannot be learned or if the patient's safety is a concern.
  [Moderate level of evidence]

- We **recommend** lower extremity orthotic devices be considered, if ankle or knee stabilization is needed to improve the patient's gait and prevent falls.
  [Moderate level of evidence]

- We **recommend** wheelchair prescriptions be based on careful assessment of the patient and the environment in which the wheelchair will be used.
  [Moderate level of evidence]

- We **recommend** walking assistive devices be used to help with mobility efficiency and safety, when needed.
  [Moderate level of evidence]

NB: The context points for post-stroke subluxation are included in those mentioned on lower extremity interventions

ACTIVITIES OF DAILY LIVING

- We **recommend** that patients with difficulties in performance of daily activities to be assessed by a trained clinician
  Legg et al, 2006; OST, 2003: [High level of evidence]

- We **recommend** mirror therapy for the paretic leg improves selective movements and the performance of basic ADL activities by patients with a stroke.
  [High level of evidence]

- We **recommend** use of walking aids, which is beneficial to patients with a stroke in terms of safety, independence, and efficiency of walking, as well as confidence.
  [Low level of evidence]

- We **recommend** for therapy to learn/re-learn leisure or social activities at home, such as gardening or painting, have a favorable effect on the participation in leisure time activities of patients with a stroke.
  [High level of evidence]

- We **recommend** memory strategy training in functional situations, using external strategies, has a favorable effect on patients with a stroke who have moderate to severe memory deficits, in terms of learning functional skills in these situations.
  [High level of evidence]

- We **recommend** patients with confirmed difficulties in personal or extended activities of daily living to have specific therapy (eg, task-specific practice and trained use of appropriate aids) to address these issues
  Legg et al, 2006; Walker et al, 2004: [High level of evidence]

- We **recommend** Other staff members, the person with stroke and carer/family should be advised regarding techniques and equipment to maximize outcomes relating to performance of daily activities and life roles, and to optimize sensorimotor, perceptual and cognitive capacities
  [GPP]

- We **recommend** People with difficulties in community transport and mobility should set individualized goals and undertake tailored strategies such as multiple escorted outdoor journeys (ie, up to seven) which may include practice crossing roads, visits to local shops, bus or train travel, help to resume driving, aids and equipment, and written information about local transport options/alternatives
  Logan et al, 2004: [High level of evidence]

- We **strongly endorse** that all patients receive ADL training

Landi, 2006; Leg, 2006; Trombly, 2002; Soderstrom, 2006; Akinwuntan, 2005; Teasell, 2005; Liu and colleagues, 2004 [High level of evidence]

- We **strongly endorse** that all patients receive IADL training in areas of need
  Landi, 2006; Leg, 2006; Trombly, 2002; Soderstrom, 2006; Akinwuntan, 2005; Teasell, 2005; Liu and colleagues, 2004 [High level of evidence]

- We **recommend** that those individuals with stroke who exhibit ADL /IADL deficits should be given a training program that is tailored to the individual needs and anticipated discharge setting.
  [High level of evidence]

APPENDIX 17: CONTENTIOUS COMPONENTS

ASSESSMENT AND OUTCOME MEASURE

Patients admitted to hospital with acute stroke should have an initial assessment by rehabilitation professionals as soon as possible after admission, preferably within 48 hours (A) ***Moderate Level of evidence***
Systematic measurements (monitoring) using reliable and valid measurement instruments enhance the process of clinical argumentation and the continuity of care for patients with a stroke. (C) ***High level evidence***
Valid, reliable and responsive instruments should include the following on admission and discharge always to be administered (A) ▪ National Institutes of Health Stroke Scale ▪ Barthel Index. ***High level evidence***
Patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke, using reliable and valid measurement Instruments. This remains necessary as long as a patient remains unable to walk independently. (A) ***High level evidence***
Establishing an estimated prognosis for the patient's dexterity 6 months after the stroke requires their capacity for finger extension (assessed with the Fugl-Meyer Assessment) and shoulder abduction (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (A)

TIMING, DURARUION AND INTENSITY

Task-specific circuit class training or video self-modeling should be used to increase the amount of practice in rehabilitation (B) ***Consistent level of evidence – low volume –- non Current***

For patients undergoing active rehabilitation, physical therapy (physiotherapy and occupational therapy) should be provided as much as possible but should be a minimum of one-hour active practice per day (at least five days a week) (GPP)

INPATIENT REHABILITATION

Where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available, early supported discharge services may be provided for people with mild to moderate disability. [B] ***High level of evidence –high volume –Non Current***
Ensure all stroke patients receive early active rehabilitation by a dedicated stroke team. ***High level of evidence***
Patients should be transferred to a stroke rehabilitation unit if ongoing rehabilitation is required (A) ***High level of evidence***
All patients including those with severe stroke should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation. ***High level of evidence***
People with disability after stroke should receive rehabilitation in a dedicated stroke inpatient unit and subsequently from a specialist stroke team within the community. ***High level of evidence***
Access to other services that may be needed, for example: Continence advice ***High level of evidence***
▪ Electronic aids (for example, remote controls for doors, lights and heating, and communication aids) ***High level of evidence***
▪ Psychiatry ***High level of evidence***
▪ Wheelchair services ***High level of evidence***
▪ Psychosocial resources and needs, including caregiver capacity and availability ***High level of evidence***

DISCHARGE PLAN

All patients including those with severe stroke, a specific rehabilitation team prior should assess who are not receiving palliative care should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation. ***High level of evidence –high volume –Non Current***
Early supported discharge services provided by a well resourced, coordinated specialized interprofessional team are an acceptable alternative to more prolonged hospital stroke rehabilitation unit care and can reduce the length of hospital stay for selected patients [Evidence Level A]. ***High level of evidence***
▪ They have access to comprehensive interprofessional community rehabilitation services and caregiver or support services [Evidence Level A]. ***High level of evidence***
▪ An inter-professional team of specialists in stroke care and rehabilitation working in collaboration with community-based healthcare professionals [Evidence Level B]. ***High level of evidence***
▪ Services that are delivered in the most suitable environment based on client issues and strengths [Evidence Level C]. ***Moderate evidence***

OUTPATIENT REHABILITATION

After leaving hospital, stroke survivors must have access to specialized stroke care and rehabilitation services appropriate to their needs (acute and/or inpatient rehabilitation) [Evidence Level A]. ***High level of evidence***
Interdisciplinary community rehabilitation services and support services should be made available whenever possible to enable early supported discharge to be offered to all people with stroke who have mild to moderate disability (A) ***High level of evidence, Low volume, non current***
Rehabilitation services after hospital discharge should be offered to all stroke patients as needed and where available, delivered in the home setting (A)

High level of evidence, Low volume, current
Outpatient stroke rehabilitation after discharge of stroke survivors to an organized rehabilitation team (physiatrist, physical therapist, occupational therapist, and speech and language pathologist). ***High level of evidence***

CONTENT OF PHYSIOTHERAPY

LOWER EXTREMITY

Patient's walking ability, 6 months after the stroke requires their sitting balance (assessed with the sitting balance item of the Trunk Control Test) and the motor function of the leg (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke. (Level 1) ***High level of evidence***
Body-weight supported treadmill training improves the comfortable walking speed and walking distance of patients with a stroke. (Level 1) ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
Robot-assisted gait training for stroke patients who are unable to walk independently improves their comfortable walking speed, maximum walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living, compared to conventional therapy (including over ground walking). (Level 1). ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
Combining robot-assisted gait training with functional electro stimulation of the paretic leg improves the sitting and standing balance and walking ability of patients with a stroke, compared to conventional therapy (including over ground walking). (Level 1) ***Inconsistent level of evidence –low volume –- Current – Uniform thought***
It has been demonstrated that circuit class training (CCT) for walking and other mobility-related functions and activities improves walking distance/speed, sitting and standing balance and walking ability, and reduces inactivity in patients with a stroke. (Level 1) ***High level of evidence***
One or more of the following interventions can be used in addition to conventional walking therapy:
Use Joint position biofeedback (B) ***High level of evidence –low volume***
Use virtual reality training (C)

Moderate level of evidence –moderate volume –- Current – Uniform thought

UPPER EXTRIMITY THERAPY

The following interventions should be given in order to encourage using their upper limb as much as possible
Mechanical assisted training (B) ***High level of evidence –low volume***
Unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke improves the selective movements and muscle strength of the paretic arm and reduces atypical pain in the paretic arm. (Level 1) ***Inconsistent, high level of evidence –High volume - Current – Uniform thought***
Virtual reality training of the paretic arm and hand as an add-on to regular exercise therapy for patients with a stroke improves the performance of basic activities of daily living. (Level 1) ***High level of evidence***
EMG-triggered neuromuscular electro stimulation (EMG-NMS) of the paretic wrist and finger extensors of patients with a stroke improves selective movements, active range of motion, and dexterity. (Level 1) ***Inconsistent, level of evidence –High volume - Current – Uniform thought***
Circuit class training with workstations for the paretic arm improves selective movements and dexterity of patients with a stroke. (Level 2) ***High level of evidence***
Mechanical arm trainer improves the dexterity of patients with a stroke. (Level 2) ***High level of evidence***
Use strengthening exercises in addition to functional task practice. [C] ***High level of evidence***

NEGLECT

Visual scanning training has a favorable effect on the attention for the neglected side of patients with a stroke in the right hemisphere. (Level 1) ***High level of evidence***

SPASTICITY

Botulinum toxin A should be trialled in conjunction with rehabilitation therapy which includes setting clear goals ***Consistent, high level of evidence –low volume - Current – Uniform thought***
Use of oral agents such as tizanidine and oral baclofen for spasticity especially if the spasticity is associated with pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients. ***High level of evidence –low volume - Current***

APPENDIX 18: DELPHI STUDY---- ROUND 1

Participant identification number…….

Title of the study: The contextualization of a physiotherapy clinical practice guidelines for stroke rehabilitation in Kenya.

Please complete the information below if you have agreed to participate in the study.

SOCIAL DEMOGRAPHIC INFORMATION

Age: ……

Gender Male……..

Highest level of qualification…… ……

Current profession…… ……

Number of years experience in stroke management ……..(Years)

There are several components of rehabilitation of stroke patients that have been proven to be effective globally. Most of these components are directly applicable to stroke rehabilitation in Kenya. However, some of the management component seems contentious in developing countries such as Kenya. The following items are part of stroke rehabilitation process that needs consensus concerning its applicability in Kenya.

On a scale of 1-5, indicate your level of agreement on applicability of the various items indicated below (**1-strongly disagree, and 5-strongly agree**).

ASSESSMENT

1. Kenyan physiotherapists assess the finger extension (using Fugl-Meyer) for stroke patients on admission, in order to establish an estimated prognosis for the patient's dexterity, 6 months after the stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapists assess shoulder abduction (using the Motricity), for stroke patients on admission, in order to establish an estimated prognosis for the patient's dexterity, 6 months after the stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapists assess the finger extension and shoulder abduction using Action Research Arm Test (ARAT), for stroke patients on admission, to establish the prognosis for the patient's dexterity, 6 months after the stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above methods of assessment, motivate and provide other options in terms of techniques used by Kenyan Physiotherapists to Asses aspects of the upper limb?

