DEVELOPMENT OF AN EVIDENCE-BASED PHYSIOTHERAPY TREATMENT PROTOCOL FOR ACUTE NON-SPECIFIC NECK PAIN IN ETHIOPIA

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A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Physiotherapy, in the Faculty of Community and Health Science, University of the Western Cape

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August 08, 2022

KEYWORDS

Acute non-specific neck pain

Prevalence

Treatment protocol

Effectiveness

Evidence-based

Feasibility

Ethiopia

ABSTRACT

Background

Although neck pain is increasingly being considered as an important public health problem in Ethiopia, there is no treatment protocol guiding physiotherapy practice for acute non-specific neck pain (NSNP) in this setting. This means that every physiotherapist treats patients based on their own knowledge of what constitutes best practice. The problem of clinical inconsistency is further compounded by the fact that the field of physiotherapy is still in its nascent stages in Ethiopia, where a recently expanded physiotherapy curriculum is yet to be fully implemented. In recognition of the fact that evidence-based treatment is now considered clinical best practice by physiotherapists worldwide, this thesis is premised on the idea that it is necessary to have an evidence-based treatment protocol that can guide physiotherapists' decisions when treating these patients. Moreover, a new and young curriculum offers the option of including new and evidence-based physiotherapy. Inspired by this apparent opportunity, this research, which focuses on acute NSNP, has also been conducted with the view to developing an evidence-based treatment protocol that could be useful in fortifying the new Ethiopian curriculum.

Aim and Objectives

Accordingly, with the broad aim of developing an evidence-based treatment protocol for patients who present with acute NSNP in Ethiopia, the specific objectives of this study were as follows: i) to determine the current modalities used in the treatment of patients with acute NSNP in Ethiopia; ii) to identify the best evidence on the effectiveness of treatment methods used by physiotherapists, globally, for patients with acute NSNP; and iii) to determine the feasibility of the devised treatment protocol for the treatment of acute NSNP patients in Ethiopia. These objectives pose the following two broad questions: Firstly, what modalities are currently being used in the treatment of patients with acute NSNP in Ethiopia, and, amongst them, which one is the most widely used and considered to be the most effective? Secondly, what are the best treatment methods currently used by physiotherapists, globally, in the treatment of patients with acute NSNP?

Methodology

The study's methodological approach of mixed methods research fuses four distinct components – a survey, a systematic review, an e-Delphi study and a feasibility study. Phase 1 of the study was a survey of physiotherapists in Ethiopia on current practices for treating patients with acute NSNP by using a self-administered questionnaire. Phase 2 was a systematic review of the latest available evidence for the treatment strategies of patients with acute NSNP. The SR was done after the survey to enable a comparison that would aid to establish existent gaps in current physiotherapy practice in Ethiopia, in relation to global best practice. Addressing these gaps – through the incorporation of some elements of global best practice – in the researcher's view, could aid to uplift Ethiopian physiotherapy practice standards. Phase 3 comprised an e-Delphi study, which was used to refine the evidence from the first two phases. Finally, the fourth phase consisted of an experimental study to evaluate the feasibility of the evidence-based treatment protocol that was developed following the e-Delphi study.

Results

The literature review shows that combination therapy (multimodal treatment) outperforms singular treatment in terms of efficiency and outcome. Also, the psychological aspect of pain, which may have escaped therapists before but is now gaining traction, is crucial to the treatment process of acute NSNP.

The survey findings regarding the actual treatment of patients with acute NSNP by physiotherapists in Ethiopia reveal the following: the majority of Ethiopian physiotherapists conduct three sessions per week for every patient; the most widely used neck joint mobilisation treatment approach is Mckenzie. The type of exercise most prioritised for the treatment of patients with acute NSNP is the stretching of the neck and scapula-thoracic muscles. The type of soft tissue approach prioritised is passive stretching of the neck muscles. The most utilised type of electro-physical modality is heat; the most popular approaches to relieving pain and promoting healing in acute NSNP patients are ergonomic and ADL positioning advice. With respect to peripheral neural mobilisation, the Butler approach is the most widely used; TENS is the preferred modality with respect to electro-physical approaches; and the combination of

cervical manipulation with supervised exercises is found to be most common in the treatment of patients with acute NSNP.

The systematic review phase of the study yielded the following approaches to treatment of acute NSNP that are largely unknown and unutilised in the Ethiopian context: Muscle energy technique; Ischemic compression; Total motions release; Strain-counter-strain; Natural apophyseal glides; Sustained natural apophyseal glides; Thoracic thrust spine manipulation; Cervical spine thrust; and Myofascial trigger point therapy. These interventions were added to the treatments menu—alongside the evidence common practice obtained from the quantitative survey—as part of the treatment protocol development process in this research. The resultant package was then taken through an e-Delphi study phase in order to refine the evidence from the first two phases.

Following the e-Delphi phase, an evidence-based treatment protocol comprising four categories of intervention was devised. They are: i) patient education; ii) manual therapy; iii) exercise therapy; and iv) electrotherapy or thermal therapy. Two main reasons inform this segmentation of the devised protocol: firstly, the researcher views the patient as a key stakeholder in the treatment process. Accordingly, from the researcher's perspective the patient has to be educated on his or her condition, as a better understanding on the patient's part increases the chances of success. Secondly, and equally important, combination therapy works better than singular therapy in the treatment of acute NSNP. Consequently, the protocol was arranged in such a manner as to guide the therapist who might employ it towards the selection of a combination of techniques in accordance with patient diagnosis and needs.

Following the feasibility study, a paired t-test (to assess mean differences) was carried out to compare the impacts of evidence-based intervention (treatment protocol devised through this research) and the common approaches to the treatment of acute NSNP in Ethiopia. Treatment outcome measures with regard to cervical spine ROM were mixed. Notably, however, evidence-based intervention returned considerably better results in three of the six measurement categories as follows: flexion ROM in degree (p = <0.001); right side bend ROM (p = 0.003); and left side bend ROM (p = 0.031). Furthermore, whereas the results show that both interventions

substantially addressed patients' neck disability, the evidence-based intervention had an appreciably greater impact than common treatment ($p = 0.036$).

Clinical implications and recommendations

Although the two interventions offer similar benefits in many aspects of pain and ROM, a strong case could be made for either the exclusive application or incorporation of the treatment protocol devised through this research, in cases where part of the major objective of treatment is to restore flexion ROM and side bending ROM. Similarly, the evidence-based treatment protocol substantially addresses patients' neck disability, offering better pain reduction benefits than the "normal" treatments. This makes it an arguably better option for the alleviation of pain in acute NSNP patients. Therefore, taken holistically the comparative improvement indices vouch for the adoption of the evidence-based treatment protocol this research produced, in relation to the individual discretion generally employed by Ethiopian physiotherapists in their choice of treatment modality for acute NSNP.

The challenges experienced by the researcher and his assistants at the planning and training stages can, however, not be gainsaid. Perhaps because of the lack of adequate appreciation for the need for an appropriate treatment protocol for acute NSNP, it took considerable negotiation efforts to convince the hospital authorities that the feasibility study was worthwhile. Moreover, the researcher encountered some resistance at the training level. This was related to what appeared to be a display of displeasure at the rigour required in the process of advancing the reliability of acute NSNP treatment approaches and minimizing clinical inconsistency by streamlining the treatment choices available for this ailment. Nonetheless, it is hoped that the evidence-based treatment approach and protocol for acute NSNP developed in this study will assist Ethiopian physiotherapists to achieve uniformity and reduce the current variations in clinical care and treatment interventions for patients with acute NSNP.

DECLARATION

I declare that *Development of an evidence-based physiotherapy treatment protocol for acute non-specific neck pain in Ethiopia* is my own work, that it has not been submitted for any degree or examination at any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

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ACKNOWLEDGMENTS

I wish to express my sincere thanks and gratitude to the following people:

Dr Einar Eriksen, for his precious advice and encouragement, and moral support throughout my entire study. I appreciate his unique friendship. It would not have been possible for me to pursue this study without financial support. Here Dr Einar is gratefully acknowledged for his determined efforts towards finding the financial sources for my family and I.

Simonette and **Alf**, for the generosity they have displayed by supporting my entire study financially and my family too. I will forever be grateful. On behalf of my family and myself, I would like to express our heartfelt thanks.

Prof. Michael Rowe and **Dr Ina Diener**, without whom the completion of this research would have been impossible, for their tolerance, high level of academic and personal support, the valuable intellectual input, diligent guidance, and the time they spent on me during their excellent role as my supervisors.

Dr Albert Omulo, a post-doctoral researcher at the University of the Western Cape, who assisted me with data organization and analysis. He taught me his excellent thesis writing skills. I appreciate his time and the wonderful ideas he shared with me.

My wife, **Tsehay**, and my children, **Bonu**, **Hawi**, and **Duba**, for their support, patience, encouragement and prayers.

I appreciate the delightful job done by various colleagues who have assisted me with different ideas and valuable information.

I also appreciate the great work done by the Department of Physiotherapy's postgraduate administration office that helped me in all administrative processes.

I would also like to express my gratitude and thanks to all the expert physiotherapists in various African countries, who participated in the e-Delphi study processes, all the physiotherapists in Ethiopia who participated in the survey study, and the patients who participated in the feasibility study. I remain extremely grateful for their unlimited contributions.

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LIST OF ABBREVIATIONS AND ACRONYMS

AAMPGP	Australian Acute Musculoskeletal Pain Guidelines Group
ADL	Activity of Daily Living
AROM	Active Range of Motion
C5	Cervical 5
CERM	Cervical Extension Range of Motion
CPR	Clinical Prediction Rule
CROM	Cervical Range of Motion
DDEA	Diclofenac Diethylamine
DN	Dry Needling
DNF	Deep Neck Flexor
EBTP	Evidence-based Treatment Protocol
EPRDF	Ethiopian People's Revolutionary Democratic Front
FABQ	Fear-avoidance Belief Questionnaire
FHP	Forward Head Posture
FMHACA	Food Medicine and Healthcare Administration and Control Authority of Ethiopia
GP	General Practitioner
GPE	Global Perceived Effect
HEA	Home Exercise with Advice
HEP	Home Exercise Programme
IC	Ischemic Compression
IEP	Isometric Exercise Programme
INIT	Integrated Neuromuscular Inhibition Technique
IR	Infrared
LLLT	Low-level Laser Therapy
MBPMA	Manipulation Based on Passive Motion Analysis
MED	Medication
MET	Muscle Energy Technique
MMR	Mixed Methods Research
MMT	Manual Muscle Testing
MP	Manual Pressure

NAG	Natural Apophyseal Glide
NCD	Non-communicable Disease
NDI	Neck Disability Index
NPQ	Northwick Park Neck Pain Questionnaire
NPRS	Neck Pain Rating Scale
NSNP	Non-specific neck pain
NR	Not Reported
PA	Posterior-Anterior
PICO	Participant, Intervention, Comparison, Outcome
PIR	Isometric Relaxation
PPT	Pressure Pain Threshold
QoL	Quality of Life
QUAL	Qualitative
QUAN	Quantitative
RA	Research Assistant
RCT	Randomised Controlled Trial
RFEM	Range of Flexion Extension Motion
ROM	Range of Motion
SBP	Systolic Blood Pressure
SCI	Subcutaneous Carbon-dioxide Insufflation
SD	Standard Deviation
SMT	Spinal Manipulative Therapy
SNAG	Sustained Natural Apophyseal Glide
SPSS	Statistical Package for Social Science
SUS	Sham Ultrasound
T1	Thoracic 1
TENS	Transcutaneous Nerve Stimulation
TJM	Thrust Joint Manipulation
TrP	Trigger Point
TSM	Thoracic Spine Manipulation
ULTT	Upper Limb Tension Test

VAS	Visual Analogue Scale
YLD	Years Lived with Disability

GLOSSARY

a) **Feasibility study**: the assessment of the practicality of a proposed project plan or method (Pearson et al., 2020).

b) **Guideline**: a criterion that guides or leads action; it comprises systematically developed statements, based on a thorough evaluation of current best evidence, and emphasises the use of clear evidence from the existing literature; it is more flexible, easily modified to patient needs, and can be adapted within a large variety of settings (Lawton & Horne 2015).

c) **Ischemic compression**: the application of sustained pressure for a long enough time (30 to 90 seconds) to relieve muscles from a painful spasm; it is gradually increased to the point of the patient's maximum tolerance to eliminate the trigger point tension and tenderness (Nambi, Sharma, Inbasekaran, Vaghesiya, & Bhatt, 2013). The idea is to cause deliberate blockage of blood flow in a trigger point area in order to increase local blood flow to facilitate healing in affected tissues (Montañez Aguilera et al., 2010). Both myofascial trigger point therapy and ischemic compression therapy address painful muscle knots and spasms, but ischemic compression therapy focuses on the application of sustained pressure for a long enough time to inactivate the trigger points in a larger area of the muscle and its fascia (Montañez Aguilera et al., 2010).

d) **Joint manipulation:** a therapeutic technique, which involves the use of short, sharp (high velocity) passive motion to push a joint beyond its normal range of movement while remaining within the limit of the joint's anatomical integrity (Harwich, 2017).

e) **Joint mobilisation**: the careful repetitive use of skilled hands with low-grade passive movement of the joint within its normal range of motion by the therapist (Anggiat, Altavas & Budhyanti, 2020).

f) **Manual therapy**: a broad term used to describe a structured clinical approach, which entails the use of skilled hands to apply therapeutic force on patients (Bizzarri & Foglia, 2020).

g) **Myofascial Trigger Point Therapy (Trigger Point Therapy)**: refers to the treatment of very local trigger points that are painful**,** taut bands, and palpable nodules found in the skeletal muscles and fascia (Dommerholt, 2013).

h) **Non-specific neck pain (NSNP)**: neck pain without known specific underlying causes or diseases. In more technical terms, NSNP is described as pain in the posterior and lateral aspect of the neck between the superior nuchal line and the spinous process of the first thoracic vertebra with no signs or symptoms of major structural pathology (see Maissan et al., 2020; Domingues et al., 2018; Hidalgo et al., 2017; Cerezo-Téllez et al., 2016; Tsakitzidis, Remmen, Dankaerts & Van Royen, 2013; Gemmell & Miller, 2006).

i) **Protocol**: a written procedure that sets out a sequence of interventions to be adhered to in the management of a specific clinical condition. For the purposes of this study, a protocol is a care package, that is, a planned way of improving the processes of care and patient clinical outcomes: a small, clear-cut set of evidence-based interventions, more explicit and specific than guidelines that leave little room for adjustment, reflecting regional or institutional practices (Lawton & Horne, 2015).

Chapter 1
Introduction

1.1 Introduction

This chapter creates a case for this study, providing details on the following elements: the background on, and prevalence of, acute non-specific neck pain (NSNP); a general analysis of the impact of the ailment on patients; emergent expert opinions on evidence-based treatment for acute NSNP; a short history of physiotherapy practice and curriculum in Ethiopia; the problem statement and research questions; the research aims and objectives; and the significance of the study. It also provides details on the organisation of this thesis.

1.2 Background

Neck pain is the result of a complex interaction of mechanical, biomechanical, psychological, and social factors (Wirth, Humphreys, & Peterson, 2016). It is an individual experience, involving sensations and perceptions, which may or may not be the result of tissue damage or physical injury, and pain differs among individuals, depending on how it affects their lives (Linton & Shaw, 2011).