……

AMOUNT, INTENSITY, FREQUENCY AND DURATION OF TREATMENT SESSION

2. Kenyan physiotherapist use task-specific circuit class training to increase the amount of practice in rehabilitation.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapist use video self-modeling method to increase the amount of practice in rehabilitation.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapist use tailored repetitive practice to increase the amount of practice in rehabilitation.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5
			✓	

If you disagree with the above choices, motivate and provide suitable options in terms of amount, intensity, frequency and duration of treatment session used by Kenyan Physiotherapists

……..……

3. In Kenyan, stroke patients undergoing active physiotherapy, should receive as much therapy as possible with a minimum of one-hour active practice per day for at least five days a week

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenyan, stroke patients undergoing active physiotherapy, should receive as much therapy as possible with a minimum of one-hour active practice per day for least three days a week.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If none of the above, please indicate duration and frequency of management.

……
……

DISCHARGE PLAN

Early Supported Discharge (ESD)

This is discharge of patients who have mild to moderate stroke, it includes; early intensive rehabilitation service at home provided by specialist team

Specialist team

This is a team in stroke rehabilitation that comprises of Neuro-Physiotherapy, Occupational Therapy, Speech and Language Therapy (SLT), Dietetics, Neuro-Psychology, Neuro-Nursing.

4. Post stroke patients should receive rehabilitation in a specialist stroke in-patient unit and subsequently from a specialist stroke team within the community

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Stroke patients should receive rehabilitation in a dedicated stroke in-patient unit and subsequently by a team comprising of a nurse, a physiotherapist, an occupational therapist and a counselor within the community

.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……

……

5. In Kenya, physiotherapist recommends early supported discharge for people with mild to moderate disability, where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenya, physiotherapists' recommends early supported discharge, if community rehabilitation can provide physiotherapy, occupational therapy and caregiver support services.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……

6. In Kenya, stroke patients including those with severe stroke should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on-going rehabilitation

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenya, stroke patients including those with severe stroke should be assessed by a team comprising of a nurse, a physiotherapist, an occupational therapist and a counselor prior to discharge from hospital regarding their suitability of on-going rehabilitation

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……

7. In Kenya, stroke survivors are transferred to a stroke rehabilitation unit if on-going rehabilitation is required

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenya, stroke survivors can remain in the general ward/medical ward if on-going rehabilitation is required

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……

8. In Kenya, physiotherapists recommend all stroke patients receive early active rehabilitation by a dedicated stroke team.

Strongly	Disagree	Undecided	Agree	Strongly

disagree				agree
1	2	3	4	5

Kenyan physiotherapists recommend all stroke patients receive early active rehabilitation by at least physiotherapist, occupational therapist, nurse, and a counselor.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……

9. Kenyan stroke patient should have access to other services that may be needed, this includes;

a) Continence advice

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

b) Electronic aids (for example, remote controls for doors, lights and heating, and communication aids) (if available)

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

c) Wheelchair services

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

d) Psychosocial resources and needs, including caregiver capacity and availability

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, please provide suitable options

……

……

10. In Kenyan, rehabilitation services after hospital discharge should be offered to all stroke patients as needed and where available, delivered in the home setting

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Rehabilitation services after discharge should be delivered in the most suitable environment based on client-centered approach (needs and strengths)

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

1	2	3	4	5

If you disagree with the above choices, motivate and provide suitable options

……
……

MANAGEMENT OF THE LOWER EXTREMITY

11. Kenyan physiotherapist use body-weight supported treadmill training to improve walking speed and walking distance for patients with a stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenyan, ground walking is used for training stroke patients to improve walking speed and walking distance in the absence of a treadmill.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above choices, motivate and provide suitable options

……
……

12. Kenyan physiotherapist use robot-assisted gait training for stroke patients who are unable to walk independently to improves their walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapist use therapy assistance in conjunction with assistive devices for stroke patients who are unable to walk independently to improve their walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above choices, please provide suitable options

……
……

13. Kenyan physiotherapist use robot-assisted gait training with functional electro stimulation of the paretic leg to improve the sitting and standing balance and walking ability of patients with a stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapists electro stimulation of the paretic leg to improve in conjunction with exercises to improve the sitting and standing balance and walking ability of patients with a stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above choices, motivate and provide suitable options
……
……

14. Kenyan physiotherapist use circuit class training for walking and other mobility-related functions and activities to improve walking distance/speed, sitting and standing balance and walking ability, and reduces inactivity in patients with a stroke

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapist use tailored repetitive practice of walking or components of walking to improve functional ambulation.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

1	2	3	4	5

If you disagree with the above choices, motivate and provide suitable options

……
……

MANAGEMENT OF THE UPPER EXTREMITY

15. In Kenya, physiotherapist use one of the following interventions in addition to conventional therapy:

a) Joint position biofeedback

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

b) Functional electrical stimulation on the wrist and forearm to reduce motor impairment and improve functional motor recovery of patients with stroke

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

c) Unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke to improve the selective movements and muscle strength of the paretic arm

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

d) Electro stimulation and / or functional electrical stimulation as a treatment for reducing motor impairment and improving upper limb function of patients with stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

1	2	3	4	5

e) EMG-triggered neuromuscular electro stimulation (EMG-NMS) of the paretic wrist and finger extensors of stroke patient to improve selective movements, active range of motion, and dexterity

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

f) Circuit class training with workstations for the paretic arm to improve selective movements and dexterity of patients with a stroke

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with any of the above, please provide suitable options

……
……
……

16. In Kenya, physiotherapists use task specific activities of the paretic arm to improve selective movements and dexterity of patients with a stroke

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……

17. In Kenya, physiotherapists use Mechanical arm trainer to improve the dexterity of patients with a stroke

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, please provide suitable options

……
……

18. In Kenya, physiotherapists use Botulinum toxin A for patients with severe spasticity in conjunction with normal therapy

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above choices, motivate and provide suitable options

……
……

19. Use of serial casting, range of motion exercise and positioning to reduce or prevent spasticity

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

1	2	3	4	5

If you disagree with the above choices, please provide suitable options

……
……

APPENDIX 19: CONSENT FORM FOR PANELIST

Participant identification number……

Title of the study

CONTEXTUALIZATION OF A PHYSIOTHERAPY CLINICAL PRACTICE GUIDELINE FOR STROKE REHABILITATION IN KENYA

1	I confirm that I have read and understood the information sheet dated for the above study. I have had the opportunity to consider the information, ask questions and have these answered satisfactorily	
2	I am willing to participate in all the rounds of the Delphi study	
3	I understand that my participation is voluntary and that I am free to withdraw at anytime without giving any reason. However, I understand that the success of this study depends on all participants completing all the Delphi rounds.	
4	I understand that I will remain anonymous to the other participants or experts throughout the Delphi study and only the researcher will be able to identify my specific answers.	
5	I understand that the researcher will hold all information and data collected in a secure and confidential manner	

…….. …… ……

Name of participant Date Signature

Not consenting

1	I' m not willing to participate in this study	

APPENDIX 20: INFORMATION SHEET FOR PANELIST

Study Title: THE CONTEXTUALIZATION OF A PHYSIOTHERAPY CLINICAL PRACTICE GUIDELINES FOR STROKE REHABILITATION IN KENYA.

Invitation

You are being invited to take part in a research study conducted by Naomi Wanjiru (PhD candidate) of the University of the Western Cape. It is important that you understand why this research is being done and what it will involve before you decide if you will participate in the process. Please read the following information carefully and if there is anything that is not clear or if you require more information, kindly inquire from me.

What is the purpose of the study?

Studies have shown that the prevalence of stroke is on the rise in developing countries among low to middle income earners. Researches have shown that approximately 30% of stroke survivors become permanently disabled while 58 % become dependent on their families and society. Evidenced based practice has shown that rehabilitation can increase independency in activities of daily living and early return to work for stroke survivors Similarly, quality of patient care is noticeably improved when evidence is used in management. On the contrary, poor rehabilitation has the capacity to cause complex social and economic effects on individuals, households and communities. This are caused by direct costs of treatment, opportunity costs of lost employment and the costs of informal care-provision within the household. Poor rehabilitation result from outdated practices which are not evidenced based. Often, evidenced based practices are entreched in the clinical guideline that steers rehabilitation. Kenya is a developing country that lack evidenced based clinical guidelines for stroke rehabilitation. This affects the efficiency of stroke rehabilitation hence poor outcome. Most clinical guidelines have been formulated in the western world and reflect a developed world health system and services, disease epidemiology and workforce. These guidelines are therefore not directly relevant or generalizable to developing countries. Guidelines are costly to produce. It is therefore cost effective for developing countries to contextualize or adapt available western guideline.

Why have I been chosen?

You have been requested to participate in this research because you have been identified as an expert in the field of stroke rehabilitation or is experienced in treatment of stroke patient in various settings. The purpose of this research is to contextualization a physiotherapy clinical practice guidelines for stroke rehabilitation in Kenya that can be implementable in all health institutions. The guideline will be developed base on results of qualitative and quantitative data from the patient journey in Kenya, systematic appraisal of the existing clinical guidelines, the PARM contextual framework and a Delphi study.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. You will not be penalized or lose any benefits to which you otherwise qualify. If you agree to participate, you will be asked to sign a consent form, which will be sent to you via email.

What will happen to me if I participate?

If you agree to participate you will be first asked to sign a consent form and return it via email. Then the research will commence using the Delphi technique consisting of two or three rounds (questionnaires) aimed to achieve consensus. With your permission, the questionnaires will be emailed to you with simple instructions and specific instruction for each question. The amount of time necessary will vary from one expert to another but will range between 10-15 minutes per round. There are no right or wrong answers to the questions. Every aspect of your opinion is important.

It is important for you to note that:-

- Your participation is voluntary
- You may decline or withdraw from the study at any time
- All records are confidential and your name will only appear on the consent form and not the questionnaire. All the information will be available to members of the research team.
- The reporting of the results of this study will not identify you in any way.
- After the completion of the study, the information gathered will be sent for publication in professional journals while still maintaining anonymity of the information that you provided.

What if something goes wrong?

I am not aware of any complications that may arise from participating in this study. However, if you agree to participate, you will be provided with information detailing the names and telephone numbers to contact should you have any complaints or difficulties with any aspect of this study.

Will my participation in this study be kept confidential?

If you consent to participate, your name will not be disclosed and would not be revealed in any report or publication resulting in this study other than the consent form. Your name will not be recorded on Delphi rounds. Each participant will be allocated a unique code. You will remain anonymous to the other participants throughout the Delphi study and only the researcher will be able to identify your specific answers.

What will happen when the study stops?

The results of this study will be used to contextualize a physiotherapy clinical practice guidelines for stroke rehabilitation in Kenya**.** The findings will also be published in professional journals and or presented in conferences. The research has been approved by the University of the Western Cape's Senate Research Committee and Ethics committee. 14/7/7 If you have any further questions about the research study itself, please contact:-

Ms Naomi Wanjiru Kingau

Department of Physiotherapy

University of the Western Cape

Private bag x17

Bellville 7535

Cell phone +27842828533

E-mail nkwanjiru@yahoo.com

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Study supervisor

Prof. Anthea Rhoda

University of the Western Cape

Tel; 021 959 2549

Private Bag X17

Bellville 7535

Email; arhoda@uwc.ac.za

APPENDIX 21: DELPHI QUESTIONAIRE---- ROUND 2

Participant identification number…….

Title of the study: The contextualization of a physiotherapy clinical practice guidelines for stroke rehabilitation in Kenya.

Am resending the following questions, as consensus was not reached for these items.

On a scale of 1-5, indicate your level of agreement on implementability of the various items of stroke rehabilitation indicated below (**1-strongly disagree, and 5-strongly agree**).

ASSESSMENT

1.Kenyan physiotherapists assess the Manual muscle power, muscle tone, & strength, for stroke patients on admission, in order to establish an estimated prognosis of the patient.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapists assess shoulder abduction (using the Motricity), for stroke patients on admission, in order to establish an estimated prognosis for the patient's dexterity, 6 months after the stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapists assess the finger extension (using Fugl-Meyer) for stroke patients on admission, in order to establish an estimated prognosis for the patient's dexterity, 6 months after the stroke.

Strongly	Disagree	Undecided	Agree	Strongly

disagree				agree
1	2	3	4	5

Kenyan physiotherapists assess the finger extension and shoulder abduction using Action Research Arm Test (ARAT), for stroke patients on admission, to establish the prognosis for the patient's dexterity, 6 months after the stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above techniques of assessment, motivate and provide other options used by Kenyan Physiotherapists to asses the upper limb?

……
……
……

AMOUNT, INTENSITY, FREQUENCY AND DURATION OF TREATMENT SESSION

2.Kenyan physiotherapist use task-specific circuit class training to increase the amount of practice in rehabilitation.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapist use video self-modeling method to increase the amount of practice in rehabilitation.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above choices, motivate and provide suitable options in terms of amount, intensity, frequency and duration of treatment session used by Kenyan Physiotherapists

……
……
……

3.In Kenyan, stroke patients undergoing active physiotherapy, should receive as much therapy as possible with a minimum of one-hour active practice per day for at least five days a week

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If none of the above, please indicate duration and frequency of management.

……
……
……

DISCHARGE PLAN

Early Supported Discharge (ESD)

This is discharge of patients who have mild to moderate stroke, it includes; early intensive rehabilitation service at home provided by specialist team

Specialist team

This is a team in stroke rehabilitation that comprises of Neuro-Physiotherapy, Occupational Therapy, Speech and Language Therapy (SLT), Dietetics, Neuro-Psychology, Neuro-Nursing.

4.Post stroke patients should receive rehabilitation in a specialist stroke in-patient unit and subsequently from a specialist stroke team within the community

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Stroke patients should receive rehabilitation in a dedicated stroke in-patient unit and subsequently by a team comprising of a nurse, a physiotherapist, an occupational therapist and a counselor within the community

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Stroke patients should receive rehabilitation in a dedicated stroke in-patient unit and subsequently by a team comprising of a doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist within the community

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……
……

5.In Kenya, physiotherapist recommends early supported discharge for people with mild to moderate disability, where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenya, physiotherapists' recommends early supported discharge, if community rehabilitation can provide physiotherapy, occupational therapy and caregiver support services.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenya, physiotherapist recommends early supported discharge for people with mild to moderate disability, where a doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist are available.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……
……

6.In Kenya, stroke patients including those with severe stroke should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on-going rehabilitation

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenya, stroke patients including those with severe stroke should be assessed by a team comprising of a nurse, a physiotherapist, an occupational therapist and a counselor prior to discharge from hospital regarding their suitability of on-going rehabilitation

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenya, stroke patients including those with severe stroke should be assessed by a team comprising of doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist prior to discharge from hospital regarding their suitability of on-going rehabilitation

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……
……

7.In Kenya, stroke survivors are transferred to a stroke rehabilitation unit if on-going rehabilitation is required

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……
……

8.In Kenya, physiotherapists recommend all stroke patients receive early active rehabilitation by a dedicated stroke team.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapists recommend all stroke patients receive early active rehabilitation by at least physiotherapist, occupational therapist, nurse, and a counselor.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

In Kenya, physiotherapists recommend all stroke patients receive early active rehabilitation by team comprising of doctor/clinical officer, a nurse, a physiotherapist and an occupational therapist

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, motivate and provide suitable options

……
……
……

If you disagree, please provide suitable options

……
……
……

MANAGEMENT OF THE LOWER EXTREMITY

9.Kenyan physiotherapist use body-weight supported treadmill training to improve walking speed and walking distance for patients with a stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

1	2	3	4	5

If you disagree with the above choice, motivate and provide suitable options

……
……
……

Kenyan physiotherapist use robot-assisted gait training for stroke patients who are unable to walk independently to improves their sitting and standing balance, & walking ability

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapists use exercises on paretic leg to improve sitting and standing balance and walking ability of patients with a stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above choice, motivate and provide suitable options

……
……
……

11.Kenyan physiotherapist use robot-assisted gait training with functional electro stimulation of the paretic leg to improve the sitting and standing balance and walking ability of patients with a stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Kenyan physiotherapists electro stimulation of the paretic leg in conjunction with exercises to improve the sitting and standing balance and walking ability of patients with a stroke.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above choices, motivate and provide suitable options

……
……
……

MANAGEMENT OF THE UPPER EXTREMITY

12.In Kenya, physiotherapist use one of the following interventions in addition to conventional walking therapy:

Joint position biofeedback

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

Unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke to improve the selective movements and muscle strength of the paretic arm

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

EMG-triggered neuromuscular electro stimulation (EMG-NMS) of the paretic wrist and finger extensors of stroke patient to improve selective movements, active range of motion, and dexterity

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with any of the above, please provide suitable options

……
……
……

13. In Kenya, physiotherapists use Mechanical arm trainer to improve the dexterity of patients with a stroke

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree, please provide suitable options

……
……
……

14.In Kenya, physiotherapists use Botulinum toxin A for patients with severe spasticity in conjunction with normal therapy

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	2	3	4	5

If you disagree with the above choices, motivate and provide suitable options

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WESTERN CAPE

APPENDIX 23: THE GUIDELINE

EXECUTIVE SUMMARY

Clinical guidelines summarize the most effective means for managing a condition by finding, appraising and synthesizing relevant research on the subject. It formulates recommendations for practice based on the strength of evidence for particular interventions and appraising the comparative effectiveness of each option.

Stroke is an emerging public health challenge requiring urgent attention to control its effects (Sarfo, Acheampong, Appiah, Oparebea, Akpalu, & Bedu-Addo, 2014). Stroke varies between and within countries (Liao, et al., 2009; Markus, et al., 2007). In Sub-Saharan Africa, data predominantly from Western and Southern Africa indicate high and progressively rising rates of stroke affecting younger persons (Richard, 2011; Kolapo & Vento, 2001). A recent publication of 19 studies from 10 African countries reveals that the burden of stroke is high and continues to increase (Adeloye, 2014). Certainly, reports predict a looming stroke epidemic in Sub – Saharan Africa and call for urgent action (Chin, 2012). In this region, including in Kenya, stroke constitutes a significant burden, and considerably affecting quality of life (Muli & Rhoda, 2013; Jowi & Mativo, 2008). To curtail the effect of stroke, there is need for effective management of post stroke challenges.

In Kenya, physiotherapists are one among other members of the interdisciplinary team involved in stroke management. Therefore, the current guideline is done as a resource for physiotherapists and patients, to help them make informed decisions about appropriate assessment and treatment. It has been developed for management of post stroke deficiencies during the acute, sub-acute and the chronic stage.

A systematic process of contextualization has been used to develop a guideline that is applicable and relevant for use in the Kenyan context, based on high quality guidelines developed in the Western world. These include recommendations for assessment, and management. These guidelines recommend that an assessment should be performed at admission, preferably within the first 24 to 48 hours by rehabilitation professionals. Valid and reliable assessment tool provides useable baseline data. The baseline data should include assessment of impairments, activity limitation, participation restriction and environmental factors.

Stroke survivors with residual impairments, who are not hospitalized, should be assessed comprehensively for functional impairment as outpatient. Assessment should likewise consider the influence of the stroke on the person's family and/or carers and, if appropriate, identify sources of support. Family members and carers of people with stroke should be informed about their right to have a carer's needs assessment. The patient should be given as much therapy as needed and tolerated to re-establish pre-morbid or optimal level of functional independence as alluded by Gonzalez-suarez et al. (2012).

Stroke rehabilitation should embrace an interdisciplinary approach (English & Hillier, 2010). The rehabilitation team should include medical doctors, rehabilitation nurses, speech therapists, physiotherapists, occupational therapists, social workers, and psychologists (Duncan et al., 2005). The crucial feature of rehabilitation is the provision of a coordinated healthcare services (Gonzalez-suarez et al., 2012).

INTRODUCTION

Stroke is one of the disabling conditions globally (American Heart Association, 2011a: Begg, et al., 2007), resulting in a huge personal and social burden (English & Hillier, 2010: Shenhar, et al., 2008). Stroke is an increasing widespread problem of immense economic importance in sub-Saharan Africa, (Kolapo & Vento, 2011). Although often considered as related to increasing wealth, stroke is more strongly related to poverty, and in turn increases it. Case-fatality rates are high and premature death and years of life lost are a major problem. Recent WHO statistics demonstrated a 42% decrease in stroke incidence since 1970 (Richard, 2011). However, this trend is not homogeneous, the same review confirmed a 100% increase in stroke incidence in developing countries over a similar time period. Economic changes in these countries are anticipated to intensify this problem, with key risk factors for stroke also increasing in prevalence (WHO, 2012). Furthermore, new effective treatment of childhood diseases will likely increase the proportion of elderly people in these countries, further increasing the burden of chronic disease.

Kolapo and Vento, (2011) proposes an approach to stroke management that takes into account the real situation on the ground that can be applied in sub-Saharan Africa, an area where stroke units are largely not feasible and many patients do not reach hospitals. The authors emphasizes on involvement of community and faith-based organizations', use of simple diagnostic tests, emphasis on clinical examination, prompt initiation of therapy and training of community on essential management of post stroke deficiencies

Kenya is a developing sub-Saharan country facing an enormous burden of disease (Kenya National Beareau of Statistics, 2011). Malaria and HIV/Aids are the leading cause of death, while non-communicable diseases are taking a toll on the population. Like most countries in Africa, the shortage of healthcare workers is not unique to Kenya. Kenya is one of the countries classified by the WHO as having a "critical shortage" of healthcare workers. This shortage is significantly worse in the rural areas (Transparent International, 2011). Likewise, Kenya has acute shortage of resources.

Given the high burden of disease, lack of resources and high costs of stroke rehabilitation, priority should be given to providing efficient rehabilitation services. It is therefore imperative that the scarce resources are used wisely to achieve optimum and impartial health outcome. It is vital that most stroke patient be managed effectively, and be able to return to work to support

their families (Jowi & Mativo, 2008). Effective management can only be achieved through utilization of evidenced based practices, embedded in clinical guideline

However, evidenced based practices is not very well established in Kenya, particularly in terms of understanding, development of guidelines, and application of guidelines in making decisions regarding patients care (McDonald et al., 2010). Lack of clinical guidelines negatively affects rehabilitation (Rafanan & Lorenzo, 2012). Often, patients end up with adverse disability (Royal Dutch Society for Physical Therapy, 2014)

DEVELOPMENT PROCESS

The development of this guideline followed a contextualization process as described by Gonzalez-suarez, et al. (2012). Most clinical practice guidelines have been developed in the Western world and reflect a developed country's health systems and services, disease epidemiology, and workforce. Such guidelines may not be relevant or generalizable to developing countries.