Acute NSNP is one of the most widespread patterns of neck disorder among the general population (Williams, Srikantaiah, & Mani, 2013). Acute NSNP is pain that lasts less than three months (Bussieres et al., 2016, Dhopte et al., 2016, Parikh, Santaguida, Macdermid, Gross, & Eshtiaghi 2019, Leaver, Maher, McAuley, Jull, & Refshauge, 2013, Spearing, March, Bellamy, Bogduk, & Brooks, 2005). It is a frequent musculoskeletal disorder characterised as mechanical or simple pain found in the posterior cervical spine between the superior nuchal line and the spinous process of the first thoracic vertebra (Vincent, Maigne, Fischhoff, Lanlo, & Dagenais, 2013). The pain may or may not radiate to the upper extremities and encompass neck muscles with no exact aetiology (Diab, Hamed, & Mustafa, 2016). It affects people of all ages, but is more common in adults. A randomised clinical trial conducted by Kaka and Ogwumike (2015) reported that NSNP may affect several structures in the neck, such as the muscles, joints, ligaments, intervertebral disks, and neural structures. It can be inferred that when tissues are stressed under repetitive movements such as work over an extended period of time, or the neck is maintained in an awkward position, or soft tissue is sprained or strained, there may be painful dysfunction.

1.3 Prevalence of NSNP

It has been estimated that the global annual prevalence of all NSNP is between 30% and 50% (Anderst et al., 2018; Goode, Freburger, & Carey, 2010; Gudavalli et al., 2015) with a higher prevalence in women than men (Bjorklund, Djupsjobaka, Svedmark, & Hager, 2012). Furthermore, the prevalence is higher in high-income countries compared to low- and middle-income countries, and higher in urban areas compared to rural areas (Hoy, Protani, De, & Buchbinder, 2010). According to Fillingim, King, Ribeiro-Dasilva, Rahim-Williams and Riley (2009), repetitive roles, such as housekeeping, childcare, sitting at computers, and work-related stress experienced by cashiers and telephone operators, can cause women to experience more pain and force them to visit the doctor. The annual prevalence of activity limitations due to neck pain ranges from 1.7% to 11.5% in the general population and 11% to 14.1% in office workers globally (Meisingset et al., 2015; Noormohammadpour, Tayyebi, Mansournia, Sharafi, & Kordi, 2017).

In Ethiopia, Tafese, Nega, Kifle and Kebede (2014) found the prevalence of work-related neck pain to be 45%, which is comparable to the global population. However, variations between neck pain studies make it difficult to compare data (Fejer, Kyvik, & Hartvigsen, 2006), because studies use different methodologies, samples or varying definitions of what constitutes the neck region (Hoy et al., 2010).

1.4 Impact of NSNP

Neck pain is the fourth leading cause of years lived with disability (YLD) in the global burden of disease, which refers to the number of years lost due to time lived in states of less than full health (Meisingset et al., 2015). Nearly 50% of acute NSNP cases willrecover, regardless of the intervention, while the rest may suffer from persistent or chronic problems (Lauche et al., 2011). Limited range of motion and a subjective feeling of stiffness that accompanies the neck pain can negatively affect the behaviour and well-being of individuals (Fillingim, King, Ribeiro-Dasilva, Rahim-Williams, & Riley, 2009). According to various studies, neck pain results in a significant burden to the individual and to society at large due to the economic costs related to prolonged sick-leave, disability pension, long- and short-term disability, and high use of health care services (Breed, Van Rooijen, & Marais, 2014; Cuesta-Varga & Gonzalez-Sanchez, 2015).

Given the morbidity and costs associated with neck pain, it is important that the treatment of patients with acute NSNP is approached through an optimum treatment protocol.

In Ethiopia, neck pain is included among the non-communicable diseases (NCDs) that are increasingly being considered as important public health problems (Food, Medicine and Healthcare Administration and Control Authority [FMHACA], 2014). From personal experience and anecdotal evidence, the author has noted that physiotherapists treat an average of 3-5 patients with neck pain per day at the Myungsung Christian Medical Centre, a physiotherapy clinic in Addis Ababa, Ethiopia. In addition, there is no treatment protocol for patients presenting with acute NSNP in this setting. Moreover, Ethiopian standard guidelines for primary hospitals do not include physiotherapy treatment for patients with acute NSNP (FMHACA, 2014). The problem of the lack of standard treatment protocols in the Ethiopian physiotherapy profession can further be understood within the context of the trajectory taken by physiotherapy practice and the physiotherapy curriculum in the country, as discussed below.

1.5 A short history of physiotherapy practice and curriculum in Ethiopia

Although changes and professional development have been ongoing since the 1990's, the physiotherapy profession in Ethiopia is relatively young when compared to the development of the profession in other countries (Footer et al., 2017). According to Footer et al., the first 4-year BSc cohort of Ethiopian physiotherapists graduated in 2006, with a total estimated graduation of 223 professionals as of 2016. To further advance the profession, the country initiated a 2-year MSc in Physiotherapy degree in 2009 at Gondar University in the northern part of the country. However, the BSc and MSc programmes were producing very few local graduates that could not adequately cater for the massive demand for physiotherapy services in the country. There was also a desire to develop capacity among Ethiopian physiotherapists in general (including university teaching staff) – who largely depended on expertise from their counterparts from other countries. The ultimate objective was to improve the knowledge, and increase the number, of physiotherapy graduates (Footer et al., 2017). Regarding knowledge, it was determined that there were deficits in the following areas and aspects: (1) "foundation and clinical sciences"; (2) "evidence-based practice"; (3) "clinical reasoning skills"; and (4) "interprofessional education opportunities" (Footer et al., 2017, p. 1).

Accordingly, in conjunction with international experts, Ethiopian authorities expanded the curriculum by introducing two additional programmes tailored to meet local physiotherapy needs: (1) the Advanced Standing Doctor of Physiotherapy (DPT) programme curriculum (4-year-course for registered physiotherapists who hold a BSc degree and wish to join faculty), and (2) the Generic DPT programmes curriculum (6-year-course for high school graduates interested in physiotherapy). While the Advanced Standing Doctor of Physiotherapy (DPT) programme was introduced at Addis Ababa University and started teaching its first cohort of physiotherapists in 2014, the Generic DPT programme curriculum is yet to be implemented. The finer details of these two programmes, are given below.

1.5.1 The Advanced Standing Doctor of Physiotherapy (DPT) programme curriculum

This 4-year programme comprises 51 courses encapsulated in the 18 content modules (Footer et al., 2017: p. 7) captured in Table 1.1 below.

Table 1.1: Advanced Standing Doctor of Physiotherapy (DPT) programme curriculum modules

No.	Title of Module
1.	Human Anatomy and Development
2.	Physiology and Kinesiology of Movement
3.	Clinical Decision-Making
4.	Cardiovascular and Pulmonary System Management
5.	Movement Sciences
6.	Diagnosis—Electromyography Studies
7.	Neurological Systems Management
8.	Radiology
9.	Musculoskeletal Management I—Extremities
10.	Musculoskeletal Management II—Spine
11.	Specialised Medical Management of the Musculoskeletal System
12.	Professional Roles
13.	Population Health
14.	Integumentary and Endocrinology
15.	Urogenital/OB-GYN
16.	Oncology
17.	Research Methods
18.	Scope of Physiotherapy Practice

Source: Footer et al., 2017, p. 7.

1.5.2 The Generic DPT programmes curriculum

On the other hand, the Generic DPT programmes curriculum, designed to last a period of 6 years, will comprise 21 new courses enshrined in 12 modules (Footer et al., 2017, p. 7), as depicted in Table 1.2 below, when it is inaugurated.

Table 1.2: Generic DPT programmes curriculum module titles

No.	Title of Module
1.	Body Structure, Organization, and Function
2.	Metabolic Homeostasis and Molecular Genetics
3.	Basic Concepts of Disease and Therapy
4.	Blood and Immunity
5.	Neoplasia and the Molecular Basis of Cancer
6.	Musculoskeletal and Integumentary Systems
7.	Cardiopulmonary System
8.	Nutrition, Metabolic Diseases and GIT
9.	Excretion and Toxicology
10.	Infectious Disease
11.	Endocrinology and Reproduction
12.	Neuroscience and Behaviour

Source: Footer et al., 2017, p. 7.