The World Confederation of Physiotherapy (WCPT) keynote paper 2005 indicates that guidelines should be about suitable healthcare in specific circumstances (WCPT, 2005). In Kenya, the development of novel guidelines would be too costly and resource demanding, furthermore there are no local experts to lead the process.

Therefore, owing to lacks of local expertise in addition to the limited resources, there was no intention of developing a guideline. On recommendation from the expert, the researcher and the supervisors embark on contextualization process of the existing clinical practice guidelines from developed countries (Rafanan & Lorenzo, 2012).

The aim of contextualization was to ensure that existing high quality recommendations are made accessible to Kenyan Physiotherapists, by putting them into a local context and demonstrating their relevance. The process of contextualization differs from adaptation. The purpose of adaptation (using the ADAPTE tool) is to identify recommendations that cannot be adopted locally because they cannot be implemented even with contextualization. Adaption provides additional evidence in tier 1 to deliver locally acceptable care alternatives through rewording, revising and updating of existing guidelines.

Through contextualization, existing guidelines are placed into context by translating existing evidence statements into local practice, demonstrating their relevance, and writing strategies that assist in the operationalization of the guideline in the local environment through a systematic and reproducible process.

Contextualization is considered a resource efficient way to implement evidence-based practice in developing countries where there is neither the time nor the resources for de novel guideline development. The available resources are focused on contextualization, implementation and

uptake rather than de novel development. The procedure is undoubtedly explained by the Philippines document (Gonzalez-suarez, et al., 2012) as consisting of four phases: A start-up phase, a systematic search, appraisal, synthesis of the evidence, and contextualization of the guidelines to the local situation followed by directions for further evaluation, dissemination and implementation.

In 2015, the researcher, supervisors and two experts in neurology reviewed the guidelines that had been identified. The Appraisal of Guidelines Research and Evaluation (AGREE II) tool was used for methodological quality assessment (Gonzalez-suarez, et al., 2012).

Of the eight clinical guidelines scored for critical appraisal/quality assessment, only the New Zealand clinical guideline for stroke management, 2010) qualified for inclusion. However, through consensus, the team agreed to use International Centre for Allied Health Evidence (iCAHE) tool for the applicability (Domain 5) part of the AGREE II tool (www.unisa.edu.au/cahe/resources). Three guidelines qualified for inclusion, this includes;

5. USVA/Dod. 2010 Management of stroke rehabilitation. Department of Veterans Affairs / Department of Defense and the American Heart Association/ American Stroke Association. URL: http://www.healthquality.va.gov/stroke/stroke_full_221.pdf [USVA/Dod]

Royal Dutch Society for Physical Therapy. KNGF Guideline. Stroke 2014. Amersfoort Netherlands. :www.kngf.nl www.fysionet.nl info@kngf.nl

Stroke Foundation of New Zealand and New Zealand Guidelines Group. Clinical Guidelines for Stroke Management 2010. Wellington: Stroke Foundation of New Zealand; 2010.

The current guideline is a consensus document based on the available literature and collective clinical experience and should be considered as a guideline only. It is not intended to be interpreted as or to serve as a standard of medical care, as these are determined on the basis of all clinical data available for an individual patient and are subject to change as scientific knowledge and technology advance and patterns of care evolves. The ultimate judgment regarding a particular procedure or treatment plan must be made in the light of the clinical data presented by the patient, the assessment, treatment options available, and the patient's values, expectations and preferences.

Limitations.

The RCTs used in KNGF guideline indicated that some interventions had not been tested to determine their added value. For instance, there had been no controlled studies to assess the evidence for motor learning strategies in physical therapy, and no RCTs have been conducted in this professional domain to assess the added value provided by training one function rather than another, and the way in which exercises are offered had hardly been tested, in the physical therapy domain. Other interventions have only been examined in one low-quality RCT. Likewise

there had been very few studies (phase I/II trials) of innovative intervention such as 'repetitive Transcranial Magnetic Stimulation' (rTMS) or 'transcranial Direct Current Stimulation' (tDCS) in combination with exercise therapy; in view of the experimental nature of these interventions.

PUBLIC CONSULTATION

A public consultation of the draft document will be undertaken from January to April 2018. The consultation draft will be made available for public viewing and comment on the Physiotherapy council of Kenya website. A feedback form will be circulated to professional organizations such as the Kenya society of physiotherapy, and Kenyan Neurological Association. It will also be sent directly to the different training institutions of physiotherapy, namely Kenya medical training college, Moi university school of medicine, and Jomo Kenyatta University of Agriculture and Technology. The above organizations and institutions will be given the opportunity to comment on the clinical practice guideline (CPG), and issues to do with uptake and application.

EXTERNAL REVIEW

The document will undergo peer review by international experts in the field of stroke rehabilitation and guideline development.

HEALTH / CLINICAL QUESTION

PURPOSE AND SCOPE

The scope of this guideline is to establish a Kenyan-specific guideline on the rehabilitation of stroke patients from acute to chronic phases. The guideline is intended to cover the comprehensive physiotherapy management appropriate for different stages of stroke recovery from the hospital setting to its implementation at home and in the community. These include; assessment, management, and re-assessment of post stroke deficiencies. The primary goal of rehabilitation is to prevent complication, minimize impairments, and maximize function.

The purpose of this guideline is to:

Ensure that all stroke patients receive early active and effective rehabilitation through available trained healthcare providers

Improve functionality in stroke patients (mobility, activities of daily living [ADL], and return to work).

TARGET POPULATION

The guideline applies to adult patient (18 years or older) with post stroke functional deficiencies who may require rehabilitation in any of the health care facilities in Kenya.

TARGET AUDIENCE

The guideline is relevant to Physiotherapists providing or directing treatment services to patient recovering from stroke in any health care setting (primary care, specialty care, long term, community based programs). This guideline has been developed to assist in assessment and management of stroke related impairment, activity limitation and participation restriction within the bio-psychosocial framework (Havelka, Lucanin, & Lucanin, 2009).

OVERALL OBJECTIVE

The objective of these guideline is to ensure that post stroke survivors are managed within the bio-psychosocial model of healthcare to prevent disability. Bio-psychosocial model is an inclusive approach to patient management that addresses the person as a whole; it includes physical and biological factors, psychological state and beliefs, as well as the family, social and work environments (Havelka, Lucanin, & Lucanin, 2009).

CLINICAL CONDITION AND SCOPE OF THE DISEASE

Stroke is an occurrence where a patient "rapidly develop (s) clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin" (WHO, 1989). There are two types of strokes, ischemic and haemorrhagic (Truelsen, et al., 2000). Ischemic stroke is due to occlusion of one or more blood vessels in the brain secondary to atherosclerosis, or an embolism obscuring an artery and depriving brain tissue of blood supply. Haemorrhagic stroke is caused by the spontaneous rupture of a brain blood vessel, leading to deficiency of blood and oxygen, ultimately leading to damage in the brain tissue.

Intracerebral hemorrhage is the second most common subtype of stroke after ischemic stroke and accounts for approximately 10 % to 20 % of all strokes (Feigin, et al., 2009). There also seems to be a difference in prevalence of different types of stroke amongst males and females. Appeglos, et al. (2009), a multinational review conducted in Sweden, found that males had more intracerebral infarctions and hemorrhages, while females had more subarachnoid hemorrhages.

Different parts of the world have different incidences of stroke. However, in certain regions of the world, there is limited information about stroke incidence. In sub-Saharan Africa, there are no ideal stroke incidence studies (Connor et al., 2007). Some of the incidence rates per country are shown in Table 7.1

Table 7.1: Incidence of strokes in different world regions and countries

Country	Country Incidence per 100,000 (Authors)
Australia	67 (Feigin, Lawes, Bennett, Barker-Collo, & Parag, 2009)
France	112 (Feigin et al ., 2009)
India urban	151 (Feigin et al ., 2009); 105 (Banerjee & Das, 2006)
India rural	268 (Banerjee & Das, 2006)
India/southern	135 (Sridharan et al ., 2009)
Iran	139 (Azarpazhooh et al ., 2010)
Ireland/Dublin	193 (Hannon et al ., 2010)
Italy	220 (Feigin et al ., 2003); 821 (Feigin , 2009)
New Zealand/Auckland	126 (Feigin et al ., 2009)
Portugal rural	118 (Feigin et al ., 2009);
Portugal urban	261 (Feigin et al ., 2009),
Sweden	260 (Feigin et al ., 2009)
Tanzania	108-315 (Walker et al ., 2010)
UK	130 (Feigin et al ., 2003)

METHODOLOGY

GUIDELINE SEARCH PROCESS

The following databases were used to search for clinical guidelines: Medical Literature on Line (MEDLINE), National Guidelines Clearinghouse, National, Institute for Clinical Excellence, Scottish International Guidelines Network (SIGN), New Zealand Guidelines Group (NZGG), National Health and Research Medical Council (NHRMC), National Institute for Clinical Excellence (NICE), Allied Health Literature (CINAHL), Google scholar, Master File Premier, Psychology Information (PsycINFO), Health Source-Consumer Edition, Public Medline (PubMed), Embase, ERIC, ASSIA and Cochrane Library was conducted in May 2015.

The key words used were: stroke, clinical guideline, rehabilitation, cardiovascular accident, and transient ischemic attack.

Guideline Inclusion criteria

i. Guidelines published in English Language.
ii. Guidelines include rehabilitation as part of stroke management.
iii. Date of publication 1995-2015 (medicine is dynamic, guidelines before this period might have out of date practice)

Guideline Exclusion criteria

i. Guidelines focused on children
ii. Guidelines that did not include rehabilitation as part of the management

CRITICAL APPRAISAL

Potentially relevant clinical guidelines were appraised using the AGREE II tool. These critical appraisal instruments provided different criteria with which to assess the methodological rigor and evidence-underpinnings of guidelines.

EXTRACTION OF RELEVANT DATA FOR CARE PATHWAYS

The following topics of stroke rehabilitation were extracted from the guidelines:

- Assessment and outcome measures
- Timing, duration, frequency and intensity
- Inpatient rehabilitation
- Discharge plan
- Outpatient rehabilitation
- Family/carer involvement
- Re-assessment
- Contents of physiotherapy
- Walking therapy
- Lower extremities therapy
- Upper extremities therapy
- Neglect
- Shoulder pain
- Spasticity
- Contractures
- Strength
- Shoulder subluxation
- Cardiovascular fitness
- Range of motion

- Posture and balance
- Swelling of extremities
- Orthosis
- Activities of the daily living

CONTEXTUALIZATION

Recommendations on a particular aspect of the patient were extracted from the three guidelines that qualified for inclusion guidelines (see table 7.2 below)

Table 7.2: Clinical guidelines and their abbreviations.

GUIDELINE AND REFERENCES	ABBREVIATED AS
KNGF Guideline for stroke (Dutch)(2014)	KNGF
New Zealand clinical guideline for stroke management, 2010)	NZCG
American Clinical Practice Guideline, 2010)	DoD

Guideline Classification of Evidence strength

All relevant recommendations were collated in a table, along with the underpinning levels of evidence, and the guideline reference (APPENDIX 10). Each included recommendation set was then rated according to the Philippine Academy of Rehabilitation Medicine guide for evidence rating and summarized in a table (APPENDIX 11).

PARM ENDORSEMENTS

Endorsements determined uniform wording for recommendations based on the level of evidence (As shown in Table 4.3). These descriptions ranged from clear statements about efficacy for those with strong evidence (strongly endorses) to those with conflicting evidence of efficacy (suggests). All the relevant recommendation were endorsed and collated in a table.

CONTEXT POINTS

Each set of endorsed recommendations was then considered in terms of generalizability and applicability to Kenyan healthcare. Context point defined the important features of service delivery underpinning evidence-based care. This took into account issues of, access to appropriate assessment tools, availability of resources, what to do when resources are

unavailable, and alternative physiotherapy approaches to be adopted in the absence of capacity to provide guideline-recommended healthcare (Hoffmann et al., 2010)

A standard framework (PARM), which outlined the elements needed to be in place, for provision of minimum impartial best-practice care assisted in writing the Context Points. This provides guidance regarding essential equipment, standards and resources, training and workforce, in order to provide evidence-based care. Using the writing guide, the researcher with the help of the supervisors drafted endorsement and context point to each set of recommendation relevant to the patient journey. Thereafter researcher mapped the contextualized recommendations into the Kenyan patients journey, and assessed it implementability through a Dephi study.

RECOMMENDATION

For every recommendation, the following items will be included where available;

i. Recommendation
ii. Level of evidence
iii. Context points and minimum best practice criteria
iv. References

CONTEXTUALIZED RECOMMENDATIONS

ASSESSMENT AND OUTCOME MEASURE

- **We recommend** that for patients admitted to hospital with acute stroke should have an initial assessment by rehabilitation professionals as soon as possible after admission, preferably within 48 hours
  [Moderate Level of evidence]
  **Consider the available health professional where necessary. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities.*

- **We recommend** systematic measurements (monitoring) using reliable and valid instruments for clinical argumentation and the continuity of care for patients with a stroke *[High-level evidence]*

  ** Where available, otherwise* muscle power, muscle tone, and range of motion will be utilized for assessment of stroke patients on admission

- **We recommend** that National Institutes of Health Stroke Scale, and Barthel Index be always administered on admission and discharge

  [High-level evidence]

- **We recommend** that Patients who initially have an unfavourable prognosis for walking

ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke, using reliable and valid measurement Instruments. This remains necessary as long as a patient remains unable to walk independently.
[High-level evidence]

** Where possible, consider travelling distance and availability of resources, measurement tools, and the knowledge of the physiotherapist on the use of the tools*

We recommend assessment of finger extension (using Fugl-Meyer), and shoulder abduction

*Consider used of manual muscle power, muscle tone, and range of motion for assessment of stroke patients on admission

- We recommend that the ideal moment to estimate a patient's chances of performing basic ADL activities 6 months after the stroke is to determine their Barthel Index at the end of the first week after the stroke, but preferably on day 5.

  High-level evidence

- **We recommend** that acute stroke patients with any residual stroke-related impairment who are not admitted to hospital to undergo a comprehensive outpatient assessment(s) for functional impairment, which includes a cognitive evaluation, screening for depression, screening for fitness to drive, as well as functional assessments for potential rehabilitation treatment

  [High-level evidence]

Context points for assessment and re-assessment of stroke patients

	Minimum standard care of practice	Additional standard care of practice
Equipment	National Institutes of Health Stroke Scale Barthel Index Manual muscle testing	Fugl-Meyer Assessment Motricity Index FIM mobility items Berg Balance 10-meter walk, Functional Ambulation Classification
Workforce	Trained personnel (physical therapist, occupational therapist, nurse)	Trained personnel (Physical therapist, occupational therapist, nurse)
Resources	Printed copy of the tools	Printed copy of the tools

Training	Within competency	Within competency
When is it done	Upon hospital admission and during re-assessment	Upon hospital admission and during re-assessment
Reassessment	Weekly	Weekly

TIMING, DURARUION AND INTENSITY

- **We recommend** upper limb training using constraint-induced movement therapy (CIMT) to commence within the first week of stroke for highly selected patients; however, early high-intensity CIMT may be harmful.
  Dromerick et al, 2009: [Moderate-level evidence]

- We **strongly endorse** starting rehabilitation as early as possible once medical stability is reached (preferably within 24 hours after the stroke occurred) accelerates and enhances functional recovery.
  Bernhardt et al, 2009; Bernhardt et al. 2008; Langhorne et al. 2007; Gagnon et al. 2006; Maulden et al. 2005; Musicco et al. 2003; Paolucci et al. 2000; Wade et al. 1992; Sorbello et al. 2009: [High level of evidence]

- **We endorse** Task-specific circuit class training or video self-modeling should be used to increase the amount of practice in rehabilitation
  Wevers et al, 2009; McClellan & Ada, 2004: [High level of evidence]
  * Video self-modeling where available

- We **strongly endorse** that rehabilitation to be structured in order to provide as much practice as possible within the first six months after stroke
  Kwakkel et al, 2004; Wevers et al, 2009; McClellan & Ada, 2004; Bhogal et al, 2003b; Bakheit et al, 2007; Godecke, 2009; Carnaby et al, 2006; Van Peppen et al. 2004; Kwakkel et al. 1997: [High level of evidence]

- We suggest that for patients undergoing active rehabilitation, physical therapy be provided as much as possible but should be a minimum of one-hour active practice per day (at least five days a week)
  (GPP)

  * Consider three days a week due to shortage of resources and logistics

Context points for timing, frequency, duration and intensity of rehabilitation

	Minimum standard care of practice	Additional standard care of practice
Equipment	Parallel bars, walking frame	Biodex machine frame
Workforce	Trained personnel (physical therapist, occupational therapist, nurse)	Trained personnel (Physical therapist, occupational therapist, speech therapist, nurse)
Resources	None	None
Training	Within competency	Within competency
When is it done	Within 24 after onset of symptoms or when medically stable	Within 24 after onset of symptoms or when medically stable
Reassessment using at least one standard outcome measure	Weekly *Discharge planning should be documented in a discharge document	Weekly *Discharge planning should be documented in a discharge document

INPATIENT REHABILITATION

- We **suggest** that medical team, including the patient and family, must analyze the patient's medical and functional status, as well as expected prognosis in order to establish the most appropriate rehab setting

  [GPP]

  **Consider the available health professional where necessary. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities*

- We **strongly endorse** that where comprehensive interdisciplinary community rehabilitation services and caregiver support services are available, early supported discharge services may be provided for people with mild to moderate disability

  Donnelly et al., 2004; Langhorne et al., 2005; Teasell et al., 2003; Anderson et al., 2002; Brady et al., 2005; Patel, et al., 2004; Askim, Morkved, et al., 2006; Bautz-Holtert, Sveen, 2002; Diserens, Michel, et al, 2006; Fjaertoft, Indredavik,

et al., 2004: [High level of evidence]

- We **strongly endorse** stroke patients to receive as much therapy as they are able to tolerate in order to adapt, recover, and/or reestablish their premorbid or optimal level of functional independence

  Kwakkel et al., 1999; Langhorne et al., 1996; Lincoln et al., 1999; Parry et al., 1999; Rapoport & Eerd, 1989; Richards et al., 1993; Sivenius et al., 1985; Smith et al., 1981; Sunderland et al., 1992; Van der Lee & Snels, 2001: [High level of evidence]

- Ensure all stroke patients receive early active rehabilitation by a dedicated stroke team.
  Healthy team should have a comprehensive services which includes and links the fundamentals of acute and rehabilitation care

  High level of evidence

  **Consider the available health professional. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities*

  - Patients should be transferred to a stroke rehabilitation unit if on-going rehabilitation is required
    *Consider general ward/medical ward will be considered if on-going rehabilitation is required in the absence of stroke rehabilitation unit

  - All patients including those with severe stroke should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation.

    High level of evidence

    **Consider the available health professional. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities*

  - People with disability after stroke should receive rehabilitation in a dedicated stroke inpatient unit and subsequently from a specialist stroke team within the community.

    High level of evidence

    **Consider the available health professional. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities*

- **We recommend** that core multidisciplinary team who has the knowledge, skills and behaviors to work in partnership with people with stroke and their families and carers to manage the changes experienced as a result of a stroke.
  [Moderate evidence]

  **Consider the available health professional. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities*

- **We recommend** stroke patients to have access to other services that may be needed, for example:
    - Continence advice
      [High level of evidence]
    - Dietetics
      [High level of evidence]
    - Electronic aids (for example, remote controls for doors, lights and heating, and communication aids)
      [High level of evidence]
    - Psychiatry
      [High level of evidence]
    - Orthotics
      [High level of evidence]
    - Pharmacy
      High level of evidence
    - Wheelchair services
      [High level of evidence]
- **We recommend** that clinical team and family/caregiver to reach a shared decision regarding the rehabilitation program.
  [High level of evidence]

- **We recommend** that rehabilitation program should be guided by specific goals developed in consensus with the patient, family, and rehabilitation team.
  [High level of evidence]

- **We recommend** the documentation of a detailed treatment plan in the patient's record to provide integrated rehabilitation care.
  [High level of evidence]

- **We recommend** that the patient's family/caregiver to participate in the rehabilitation sessions, and be trained to assist patient with functional activities, when needed.
  [Moderate level of evidence]

- **We recommend** that as patients' progress, additional important educational topics include subjects such as the resumption of driving, sexual activity, adjustment and adaptation to disability, patient rights/responsibilities, and support group information.
  [High level of evidence]
- **We recommend** that treatment plan should include documentation of the following:
    - Patient's strengths, impairments, and current level of functioning
      [High level of evidence]

    - Psychosocial resources and needs, including caregiver capacity and availability
      [High level of evidence]

- **We recommend that** treatment plan to have Short term and long-term goals
    - Patients personal goals (e.g., I want to play with my grandson)
    - Patients functional goals (e.g., ADL, IADL, mobility)

[High level of evidence]

- **We recommend** that strategies to be put in place for achieving these goals including:
    - Resources and disciplines required
    - Estimations of time for goal achievement
    - Educational needs for patient/family

  [High level of evidence]

- **We recommend** Plans and timeline for re-evaluation

  [High level of evidence]

Context points for in patients

	Minimum standard care of practice	Additional standard care of practice
Equipment	Parallel bars, walking frame	Biodex machine frame
Workforce	Trained personnel (physical therapist, occupational therapist, nurse)	Trained personnel (physical therapist, occupational therapist, speech therapist, nurse)
Resources	None	None
Training	Within competency	Within competency
When is it done	Within 24 after onset of symptoms or when medically stable	Within 24 after onset of symptoms or when medically stable
Reassessment using at least one standard outcome measure	Everyday * Discharge planning should be documented in a discharge document	Everyday * Discharge planning should be documented in a discharge doc.