A new and young curriculum offers the option of including new and evidence-based physiotherapy. Inspired by this apparent opportunity, this research, which focuses on acute NSNP, has been conducted with the view to developing an evidence-based treatment protocol that could be useful to fortify the new Ethiopian curriculum discussed above.

1.6 Evidence-based practice

Evidence-based treatment for acute NSNP has increasingly been recognised as a clinical best practice by physiotherapists worldwide as it improves patient outcomes, quality of care, and provides some standardisation of treatment (Bernhardsson, Oberg, Johansson, Nilsen, & Larsson, 2015; Oakley, Harrison, Harrison, & Haas, 2005). Best practice involves incorporating the best research evidence with clinical experience and patient values (Veras, Kairy, & Paquet, 2016). However, with the proliferation of evidence regarding treatment modalities for patients with acute NSNP, it is necessary to have a tool that can guide physiotherapists' decisions when treating these patients. Physiotherapy is a relatively underdeveloped field in Ethiopia and local evidence related to NSNP treatment is scarce. Although evidence-based treatment protocols for

NSNP exist elsewhere (Williams, Srikantaiah, & Mani, 2013; Diab, Hamed, & Mustafa, 2016), their utility and effectiveness in Ethiopia remain unknown. It is necessary that treatment protocols be informed by locally generated evidence, because culture, population and settings vary and are likely to influence patient outcomes (Dell'Osso, 2016; Peacock & Patel, 2008).

A treatment protocol is one of the tools that can assist health practitioners to make appropriate clinical decisions (Koch, Woodcock, & Harris, 2010). However, in Ethiopia, physiotherapists' choices of treatment for patients with acute NSNP are based on their discretion or levels of skill, mainly because there is no contextually appropriate treatment protocol for the condition (FMHACA, 2014). A treatment protocol facilitates the provision of care that is in accordance with the best available evidence to improve treatment outcomes for patients with acute NSNP (Bolarinwa, 2015). The lack of a standardised evidence-based treatment protocol may lead to clinical practice variation which will result in underuse of effective care or overuse of non-beneficial services and emphasis on therapist views rather than patient preference (Cook et al., 2018). Unlike guidelines, which typically provide direction for clinicians, protocols tend to answer questions for specific patients with specific health issues in a specific setting (Koch, Woodcock, & Harris, 2010). A good treatment protocol should be evidence-based oriented, clear, help in decision-making according to the individual client's needs and presentation, and provides structure for treatment, and a clear starting point for disseminating evidence-based treatments (Kendall & Frank, 2018, Rycroft-Malone, Fontenla, Seers, & Bick, 2009). In addition, it should decrease inconsistency in a treatment and prevent the application of potentially harmful treatments (World Health Organization, 2018, Hawk et al., 2017). It is therefore evident that having a treatment protocol for acute NSNP is important for physiotherapists to implement the best evidence-based practices in a standardised way in order to ensure qualitative, uniform and cost-effective healthcare for patients with acute NSNP.

1.7 Problem statement

Since physiotherapy is a relatively new field in Ethiopia, there is limited evidence of an appropriate treatment protocol for patients presenting with NSNP. Furthermore, existing evidence, mostly from high income countries, cannot always be applied in low-resource settings. Anecdotal experience indicates that physiotherapists in Ethiopia rely on individual discretion in

their choice of treatment modality for acute NSNP. There is no evidence-based, standardised approach for managing these patients. Currently, researchers in the developing world have focused on encouraging the use of substantial evidence to guide treatment decisions and practices. Unfortunately, developing countries, particularly countries such as Ethiopia, still lag behind in many clinical areas. While the adaptation of existing protocols might be a simpler exercise, it might not suffice for the simple reason that contexts vary. Furthermore, the situation in other developing countries, especially in Africa, is largely similar to the one in Ethiopia – because of a challenged resource base, subjective individual discretion prevails in the treatment of conditions such as NSNP. Developing an evidence-based treatment protocol is desirable for physiotherapy practice in Ethiopia as it would address an important issue in clinical practice. Therefore, this study aimed to fill this gap by developing a locally informed and contextually relevant but also evidence-based treatment protocol for the management of the patients presenting with acute NSNP.

1.8 Research questions

Based on the problem statement above, the study sought to answer the following research question: What is an evidence-based treatment protocol (EBTP) for Ethiopian physiotherapists to follow, for patients who present with acute non-specific neck pain?

1.9 Aim of the study

The aim of this study was to develop an EBTP for Ethiopian physiotherapists to follow, for patients who present with acute non-specific neck pain.

1.10 Objectives of the study

1. To determine the current modalities used in the treatment of patients with acute NSNP in Ethiopia to establish the local management context.
2. To identify the best evidence on the effectiveness of treatment modalities for acute NSNP from the literature and from experts.
3. To develop a draft EBTP for patients with acute NSNP in Ethiopia.
4. To determine the feasibility of this protocol for the treatment of patients with acute NSNP in Ethiopia.

1.11 Significance of the study

The significance of this study is fourfold. Firstly, the evidence-based treatment protocol developed in this study may help physiotherapists in Ethiopia and other developing countries, that work with severe resource constraints, to provide higher quality care to patients with acute NSNP. It may also help to reduce the current variations in clinical care and treatment interventions for patients with acute NSNP. Secondly, the findings from this study may be utilised by physiotherapy educators responsible for developing or implementing curricula for physiotherapy students and other related health professionals. The study may create a reference publication for physiotherapy clinicians, academic instructors, clinical instructors, students, and interns, regarding the best current practice of physiotherapy in Ethiopia. Thirdly, the study may inform polices related to physiotherapy training, clinical practice, and for the continued development of manpower and the physiotherapy profession at the national level. Finally, to the best of the researcher's knowledge, there is no research on developing an EBTP for patients with acute NSNP in Ethiopia, nor in Africa more generally, and therefore, the findings of this study may serve as baseline data for future research on this topic.

1.12 Organisation of the thesis

Besides this introductory chapter, this thesis is organised in the following manner: Chapter 2 examines and analyses contemporary scholarly work and analytical trends on neck pain in general, and acute NSNP in particular. It also presents a conceptual framework for the study. Chapter 3 discusses the research methodology that was employed to meet the objectives of this study. It begins with a detailed description of the research design that was adopted for the study. Thereafter it discusses each of the four components of the study design, that are, the survey, the systematic review, the e-Delphi study, and the feasibility study, giving specifics of the methods, steps, and procedures that were followed to obtain data for the study. Chapter 4 presents the results of the quantitative survey that was administered among various practising physiotherapists in Ethiopia with the objective of determining the current modalities used in the treatment of patients with acute NSNP. The chapter concludes with a summary of the components of best practice for effective treatment of NSNP according to the collective opinion of a subset of Ethiopian physiotherapists. Chapter 5 presents a systematic review of literature on the effectiveness of treatment strategies in order to develop an initial set of potential

interventions for patients with acute NSNP. Chapter 6 presents the details of the e-Delphi study that captured the collective opinion of physiotherapy experts in Africa on the formulation of an evidence-based treatment protocol for patients with acute NSNP in Ethiopia. It begins with a comprehensive outline of the details of all the processes employed during the e-Delphi study to yield the preliminary evidence-based treatment protocol. Finally, the draft treatment protocol informed by the survey, the literature review and the e-Delphi study are described. Chapter 7 presents the feasibility study that was conducted in order to determine if the evidence-based treatment protocol for patients with acute NSNP in Ethiopia is contextually appropriate and has the potential to be used as a baseline for further research on efficacy. It describes both the EBTP intervention and the common treatment components of the feasibility study phase of this research; it then gives a comparison of the outcomes of both the common treatment and EBTP intervention sides. Based on this comparison, it provides an objective assessment of the efficacy of the final evidence-based treatment protocol to see if this small feasibility study resulted from this research might work in a local context. Finally, it discusses the findings presented in this chapter in relation to those of prior contemporary studies discussed in the literature review in Chapter 2. Chapter 8 integrates the findings of the previous chapters; it presents a deeper and more critical analysis of the results by discussing them in relation to other, similar research, and it makes recommendations accordingly. Chapter 9 presents a summary of the research in relation to the research questions, aim and objectives, presented in Chapter 1, and outlines the study's contribution to knowledge.