DISCHARGE PLAN

- All patients including those with severe stroke, a specific rehabilitation team prior should assess who are not receiving palliative care should be assessed by the specialist rehabilitation team prior to discharge from hospital regarding their suitability of on going rehabilitation.

  High level of evidence

*Consider the available health professional. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities

- We **recommend** that discharge planning should be initiated as soon as possible after the patient is admitted to hospital (emergency department or inpatient care)
  Barras, 2005; Schedlbauer et al, 2004

  [High level of evidence]

- We **recommend** that a process be established to ensure that patients, families and caregivers are involved in the development of the care plan, which needs to include discharge planning
  [High level of evidence]

- We **recommend** that discharge planning discussions be on-going throughout hospitalization to support a smooth transition from acute care
  [High level of evidence]

- We **recommend** that Information about discharge issues and possible needs of patients following discharge be provided to patients and caregivers soon after admission
  [Moderate evidence]

- We **recommend** that Discharge planning activities should include patient, family and team meetings, discharge and transition care plans, a pre-discharge needs assessment, caregiver training, post discharge follow-up plan, and review of patient and family psychosocial needs
  [High level of evidence]

Early supported discharge

- We **recommend** that Stroke survivors should continue to have access to specialized stroke services after leaving hospital, whether from acute care or inpatient rehabilitation
  [High level of evidence]

- We **recommend** that Stroke survivors should continue to have access to specialized stroke services after leaving the hospital, whether from acute care or inpatient rehabilitation
  [High level of evidence]

- We **recommend** that Early supported discharge services provided by a well resourced, coordinated specialized interprofessional team are an acceptable alternative to more prolonged hospital stroke rehabilitation unit care and can reduce the length of hospital stay for selected patients
  [High level of evidence]

- We **recommend** that stroke patients with mild to moderate disability may be offered early supported discharge if all of the following criteria are met:
  - They are able to participate in rehabilitation from the date of transfer
    [High level of evidence]

- They can be safely managed at home
  [High level of evidence]

- They have access to comprehensive interprofessional community rehabilitation services and caregiver or support services
  [High level of evidence]

- We **recommend** that Early supported discharge should not be offered to patients with moderately severe to severe stroke
  [High level of evidence]

- To work effectively, we **recommend** that early supported discharge to have elements similar to those of coordinated inpatient stroke teams including:
  - A case coordination approach
    [High level of evidence]
- We **recommend** that an inter-professional team of specialists in stroke care and rehabilitation working in collaboration with community-based healthcare professionals

  [High level of evidence}

  *Consider the available health professional. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities

- We **recommend** rehabilitation to emphasis on client- and family-centered practice, setting client goals and ongoing review of goal attainment
  [Moderate evidence]

- We **recommend** that in stroke rehabilitation services, intensity of rehabilitation be based on individual client needs and goals
  [High level of evidence]

- We **recommend** that rehabilitation services be delivered in the most suitable environment based on client issues and strengths
  [Moderate evidence]

- We **recommend** regular team meetings to discuss assessment of new clients, review client management, goals, and plans for discharge
  [High level of evidence]

- We **recommend** family meetings to ensure patient and family involvement in management, goal setting, and planning for discharge from the early supported discharge program
  [High level of evidence]

- We **recommend** negotiated withdrawal and discharge from early supported discharge program
  [Moderate level of evidence]

Context points for discharge plan

	Minimum standard care of practice	Additional standard care of practice
Equipment	None	None
Workforce	Trained personnel (physical therapist, occupational therapist, nurse, orthopaedic technologist, social worker)	Trained personnel (Physical therapist, occupational therapist, speech therapist, nurse, doctor, orthopaedic technologist, psychologist, neurologist)
Resources	General ward	Stroke rehabilitation unit Neurological unit
Training	Within competency	Within competency
When is it done	N/A	N/A
Reassessment using at least one standard outcome measure	N/A	N/A

OUTPATIENT REHABILITATION

- After leaving hospital, we **recommend** that stroke survivors to have access to specialized stroke care and rehabilitation services appropriate to their needs (acute and/or inpatient rehabilitation
  [High level of evidence]

- We **recommend** early supported discharge to be considered for patients discharged to the community
  [High level of evidence]

- We **recommend** that stroke survivors who have difficulty in activities of daily living, including self-care, productivity and leisure, to receive occupational therapy or inter-professional interventions targeting activities of daily living
  [High level of evidence]

- We **recommend** that patients who are identified as high risk for falls in the community to have a comprehensive set of interventions implemented, such as an individually prescribed exercise program, in order to prevent or reduce the number and severity of falls
  [High level of evidence]

- We **recommend** that people with difficulties in mobility to be offered an exercise program specific to those difficulties and monitored throughout the program
  [High level of evidence]

- We **recommend** that patients with aphasia to be taught supportive conversation techniques
  [High level of evidence]

- We **recommend** that patients with dysphagia to be offered swallowing therapy and opportunity for reassessment as required
  [High level of evidence]

- We **recommend** that stroke survivors should be provided with a cardiovascular fitness program to maximize functional outcomes after stroke (and as part of overall vascular risk reduction). Patients should be prescribed modified activities to allow age appropriate target heart rates to be achieved for 20 to 30 minutes three times per week.
  [High level of evidence]

- We **recommend** Interdisciplinary community rehabilitation services and support services to be made available whenever possible to enable early supported discharge to be offered to all people with stroke who have mild to moderate disability
  Larsen et al, 2006; ESD Trialists, 2005: [High level of evidence]

- We **endorse** that rehabilitation services after hospital discharge to be offered to all stroke patients as needed and where available, delivered in the home setting
  Larsen et al, 2006; ESD Trialists, 2005: Hillier & Gakeemah, 2010*: [High level of evidence]*

- We **endorse** contact with, and education by trained staff to be offered to all people with stroke and family/carers after discharge
  Middleton et al, 2005; Boter, 2004 *[High level of evidence]*

- We **recommend** that outpatient rehabilitation after discharge of stroke survivors to an organized rehabilitation team (physical therapist, occupational therapist, and speech and language pathologist).
  **Consider the available health professional. Consider a physiotherapist, occupational therapy, a nurse and a clinical officer in lower lever healthcare facilities*

High level of evidence

Context points for discharge plan

	Minimum standard care of practice	Additional standard care of practice
Equipment	Gym equipment: Therapeutic exercises Electrical stimulation	Biodex machine frame Robotics Virtual reality
Workforce	Trained personnel (physical therapist, occupational therapist)	Trained personnel (physical therapist, occupational therapist, speech therapist)
Resources	None	None
Training	Wihin competency	Within competency
When is it done	After discharge up to optimum functional independence	After discharge up to a minimum of six months, progressing program to improve cardiovascular and muscular endurance
Reassessment using at least one standard outcome measure	Monthly	Monthly

FAMILY/CARER INVOLVEMENT

- We **recommend** self-management programs to effectively improve self-efficacy, participation, and quality of life of patients with a stroke
  [High level of evidence]

- We **recommend** that Rehabilitation process can be optimized by informing the stroke patient's informal caregiver at the earliest possible occasion about what the patient can and cannot do
  [High level of evidence]

- We **suggest** that people with stroke and family/carers to be provided with information about the availability and potential benefits of a local stroke support group and/or other sources of peer support prior to discharge from the hospital or in the community
  [GPP]

- We **strongly endorse** that carers to be provided with tailored information and support during all stages of the recovery process. This includes (but is not limited to) information provision and opportunities to talk with relevant health practitioners about the stroke, stroke team members and roles, test or assessment results, intervention plans, discharge planning, community services and appropriate contact details

Brereton et al, 2007; Smith et al, 2008; Smith et al., 2008; Forster, 2001; Clark et al., 2003; [High level of evidence]

- We **suggest** that, where it is the wish of the person with stroke (and their family/carer), carers should be actively involved in the recovery process by assisting with goal setting, therapy sessions, discharge planning, and long-term activities

  [GPP]

- We **strongly endorse** that carers of people with stroke to be provided with information about the availability and potential benefits of local stroke support groups and services, at or before the person's return to the community

  Lee et al, 2007; Eldred& Sykes, 2008; Lui et al, 2005; Bhogal et al, 2003a; [High level of evidence]

- We **recommend** that carers of people with stroke to be offered services to support them after the person's return to the community. Such services can use a problem-solving or educational-counseling approach

  Brereton et al, 2007; Lee et al, 2007; Eldred & Sykes, 2008; Visser-Meily et al, 2005; [Moderate level of evidence]

- We **suggest** assistance to be provided for family/carers to manage people with stroke who have behavioral problems

  [*GPP]*

- We **suggest** that advice about the financial support available should be provided for family/carers of people with stroke prior to discharge and as needs emerge and circumstances change

  [GPP]

- We **strongly endorse** that caregivers be provided in a variety of methods of training based on their specific needs, cognitive capability, and local resources; Training may be provided in individual or group format, and in community-based programs

  Bhogal et al., 2003; Smith et al., 2008; Kalra, 2004; Bjorkdahl et al., 2007; [High level of evidence]

RE-ASSESSMENT

- We **recommend** that patients be re-evaluated intermittently during their rehabilitation progress. Particular attention should be paid to interval change and progress towards stated goals.

  [High level of evidence]

- We **recommend** that patients who show a decline in functional status may no longer be candidates for rehabilitation interventions. Considerations about the etiology of the decline and its prognosis can help guide decisions about when/if further rehabilitation evaluation should occur.

[High level of evidence]

- We **recommend** that psychosocial status and community integration needs to be re-assessed, particularly for patients who've experienced a functional decline or reached a plateau.
  [High level of evidence]

- We **strongly endorse** re-assessment of severity using the NIHSS at the time of acute care discharge to validate the first assessment or identify neurological changes.
  [High level of evidence}

  ** Consider availability*

- The rehabilitation needs of survivors of a severe or moderate stroke should be reassessed weekly for the first month, and then at intervals as indicated by their health status.
  [High level of evidence]

NB: The context points for re-assessment are included in those mentioned on *assessment part.*

CONTENT OF PHYSIOTHERAPY

LOWER EXTRIMITY THERAPY

- We **recommend** that patient's walking ability, 6 months after the stroke requires their sitting balance (assessed with the sitting balance item of the Trunk Control Test) and the motor function of the leg (assessed with the Motricity Index) to be recorded as soon as possible, but preferably on day 2 after the stroke.
  High level of evidence

  ** Consider availability*

- We **suggest** that patients who initially have an unfavorable prognosis for walking ability should be monitored weekly during the first 4 weeks and then monthly for 6 months after the stroke for recurrence, using reliable and valid measurement instruments. This remains necessary as long as a patient remains unable to walk independently. (Level 4)
  [Low level of evidence]

- An indication of possible further changes in walking ability for patients during the chronic phase who have a Functional Ambulation Categories (FAC) score of 3 or more at 6 months after the stroke can be obtained by having them do the 10-meter walk test at comfortable speed every 6 months. We **suggest** that a meaningful change can be defined as a change in the walking speed of at least 0.16 m/s relative to the speed attained 6 months after the stroke.
  [Low level of evidence]