Chapter 2

Literature review

2.1 Introduction

This chapter begins with an overview of the healthcare policy in Ethiopia. Thereafter it provides additional contextual information in the form of the organisation of physiotherapy in Ethiopia and scholarship on neck pain in the country. Contextual content and analysis on healthcare policy in Ethiopia, generally, and physiotherapy practice, specifically, has been added to this literature review and used as a basis for the discussion of study outcomes in the penultimate chapter of the thesis. The chapter also examines and analyses contemporary scholarly work and analytical trends on neck pain in general, and acute NSNP in particular. Its main objective is to provide an overview of modalities used for the management of acute neck pain. This information was crucial to the researcher in terms of formulating a conceptual framework. It also assisted the researcher in the discussion of the systematic review findings in chapter 5. Accordingly, it mainly examines the following issues regarding the ailment: the effectiveness of electrophysical treatment methods to tackle acute NSNP; the effectiveness of muscle relaxation treatment methods used to tackle acute NSNP; the effectiveness of joint mobilisation or manipulation treatment methods; the effectiveness of a combination of joint mobilisation or manipulation treatment methods and exercises to tackle acute NSNP; and the effectiveness of medication to treat acute NSNP. Here, the studies were not evaluated for level of evidence. Rather, literature was reviewed with the intent of establishing contemporary scholarly patterns and themes surrounding neck pain in general. This is followed by an assessment of other less dominant themes on acute NSNP and a summary of the research trends pertaining to the ailment. Finally, the conceptual framework, which derived from the review itself, and guided this study, is presented.

2.2 Healthcare policy in Ethiopia

Since the ascendancy of the EPRDF to power under PM Meles Zenawi in 1991, Ethiopia has substantially pursued a healthcare policy targeted at addressing the needs of the masses at the grassroots level of society (Croke, 2020). The country's healthcare policy, from 1991 to date, has been strongly characterised by the following three major aspects: 1) a "focus on fiscal and political decentralisation"; 2) "expanding the primary health care system"; and 3) "encouraging

partnerships and the participation of nongovernmental actors" (Wamai, 2009, p. 280). The aforementioned three objectives have been followed largely under the following three implementation strategies: the Health Sector Development Program-1 (HSDP-1), which covered the period 1997/98–2001/02); HSDP-II (2002/03– 2004/05); and HSDP-III (2005 to run through 2005/06 – 2009/10) (Wamai, 2009, p. 280).

In their decentralisation endeavours, Ethiopian authorities have strongly prioritised the *woreda* (district) in the provision of primary healthcare. Accordingly, in 2003, the Government of Ethiopia inaugurated the Health Extension Program (HEP), "a program that is deeply rooted in communities, providing primary level preventive activities to household members. The program encourages families to be responsible for their own health" (Wang, Tesfaye, Ramana, & Chekagn., 2016) as depicted in Figure 2.1 below.

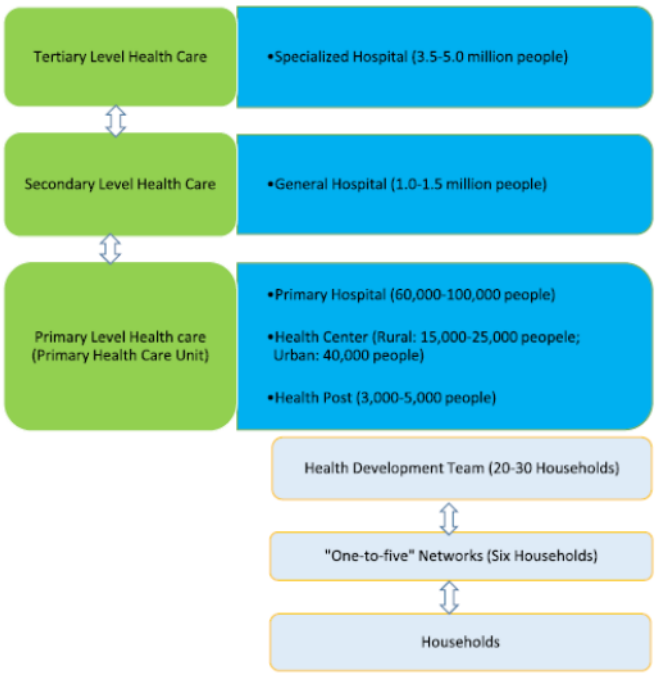


Figure 2.1: Ethiopia's Health Extension Program (Source: Assefa et al., 2019)

Since "2004, over 30 000 Health Extension Workers [HEWs] were trained and deployed in Ethiopia and over 2 500 health centres and 15 000 village-level health posts were constructed" (Croke, 2020, p. 1318). The services provided under the HEP include "16 essential health

packages under four major program areas" (Wang et al., 2016, p. 2) as depicted in Figure 2.2 below.

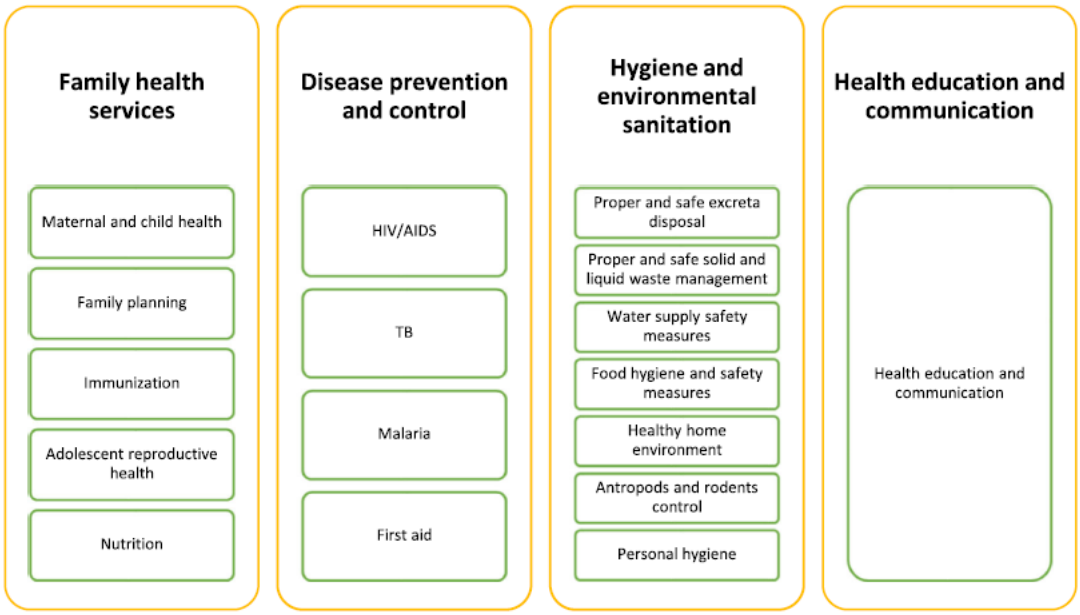


Figure 2.2: Ethiopia's Health Extension Program Packages (Source: Assefa et al., 2019)

For availing primary healthcare to numerous citizens at the grassroots level, Ethiopia's approach is widely acclaimed (Croke, 2020). Nonetheless, the HEP, as a Community Health Programme (CHP), has faced its challenges. For instance, it has had to grapple with a "shortage of resources, non-functional referral system, lack of interest from private health service organizations, attitudinal problems from both the society and service providers, and lack of consistent reporting system of … health problems" (Yitbarek et al., 2021, p. 1201). Crucially, there are some ailments that require specialised treatment that cannot be availed even under a successful CHP such as Ethiopia's. As quite correctly put by Wamai (2009), "an overemphasis [on successes] and high expectations may overshadow other human resource and management and other programmatic needs"; indeed, "there needs to be a focus on training and retaining skilled personnel such as physicians, nurses and skilled birth attendants in the health system" (Wamai, 2009, p. 285). The HEWs, who only undergo "a year-long training, which includes both theoretical training in training institutions and practical training in health centers" (Wang et al., 2016, p. 26) may not provide this. It is in this context and argument for the need for skilled

health personnel to ensure an improved, balanced and expansive health system, that physiotherapy in Ethiopia, whose organization is discussed next, finds its bearing.

2.3 Organization of physiotherapy in Ethiopia

As partly discussed, physiotherapy in Ethiopia is still a new and evolving field. At the time this research was being conducted, for instance, there were approximately 300 physiotherapists in the country. About 15% of them are members of Ethiopian PTs association and 30% of them are female. According to WCPT, as of 2020, there were 0.08 practicing physiotherapists per 10,000 members of the population. Africa's ratio for the same period, at 0.28 per 10,000 members of the population, was relatively higher. Although "health practitioners, including medical doctors work alongside physiotherapists to offer the best treatment and recovery choices … for patients" (Kutty, Gebremichael, & Vargehese, 2013, p. 74), it has been found that the former has inadequate knowledge on this particular field of practice.

Ethiopia considers it "important to set practice boundaries within and across health professional categories, thereby promoting the integrity of the health professions and ultimately protecting the public from health risks associated with practices beyond allowable scope" (Ethiopian Food, Medicine and Health Care Administration and Control Authority [EFMHACA], 2014, p. 1). Accordingly, the scope of physiotherapy practice in the country – with regard to required competencies and permitted operations – are spelt out, defined and regulated by the EFMHACA under the following categories: 1) Assistant Physiotherapy Technician; 2) Physiotherapist; 3) Physiotherapy Specialist; and 4) Doctor of Physiotherapy (DPT).

An Assistant Physiotherapy Technician, defined as "a practitioner who, having been admitted to a physiotherapy certificate training program duly recognised in the country, successfully completed the prescribed course and licensed by the regulatory authority to practice physiotherapy" (p. 95), may perform the following duties:

a. The collection of qualitative and quantitative client data related to the client's physical status and functional ability;
b. Selection of objective measures/tests/procedures for the overall (re)assessment plan;

c. Implementation of therapeutic interventions including thermal, electrical and mechanical modalities or providing physical assistance (supporting or enhancing in nature) to clients;
d. Explanation and provision of verbal instructions to the client regarding the intervention plan; and
e. Evaluation of the effectiveness of specific interventions in relation to identified client outcomes (p. 95).

Amongst other duties, a Physiotherapist, "a practitioner who, having been admitted to a physiotherapy educational program duly recognised in the country, successfully completed a BSc course and licensed by the regulatory authority to practice physiotherapy" (p. 96) can:

a. Perform a comprehensive physiotherapy assessment/examination to musculoskeletal disorders, sports injuries, neurological disorders, cardiac and respiratory conditions, paediatric conditions, gynaecological and obstetrics conditions and integumentary disorders incorporating diagnostics data to produce a diagnosis and render appropriate intervention;
b. Order diagnostic tests, utilise the data or information to assist in the examination/assessment process of a patient;
c. Practice of preventive gerontology, geriatric rehabilitation, apply appropriate treatment modalities, and prescribe specific exercises for aged patients;
d. Plan, prepare, or carry out individually designed programmes of physical treatment to maintain, improve, or restore physical functioning, alleviate pain, or prevent movement dysfunction in patients; and
e. Perform physiotherapy manual techniques, utilise physical modalities, plastering techniques and prescribe therapeutic exercises (p. 96 – 97).

On the other hand, a Physiotherapy Specialist, "a physiotherapist who, having been admitted to a MSc educational programme, duly recognised in the country and has successfully completed the prescribed course and has been licensed by the regulatory authority to practice at a specialist capacity" (p. 97) performs, among others, the following tasks among others:

a. Critically appraises and applies the current evidence base to clinical physiotherapy practice;
b. Assesses and manages patients with musculoskeletal, trauma and orthopaedic, neurological and pediatric conditions commonly encountered in Ethiopia;
c. Performs spinal and joint manipulations and mobilisations as indicated;
d. Teaches health science students;
e. Manages physiotherapy services; and
f. Acts as a consultant for the setting up and further development of disability services.

Finally, the Doctor of Physiotherapy, "a practitioner who, having been admitted to a doctor of physical therapy programme duly recognised in the country successfully completed the prescribed course of study and licensed by the regulatory authority to practice as a doctor of physiotherapy" (p. 98), amongst other responsibilities, can do the following:

a. Perform physical examinations and interventions based on diagnosis, prognosis, and desired outcomes;
b. Participate in the management of medical/surgical emergencies or trauma;
c. Manage congenital deformities, post traumatic injuries, pathological conditions, fractures, deformities;
d. Perform specialty interventions such as mechanical decompression, plastering techniques, joint and soft tissue injections, neuromusculoskeletal medication prescription minor trauma suturing, reducing and stabilising minor fractures and dislocations;
e. Perform electromyography and lower extremity doppler testes as well as stress tests (p. 98).

To practice as a physiotherapist, one has to be registered by the Ministry of Health in Addis Ababa. Re-registration is required every five years. Continuing Professional Development (CPD) is required for re-registration. CPD involves educational activities aimed at enhancing medical competence in medical knowledge and skills, as well as management, team building,

professionalism, interpersonal communication, technology, teaching, and accountability. The Federal Ministry of Health (FMOH) of Ethiopia has launched a CPD to continually develop the competency of all health professionals through standardized in-service training, standardisation meetings, conferences, newsletter subscriptions, research, new technology, social media groups etc. The interests of physiotherapists in the country are championed by the Ethiopian Physiotherapists Association (EPA), which is devoted to promoting compassionate and respectful professional practices. The EPA also facilitates the provision of accredited CPD courses and in-service training to enhance physiotherapy practice standards among members. It strives to create equal opportunities for members and provides them with up-to-date information on trends that could affect members' practice and development. It also enforces professional codes of conduct. Contemporary scholarship on neck pain in Ethiopia is examined next.

2.4 Scholarship on neck pain in Ethiopia

The body of knowledge on neck pain in Ethiopia is limited. Moreover, despite exhibiting some diversity in approach and study populations, it is still in its nascent stages (cf. e.g., Biadgo, Tsegay, Mohammednur, & Gebremeskel., 2018; Weleslassie, Meles, Haile, & Hagos., 2020; Temesgen, Belay, Gelaw, Janakiraman, & Animut., 2019; Balcha, Getaneh, & Woldeyohannes, 2021; El-Sayed et al., 2010; Mengistu, 2021.; Tafese, Kebede, Medhin, Mariam, & Kindu., 2018; Delele, Janakiraman, Abebe, Tafese, & van de Water., 2018).

Those who operate or work with sewing machines in Ethiopia have attracted the attention of experts in this scholarly domain. Biadgo et al. (2018), for instance, focused on the textile factories in Mekelle City in Northern Ethiopia and found neck pain to be a considerable public health issue. They attributed it to the following factors: insufficient break time at work; workdays of more than eight hours; sitting in an unchanged position for more than a couple of hours; and the replication aspect that highly characterizes the profession. On the other hand, Tafese et al. (2018), whose study was based in Northern Gondar in Amhara, also found neck pain to be highly prevalent among sewing machine workers. Unusually long working hours, they contended, was the major factor that led to the ailment in this particular profession. Other subject of neck pain studies in Ethiopia have included the following: medical students; school teachers; rural dwellers and elementary school children. Almost fifty percent of medical students, the

subjects of analysis in a study conducted by Weleslassie et al. (2020), indicated that they had experienced neck pain during the year that preceded the study. The following factors among others were fronted as causes for the pain: awkward postures; lack of regular physical activity; and long reading sessions. It was recommended that, to effectively tackle neck pain, medical students should engage in physical activity, regularly, for at least thirty minutes on a daily basis.