- We **suggest** that in the opinion of the guideline development team, patients in the chronic phase who still have a limited walking ability in the period following the first 6 months after the stroke should be monitored for their functional performance regularly (every 6 months)

[Low level of evidence]

- We **recommend** that after thorough assessment and goal setting by a trained clinician, all people with difficulty walking should be given the opportunity to undertake tailored, repetitive practice of walking (or components of walking) as much as possible
  French et al, 2007; [High level of evidence]

- We **suggest** that Patient in the chronic phase showing significant functional changes at the level of activities justifies continuation or resumption of physical therapy.
  [Low level of evidence]

- We **recommend** that Body-weight supported treadmill training improves the comfortable walking speed and walking distance of patients with a stroke.
  [High level of evidence]

- We **recommend** that Robot-assisted gait training for stroke patients who are unable to walk independently improves their comfortable walking speed, maximum walking speed, walking distance, heart rate, sitting and standing balance, walking ability and performance of basic activities of daily living, compared to conventional therapy (including over ground walking).
  Inconsistent level of evidence –low volume –- Current – Uniform thought

  *Consider availability. However Gym equipment, therapeutic exercises, and electrical stimulation can likewise be used

- We **recommend** that Combining robot-assisted gait training with functional electro stimulation of the paretic leg improves the sitting and standing balance and walking ability of patients with a stroke, compared to conventional therapy (including over ground walking). (Level 1)
  Inconsistent level of evidence –low volume –- Current – Uniform thought

  *Consider availability of robot-assisted

- We **recommend** ground gait training by stroke patients who are able to walk without physical support is more effective in increasing walking distance and reducing anxiety than walking on a treadmill.
  [High level of evidence]

- We **recommend** exercising walking and other mobility-related functions and activities under the supervision of an informal caregiver improves the performance of basic activities of daily living for the patient with a stroke, and reduces the perceived burden of care for the informal caregiver.
  [High level of evidence]

- We **recommend** circuit class training (CCT) for walking and other mobility-related functions and activities improves walking distance/speed, sitting and standing balance and walking ability, and reduces inactivity in patients with a stroke.
  [High level of evidence]

- One or more of the following interventions can be used in addition to conventional walking

therapy:

- We **recommend** use Cueing of cadence
  Langhorne et al, 2009: [High level of evidence]

- We **recommend** that use Joint position biofeedback
  Langhorne et al, 2009: [High level of evidence]

- We **endorse** use virtual reality training
  You et al, 2005; Mirelman et al, 2009; Kim et al, 2009; Yang et al, 2008; Jaffe et al, 2004: [Moderate level of evidence]

- We **recommend** use of functional electrical stimulation (FES) as an adjunctive treatment for patients with impaired muscle contraction, specifically for patients with impaired gait due to ankle/knee motor impairment. FES can be utilized for individuals with acute or chronic deficits after stroke.
  [High level of evidence]

- We **recommend** use of transcutaneous electrical nerve stimulation (TNS or TENS) as an adjunctive treatment for enhancing recovery of gait function after stroke.
  [Moderate level of evidence]

Context points for lower extremity in stroke patients

	Minimum standard care of practice	Additional standard care of practice
Equipment	Gym equipment Therapeutic exercises Electrical stimulation	Biodex machine frame Robotics Virtual reality
Reassessment using at least one standard outcome measure	Monthly Assessment should include tests for strength, coordination, tone, ROM, pain; and evaluation of lower extremity impairment and the level of assistance needed for mobility and self-care such as Berg Balance Scale, Functional Instrument and 10 meter walk	Monthly

UPPER EXTRIMITY THERAPY

- The following interventions should be given in order to encourage using their upper limb as much as possible
  - We **strongly endorse** the use of constraint-induced movement therapy to

improves the dexterity, perceived use of arm and hand, quality of arm and hand movements, and quality of life of patients with a stroke.

Langhorne et al, 2009; Sirtori et al, 2009; Brogardh et al., 2006; Hakkennes et al., 2005; Lin et al., 2007; Page et al., 2008; Taub et al., 2007; Wolf et al., 2006, 2008; Wu et al., 2007a and b [High level of evidence]

- **We recommend** use of mechanical assisted training (B)
  Mehrholz et al, 2008: [High level of evidence]

- **We recommend** use of repetitive task-specific training
  French et al, 2007: [High level of evidence]

- We **strongly endorse** the use unilateral robot-assisted training of the paretic shoulder and elbow of patients with a stroke improves the selective movements and muscle strength of the paretic arm and reduces atypical pain in the paretic arm.

  Daly, 2005; Hesse, 2005; Lum, 2002; Lum 2006; Masiero, 2006, 2007; Prange, 2006; Volpe, 2008a & b: [high level of evidence]

  **Consider availability of* robotic device

- We **strongly endorse** the use of bilateral training of the elbow and wrist to improve the selective movements and muscle strength of the arm of patients with a stroke.

  Lewis, Byblow Whitall, et al., 2000; Mudie; Mudie & Matyas, Cauraugh & Kim, 2002; Stewart et al, 2006: [high level of evidence]

- We **recommend** the use Virtual reality training of the paretic arm and hand as an add-on to regular exercise therapy for patients with a stroke improves the performance of basic activities of daily living

  [High level of evidence]

  **Consider staff competency*

- We **endorse** neuromuscular stimulation (NMS) of the paretic wrist and finger flexors and extensors of patients with a stroke improves selective movements and muscle strength.

  Langhorne et al, 2009: [High level of evidence]

- We **strongly endorse** the use of EMG-triggered neuromuscular electro stimulation (EMG-NMS) of the paretic wrist and finger extensors of patients with a stroke improves selective movements, active range of motion, and dexterity.

  Langhorne et al, 2009; Meilink et al, 2008; Hara, 2008; Kimberley, 2004; McDonnell et al., 2007; Pomeroy, 2006; Daly et al., 2005; Alon et al., 2007: [High level of evidence]

- We **recommend** the Interventions to improve the somatosensory functions of the paretic arm and hand of patients with a stroke improve the somatosensory functions and reduce the resistance to passive movements.

[High level of evidence]

- We **recommend** the Circuit class training with workstations for the paretic arm to improve selective movements and dexterity of patients with a stroke. (Level 2)
  High level of evidence

- We **recommend** passive bilateral arm training improves neurophysiological outcome measures like excitation of the ipsilateral motor cortex of patients with a stroke
  [High level of evidence]

- We **recommend** use of mechanical arm trainer improves the dexterity of patients with a stroke
  [High level of evidence]

- We **recommend** strengthening exercises in addition to functional task practice.
  [High level of evidence]

Context points for upper extremity in stroke patients

	Minimum standard care of practice	Additional standard care of practice
Equipment	Occupational therapy equipment for hand and shoulder function Functional activities Electrical stimulation Assistive devices Oral medication for spasticity and pain management Upper extremity splint	Robotics Virtual reality Botulinum toxin EMG biofeedback Intrathecal baclofen
Workforce	Physical therapist Occupational therapist Physical therapist (in absence of occupational therapy in the facility) Orthotist (under guidance of available health provider)	Physical therapist Pain management specialist Occupational therapist Orthotist Psychologist (post stroke pain)
Resources	Room space suitable for rehabilitation	Occupational therapy room

	program	Operating room
Training	Within competency Training for physical therapist in upper extremity training and splint fabrication	Training for botolinum injection and intrathecal baclofen for spasticity management
When is it done	Upon hospital admission up to optimal functional independence in use of upper extremity	Upon hospital admission up to optimal functional independence in use of upper extremity
Reassessment using at least one standard outcome measure	Monthly Assessment tools such as Frenchay Activities Index and Canadian Occupational Performance Measure	Monthly

NEGLECT

- We **recommend** that any patient with suspected or actual impairment of spatial awareness eg, hemi-inattention or neglect to have a full assessment with appropriate tests.
  Bowen & Lincoln, 2007; Jehkonen et al, 2006: [Moderate level of evidence]

- We **recommend** visual scanning training, which has favorable effect on the attention for the neglected side of patients with a stroke in the right hemisphere.
  [High level of evidence]

- We **endorse** neglect-oriented training for favorable effect in terms of the attention for the neglected side of patients with a stroke in the right hemisphere: combined training for visual scanning, reading, copying, and describing figures, activation of the extremities on the neglected side, stimulating the neck muscles, wearing hemispatial sunglasses, wearing prism glasses, video feedback, aids and environmental adaptations.
  Luaute et al, 2006; Polanowska et al, 2009: [Inconsistent level of evidence]

- We **recommend** use of simple cues to draw attention to the affected side

(GPP)

- We **recommend** use of mental imagery training or structured feedback
  Luaute et al, 2006: [Low level of evidence]

- We **recommend** use of half-field eye patching
  Luaute et al, 2006; Tsang 2009: [Moderate level of evidence]

- We **recommend** nursing and therapy sessions (e.g., for shoulder pain, postural control, feeding) need to be modified to cue attention to the impaired side in patient with impaired spatial awareness
  [GPP]

Context points for cognitive, perceptual disorders and apraxia in stroke patients

	Minimum standard care of practice	Additional standard care of practice
Equipment	Montreal cognitive assessment tool Naturalistic action test Methods used in the treatment of cognitive and perceptual disorders; and limb apraxia such as attention training, memory compensatory strategies, strategy training for apraxia, cueing and feedback strategies for unitalteral neglect, visual scanning, sensory stimulation and mental imagery techniques	Electronic organizer Computers Electronic tablet
Workforce	Physiatrist Neurologist Psychologist Occupational therapist Nurse (in the absence of occupational therapist in the facility)	Multidisciplinary team: standard care workforce plus psychiatrist, geriatrician, speech pathologist, social worker, psychologist
Resources	Room for counselling and assessment	Room for counselling and assessment
Training	-training to use and interpret the tools used -training for the methods used to treat the disorders	-training to use and interpret the tools used -training for the methods used to treat the disorders using

		electronic gadgets.
When is it done	After discharge up to optimum functional independence	After discharge up to optimum functional independence
Reassessment	Monthly	Monthly

SHOULDER PAIN

- We **endorse that** for people with severe weakness who are at risk of developing shoulder pain, management can include shoulder strapping
  Ada et al, 2005; Griffith & Bernhardt, 2006: [High level of evidence]

- We **recommend** for interventions to educate staff, carers and people with stroke to prevent trauma to the shoulder
  [GPP]

- We **endorse that** tor people with severe weakness who are at risk of developing shoulder pain or who have already developed shoulder pain use ultrasound is not recommended
  Inaba & Piorkowski, 1972: [high level of evidence]

NB: The context points for post-stroke shoulder pain are included in those mentioned on upper extremity interventions.