Notably, neck pain in the Ethiopian context has been studied alongside other closely associated ailments. Concerning shoulder and neck pain amongst school teachers, for example, Temesgen et al. (2019) also finds that more than fifty per cent of the participants in the study experienced shoulder and neck pain within the twelve-month period that preceded their research. Furthermore, theyfound that "teaching experience, static head down posture, elevated arm over shoulder, and hypertension are likely to be significantly associated with shoulder and/or neck pain among school teachers in Ethiopia" (Temesgen et al., 2019, p. 1). Another study by El-Sayed et al. (2010) combines back and neck pain and psychopathology with a focus on the Gilgel-Gibe region in the south-west part of Ethiopia. Significantly, their study found a prevalence of neck pain much lower in this rural, developing country context (5%) than is the case in developed countries (18-53%). Also, they found that depression and anxiety in most instances accompany cases of back and neck pain in the rural areas of sub-Saharan Africa. A study by Mengistu (2021) examined shoulder and neck pain among Ethiopian workers. It found an occupational shoulder and neck pain prevalence of about thirty-three per cent in participants, and recommends, as a result, an adoption of more effective occupational work and safety measures to reduce these and other related hazards.

A retrospective analysis of cervical spine Magnetic Resonance Imaging (MRI) patterns in neck pain patients conducted by Balcha, Getaneh and Woldeyohannes (2021), found degeneration of the cervical spine – a common occurrence amongst the aged – to be the most probable cause of the ailment ahead of neoplasm and infection. A study by Delele et al. (2018) that examined musculoskeletal pain among Ethiopian elementary school children found a high prevalence of the ailment. Long walks to and from school and heavy school bags were fronted in this study as the major causes of musculoskeletal pain. Such is the nature of neck pain scholarship in the Ethiopian context – limited, yet rich and diverse in approach and context. With the objective of

expanding this emerging scholarship on neck pain in the country, the ensuing sections review contemporary literature on acute NSNP globally, with the intent of borrowing insights to inform a conceptual framework to guide the research.

2.5 An analysis of contemporary literature on acute NSNP

The literature review presented in this section was driven by the objective of examining scholarly trends, patterns, and findings on neck pain in general. It therefore includes, rather than limits itself, to acute NSNP research. A scrutiny of contemporary research on acute NSNP revealed three dominant themes in the field; the effectiveness of the treatment methods used in the treatment of acute NSNP, a focus on manipulation and mobilisation techniques employed in the treatment of acute NSNP, and a comparison of treatment methods for acute NSNP. These themes, as well as other less dominant themes on acute NSNP, will be discussed in this chapter. The review will be concluded with a summary of research trends pertaining to acute NSNP.

2.5.1 Effectiveness of electrophysical treatment methods used in the treatment of acute NSNP

There is an abundance of similar studies that focus on the effectiveness of treatment methods applied in the treatment of acute neck pain. Schabrun et al. (2012), who assessed the effectiveness of neurostimulation therapy on myofascial trigger points associated with mechanical neck pain, found substantial improvements in pain intensity and neck disability.[1] They concluded that neurostimulation therapy, though still in its infancy as a treatment method, should be given more attention, as it may prove helpful in addressing conditions such as acute NSNP. Gross et al. (2013), for example, analysed the effectiveness of low-level laser therapy (LLLT) for neck pain. They found inconsistent results, which partly indicate that LLLT may be useful for the treatment of neck pain, function and quality of life. Nonetheless, they called for additional studies involving long-term dosage trials that could shed more light on LLLT and the treatment of neck pain. Kalra and Kalra (2016) assessed the value of combination therapy in the alleviation of non-specific cervical neck pain. Their study examined the simultaneous combination of the following two methods: cervical traction together with infra-red exposure,

[1] Neurostimulation therapy is the alteration of nerve activity using electrical stimulation to specific neurological sites in the body part to deliver pain relief and to restore function (Cruccu et al., 2007; Harandi & Kapural, 2018; and Takla, 2018).

and cervical traction followed by infra-red exposure. They concluded that the combination of cervical traction and heat therapy yields better results than the exclusive application of either treatment (Kalra & Kalra, 2016). Reda and Eman (2016), who also appear to appreciate the value of combined treatments in the treatment of neck pain, assessed the effectiveness of the mixture of ultrasound therapy and static stretching of the upper fibres of trapezius in the treatment of the condition. While they found both techniques useful, they nonetheless noted that simultaneous application of ultrasound therapy and static stretching was more effective in increasing the range of motion and in reducing cervical pain and disability than the application of ultrasound therapy followed by static stretching. In a similar study, a double-blind, placebo-controlled study by Aÿr and Etkinliÿi (2010), conducted with the objective of establishing the effectiveness of ultrasound therapy in cervical myofascial pain syndrome, ultrasound therapy was found to be useful in the management of cervical myofascial syndrome.

Pavkovich (2015), assessed the impact of treating new instances of acute non-specific cervical region pain by way of dry needling, and found the following: There were notable positive changes regarding pain and disability, but no significant ROM improvements, apart from right lateral flexion enhancements. Importantly, the study associated dry needling with an increased potential of resumption of daily activities, such as work devoid of additional limitations arising from pain. Dry needling was also the focus of research conducted by Shanmugam and Mathias (2017), who assessed the immediate effect of paraspinal dry needling in patients with acute facet joint, lock-induced, wry neck. Upon the application of the treatment, there was an immediate reduction in pain and an improvement in cervical spinal ROM. They concluded that paraspinal dry needling is a dependable technique when it comes to accomplishing pain free neck movements in acute facet joint, lock-induced, wry neck occurrences. Mejuto-Vázquez et al. (2014) examined the effect of applying dry needling to trigger points in acute mechanical neck pain. Their randomised clinical trial concentrated on the following specific parameters: short-term changes; widespread pressure pain sensitivity; and cervical range of motion. They found that patients who received a single session of trigger-point dry needling experienced greater improvements in various spheres, including pain, cervical ROM and pressure pain threshold (PPT), than their counterparts who did not receive this treatment. From the above-mentioned reviews, dry needling appears to be an effective technique in the treatment of acute mechanical neck pain. Also, it is evident from the literature reviewed above, that experts have largely found

combination therapy more effective than the exclusive application of any singular form of therapy in the treatment of acute NSNP and other related neck problems.

2.5.2 Effectiveness of muscle relaxation treatment methods used in the treatment of acute NSNP

Naik, et al. (2016) examined the viability of total motion release in the treatment of acute neck pain, concluding that the technique is effective in combating pain and disability and in improving the cervical spine range of motion in cases of acute neck pain. On the other hand, a study by Sharmila (2014) concluded that post-isometric relaxation, following the application of the isometric muscle energy technique, works effectively to reduce pain and disability in cases of NSNP, whether or not the neck is stretched. Javaid et al. (2016) compared the application of conventional physical therapy with or without strain counter-strain (a passive manipulation technique of painful soft tissues through a relaxed position) in patients with trigger points in the upper trapezius. Their findings show that the fusion of strain counter-strain and conventional physical therapy works well to alleviate pain and to increase functional ability and cervical ROM.