SPASTICITY

- We **suggest** In addition to general therapy (eg, task specific practice) other interventions to decrease spasticity should NOT be routinely provided for people with stroke who have mild to moderate spasticity (ie, spasticity that does not interfere with their activity or personal care).
  [GPP]

- We **strongly endorse** In people with stroke who have persistent, moderate to severe spasticity (ie, spasticity that interferes with their activity or personal care):
  Botulinum toxin A should be trialled in conjunction with rehabilitation therapy, which includes setting clear goals

  Rosales & Chua-Yap, 2008; Elia et al, 2009; Garces et al, 2006: [High level of evidence]

- We **endorse** electrical stimulation in combination with EMG biofeedback can be used
  Bakhtiary & Fatemy, 2008; Yan & Hui-Chan, 2009: [Low level of evidence]

- We **recommend** deterring spasticity with antispastic positioning, range of motion exercises, stretching and splinting. Contractures may need to be treated using splinting, serial casting, or surgical correction.
  [Moderate level of evidence]

- We **recommend** use of oral agents such as tizanidine and oral baclofen for spasticity especially if the spasticity is associated with pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients.
  [High level of evidence]

- We **recommend** intrathecal baclofen treatments for stroke patients with chronic lower extremity spasticity that cannot be effectively managed by oral medication or botulinum toxin.
  [High level of evidence]

NB: The context points for post-stroke spasticity are included in those mentioned on lower extremity interventions.

CONTRACTURES

- We **endorse** that for people at risk of developing contractures undergoing active rehabilitation, the addition of prolonged positioning of muscles in a lengthened position to maintain range of motion is NOT recommended
  Turton & Britton, 2005; Gustafsson & McKenna, 2006: [High level of evidence]

- We **suggest** Overhead pulley exercise should NOT be used to maintain range of motion of the shoulder (C)
  [Low level of evidence]

- We **recommend** that for people who have contracture, management can include the following interventions to increase range of motion:
  - Electrical stimulation (C)
    Pandyan et al, 1997; Kumar et al, 1990: [Moderate level of evidence]

  - Casting/serial casting(C)
    Mortenson & Eng, 2003: [Moderate level of evidence]

NB: The context points for post-stroke contractures are included in those mentioned on lower extremity interventions

STRENGTH

- We **recommend** Training the muscle of the paretic leg or both legs of stroke patients increases their muscle strength, and improves the patient's gait in terms of cadence, symmetry, and stride length.
  Ada et al., 2006; Winstein et al., 2004; Stein et al., 2004; Pack et al., 2008 [High level of evidence]

- We **recommend** Hydrotherapy increases the muscle strength of the paretic leg of patients with a stroke
  [High level of evidence]

- We **recommend** Combination of aerobic endurance training and strength training improves selective movements, muscle strength of the paretic leg, comfortable and maximum walking speed, walking distance, maximum oxygen consumption, heart rate in exertion, balance, level of physical activity in everyday life, and quality of life for patients with a stroke. (Level 1)

  [High level of evidence]

- We **endorse** transcutaneous electrical nerve stimulation (TENS) of the paretic leg improves muscle strength and walking ability and related activities for patients with a stroke.

  Glinsky et al, 2007; Ada et al, 2006: [High level of evidence]

- We **recommend** one or more of the following interventions should be used for people who have reduced strength:
  - Progressive resistance exercises

    Ada et al, 2006; Pak & Pattern, 2008; Harris & Eng, 2010: [High level of evidence]

  - Electromyography biofeedback in conjunction with conventional therapy

    Ada et al, 2006: *[High level of evidence]*

NB: The context points for post-stroke weaknes are included in those mentioned on lower extremity interventions

SHOULDER SUBLUXATION

- We **endorse** Neuromuscular electro stimulation (NMS) of the paretic shoulder muscles of patients with a stroke reduces glenohumeral subluxation.

  Ada & Foongchomcheay, 2002; Price & Pandyan, 2001; Van Peppen et al., 2004; Chae et al., 2005 [High level of evidence]

- We **recommend** that for people who have developed a subluxed shoulder, management can include firm support devices (eg, lap trays, arm troughs and triangular slings) to prevent further subluxation

  [Moderate level of evidence]

- We **suggest** that, carers and staff of stroke patient to receive appropriate training in the care of the shoulder and use of support devices to prevent/minimize subluxation

  [GPP]

Context Point: Standard care of practice is to prevent complications occurring during post stroke period.

This is particularly relevant for decubitus ulcer, subluxed shoulder, bladder and bowel incontinence, depression, deep venous thrombosis and sleep disturbances. It is everybody's responsibility to be alert for these complications and to actively educate the patient and relatives about these issues and how to prevent them.

The recommendations provide clear instruction about the management of these complications should they occur. Complications often result from poor medical and nursing care. Where

complications are preventable, and occur through poor practices, they place unnecessary burdens on scarce health resources.

CARDIOVASCULAR FITNESS

- We **recommend** for lifestyle programs involving aerobic exercising which has favorably influence the risk factors for stroke in patients with a history of TIA or minor stroke
  [High level of evidence]

- We **recommend** for aerobic training since they have favorable effect on conditional learning and implicit learning by patients with a stroke. (Level 2)
  [High level of evidence]

- We **recommend** that rehabilitation to include interventions to increase cardiorespiratory fitness once the person with stroke has sufficient strength in the large lower limb muscle groups
  Sanders et al, 2009; Pang et al, 2006: [High level of evidence]

- We **recommend** that people with stroke should be encouraged to undertake regular, ongoing fitness training
  [GPP)

NB: The context points for post-stroke subluxation are included in those mentioned on lower extremity interventions

RANGE OF MOTION

- We **recommend** active and passive ROM, and prolonged stretching program to decrease risk of contracture development (night splints, tilt table) in early period following stroke.
  [High level of evidence]

- We **recommend** joint movement and positioning needs to be carefully monitored during rehabilitation to prevent the development of maladaptive activity patterns
  [High level of evidence]

BALANCE & POSTURE

- We **recommend** exercise postural control with visual feedback while standing on a force platform improves the postural sway in stance of patients with a stroke
  [High level of evidence]

- We **recommend** exercise balance during various activities to improve sitting and standing balance, and to improve performance of basic activities of daily living by stroke patients.
  [High level of evidence]

- We **recommend** that patients demonstrating balance impairments following stroke to be provided a balance-training program
  [Moderate level of evidence]

SWELLING OF THE EXTREMITIES

- We **recommend** that for people who are immobile, management can include the following interventions to prevent swelling in the hand and foot:
    - Dynamic pressure garments for the upper limb
      [Moderate level of evidence]
    - Electrical stimulation
      [Moderate level of evidence]
    - Elevation of the limb when resting
      [GPP]
- We **recommend** that for people who have swollen extremities, management can include the following interventions to reduce swelling of the hand and foot
    - Dynamic pressure garments for the upper limb
      Gracies et al, 2000: [High level of evidence]
    - Electrical stimulation
      Faghri & Rodgers, 1997: [Low level of evidence]
    - Continuous passive motion with elevation
      Giudice, 1990: [Low level of evidence]

- We **recommend** Elevation of the limb when resting
  [GPP]

ORTHOSIS

- We **recommend** use of a device to influence the range of motion of the ankle is not more effective for patients with a stroke in terms of active and passive range of motion, resistance to passive movements, muscle strength, walking distance, walking speed, balance, walking ability, activities of daily living and quality of life than other interventions
  [High level of evidence]

- We **recommend** walking with a leg orthosis results in greater improvements to the walking speed and energy consumption of patients with a stroke than walking without such a leg orthosis.
  [High level of evidence]

- For patient with foot drop, we **recommend** ankle foot orthoses (AFO) to prevent foot drop and improve knee stability during walking.
  [High level of evidence]

- We **recommend** gait training with the help of a leg orthosis along a bar, supported by a physical therapist, is just as effective for patients with a stroke in terms of walking speed and walking distance as body-weight supported treadmill training.
  [High level of evidence]

- We **strongly endorse** ankle-foot orthoses for people with persistent drop foot. If used, the ankle-foot orthosis should be individually fitted

  Leung & Moseley, 2003; Bleyenheuft et al, 2008; De Wit et al, 2004; Pohl & Mehrholz, 2006; Sheffler et al, 2006; Wang et al, 2005; Wang et al, 2007; Tyson & Rogerson, 2009; Chen et al, 1999: [Moderate level of evidence]

- We **recommend** adaptive devices be used for safety and function if other methods of performing the task are not available or cannot be learned or if the patient's safety is a concern.

  [Moderate level of evidence]

- We **recommend** lower extremity orthotic devices be considered, if ankle or knee stabilization is needed to improve the patient's gait and prevent falls.

  [Moderate level of evidence]

- We **recommend** wheelchair prescriptions be based on careful assessment of the patient and the environment in which the wheelchair will be used.

  [Moderate level of evidence]

- We **recommend** walking assistive devices be used to help with mobility efficiency and safety, when needed.

  [Moderate level of evidence]

NB: The context points for post-stroke subluxation are included in those mentioned on lower extremity interventions

ACTIVITIES OF DAILY LIVING

- We **recommend** that patients with difficulties in performance of daily activities to be assessed by a trained clinician

  Legg et al, 2006; OST, 2003: [High level of evidence]

- We **recommend** mirror therapy for the paretic leg improves selective movements and the performance of basic ADL activities by patients with a stroke.

  [High level of evidence]

- We **recommend** use of walking aids, which is beneficial to patients with a stroke in terms of safety, independence, and efficiency of walking, as well as confidence.

  [Low level of evidence]

- We **recommend** for therapy to learn/re-learn leisure or social activities at home, such as gardening or painting, have a favorable effect on the participation in leisure time activities of patients with a stroke.

  [High level of evidence]

- We **recommend** memory strategy training in functional situations, using external strategies, has a favorable effect on patients with a stroke who have moderate to severe memory deficits, in terms of learning functional skills in these situations.

  [High level of evidence]

- We **recommend** patients with confirmed difficulties in personal or extended activities of daily living to have specific therapy (eg, task-specific practice and trained use of appropriate aids) to address these issues

  Legg et al, 2006; Walker et al, 2004: [High level of evidence]

- We **recommend** Other staff members, the person with stroke and carer/family should be advised regarding techniques and equipment to maximize outcomes relating to performance of daily activities and life roles, and to optimize sensorimotor, perceptual and cognitive capacities

  [GPP]

- We **recommend** People with difficulties in community transport and mobility should set individualized goals and undertake tailored strategies such as multiple escorted outdoor journeys (ie, up to seven) which may include practice crossing roads, visits to local shops, bus or train travel, help to resume driving, aids and equipment, and written information about local transport options/alternatives

  Logan et al, 2004: [High level of evidence]

- We **strongly endorse** that all patients receive ADL training

  Landi, 2006; Leg, 2006; Trombly, 2002; Soderstrom, 2006; Akinwuntan, 2005; Teasell, 2005; Liu and colleagues, 2004 [High level of evidence]

- We **strongly endorse** that all patients receive IADL training in areas of need

  Landi, 2006; Leg, 2006; Trombly, 2002; Soderstrom, 2006; Akinwuntan, 2005; Teasell, 2005; Liu and colleagues, 2004 [High level of evidence]

- We **recommend** that those individuals with stroke who exhibit ADL /IADL deficits should be given a training program that is tailored to the individual needs and anticipated discharge setting.

  [High level of evidence]

CONTEXT POINTS

The main objective of rehabilitation of stroke patients is for the patients to be able to become independent functionally not only in ambulation and activities of daily living but also to be able to become a productive member of the society and not be a burden to the family and community. Physiotherapist should be cognizant of these goals and should be planning the patient's reintegration to the society particularly in return to work, driving, involvement in leisure pursuit and physical activity