2.5.3 Effectiveness of joint mobilisation or manipulation treatment methods used in the treatment of acute NSNP

In their contribution to the effectiveness discourse regarding the treatment methods for acute neck pain, Vincent, Maigne, Fischhoff, Lanlo and Dagenais (2013) conducted a systematic review of manual therapies. They found that manual therapies contribute significantly to the management of patients with NSNP, with varying results for short- and long-term effects on the ailment. Chaudhery and Dabholkar (2017) researched the effect of spinal mobilisation with arm movement in patients with mechanical neck pain. They found spinal mobilisation with arm movements (Mulligan technique) more effective than supervised exercises to reduce pain and disability and in the improvement of functional ability.

Schomacher's (2009) randomised controlled trial examined the effect of an analgesic mobilisation technique (Maitland approach) applied at symptomatic or asymptomatic levels of the cervical spine in subjects with neck pain. His conclusion was that pre- and post-test results confirmed considerable improvements in both mobilisation techniques even though there was no

substantial variance between the two groups, and the essence of accurate symptom localisation assessments for a pain treatment. A study by Mansilla-Ferragut et al. (2009) examined the effects of a spinal thrust manipulation in women with mechanical neck pain and their results indicate that atlantoaxial joint thrust manipulation effectively increased mouth opening and PPT over a trigeminal nerve supply region in women with mechanical neck pain.

Contemporary literature on acute NSNP has also tended to coalesce around the comparison and complementarity of manipulation and mobilisation, two distinct yet closely related physiotherapy techniques. While manipulation refers to "the use of low-amplitude, high-speed manual operations that are short, precise and selective for one vertebral segment; these manipulations are applied until the normal physiological range of motion is exceeded, but without reaching the anatomical limit", mobilisation is defined as "any passive, low-speed movements directed at the vertebral segments within anatomical limits" (Martínez, 2012, P. 91).

An RCT, by Leaver et al. (2007), created a case for research to determine whether manipulation alleviates neck pain faster than mobilisation. According to Leaver et al. (2007), when clinicians develop a greater understanding of the advantages of neck manipulation as a treatment technique, they will be in a better position, not only to diagnose the ailment, but also to formulate and implement policy to inform the approach taken to handle the condition in general. Whilst noting the increased concurrent use of both manipulation and mobilisation in contemporary physiotherapy practice, Gross et al. (2010) examined whether the two techniques contribute to pain reduction, increased function or reduction in disability, quality of life (QoL), patient satisfaction and global perceived effect (GPE) in adults presenting with neck pain. Their study, a blend of computer research and randomised trials, found the following: firstly, the two techniques – cervical manipulation and mobilisation – yielded comparable positive results in patients in terms of pain, function and satisfaction, in the intermediate-term; secondly, though not significantly, their results showed that, relative to the typical control side, cervical manipulation produces more meaningful short-term pain relief; and, thirdly, there is some evidence to suggest that, in cases of acute neck pain, thoracic manipulation increases function and reduces pain. On the other hand, in the case of chronic neck pain, the pain reduction is faster, for it occurs almost instantly. They concluded that future studies should attempt to establish the

ideal techniques and dosage in the management of neck pain. Ganesh et al. (2015) have examined the effectiveness of the combined use of mobilisation and exercise in the treatment of mechanical neck pain. They did not find any evidence to suggest that manual therapy is better than supervised exercise when it comes to the reduction of pain and disability and the improvement of ROM. From these findings, it is evident that both techniques are effective, though manipulation may yield faster results, especially in a scenario of limited treatment duration.

The contribution of González-Iglesias et al. (2009) epitomises physiotherapy practice that advocates the simultaneous use of manipulation or mobilisation and other appropriate, related techniques to address neck pain. They examined the effect of fusing thoracic spine thrust manipulation with electrotherapy (a thermal programme) in the attempt to manage patients presenting with acute mechanical neck pain. They came to the conclusion that this particular blend is helpful in pain and disability reduction, and in the improvement of patient cervical spine ROM. In their quest to ascertain the effectiveness of manipulation and/or mobilisation, Naidu and Ramteke (2016) employed a strategy that contrasted the results of the exclusive application of conventional treatment, with those of two techniques – the combination of cervical and thoracic spine mobilisation or manipulation, and conventional treatment – in mechanical neck pain patients. They come to the conclusion that both approaches are similarly helpful.

In their assessment of subjects presenting with mechanical neck pain, Fernandez-de-Las-Penas, Alonso-Blanco and Miangolarra (2007) examined the effects of a single application of thoracic spinal manipulation. Their focus was on the outcomes of the treatment on pain and active cervical ROM. They found that thoracic manipulation profoundly reduces pain at rest, immediately, or within a period of two days, following its application. A randomised, placebo-controlled trial by Yung et al. (2017) examined the immediate cardiovascular response to joint mobilisation of the neck with a focus on pain-free adults. It found that the intervention results in a temporary, almost negligible reduction in systolic blood pressure.

Snodgrass, Cleland, Haskins and Rivett (2014) conducted a systematic review to investigate the clinical utility of cervical ROM in the diagnosis, prognosis and evaluation of the effects of

manipulation. They found very little evidence for the importance of cervical ROM in diagnosing spine injury, cervical radiculopathy, and cervicogenic headaches. They also found a direct correlation between ROM and treatment outcomes: the greater the ROM, the more positive the treatment outcome. Finally, they found no definitive evidence of the effects of mobilisation or manipulation on cervical ROM. Although they acknowledged that cervical ROM is an important assessment tool in neck pain diagnosis and treatment, they found it substantially inadequate as an informative component in clinical practice.

A study by Saavedra-Hernández et al. (2011) sought to identify prognostic factors which indicate that patients suffering from mechanical neck pain will achieve short-term success with manipulative interventions applied to the cervical and thoracic spine. The study was conceptualised around the following five variables: i) pain intensity greater than 4.5 on a Numerical Pain Rating Scale (NPRS) with an upper limit of 10; ii) cervical extension less than 46-degree ROM; iii) hypomobility at T1 vertebra; iv) a negative upper limb tension test; and v) female sex. The study found the following: the presence of four of the five aforementioned variables increased the likelihood of success appreciably from about 60% to 75%. The probability of success remained consistent at about 75% in the presence of all five variables. A study by Bowler, Browning and Lascurain-Aguirrebena (2017) examined the effects of cervical sustained natural apophyseal glides (SNAGs) on neck range of movement and sympathetic nervous system activity. According to the study findings, sustained NAGs improve cervical ROM as well as the skin condition. In a closely related study, Gong (2015) set out to examine how Manipulation Based on Passive Motion Analysis (MBPMA) affects the following three elements in a population of university students: cervical lordosis, forward head posture (FHP), and cervical ROM in adults with abnormal posture of the cervical spine. Gong's (2015) study found MBPMA helpful in achieving positive corrective outcomes in each of the three scenarios.

The contribution of Huisman, Speksnijder and De Wijer (2013), which concludes this particular sub-section, investigated the effects of thoracic spine manipulation (TSM) on pain and disability in patients with NSNP and found the intervention more beneficial than electrotherapy/thermal programmes, spinal mobilisation, and exercises, in some patients. They did find evidence to

support the assumption that TSM was more effective at pain reduction and ability restoration compared to cervical spine manipulation.

2.5.4 Effectiveness of a combination of joint mobilisation or manipulation treatment methods and exercises in the treatment of acute NSNP

Hidalgo et al. (2017), who examined the value of manual therapy and exercise in the treatment of NSNP, concluded that the combination of various types of manual therapy with exercise yields better results than the exclusive use of either technique. Ali, Shakil-ur-Rehman and Sibtain's (2014) study also strongly supports combination therapy. They found that the application of natural apophyseal glides (NAGs) followed by isometric exercise training (IEP) is more effective in reducing pain and enhancing function as opposed to the exclusive application of NAGs.

Hurwitz et al. (2009) sought to find out whether manual therapies and exercise are more efficient at addressing neck pain than alternative therapies. They also found that combination therapy, in this case the mixture of low-laser therapy, manual therapy and supervised exercise, is effective. However, they called for more research that may contribute towards further assessing their findings. In a closely related study, Ganesh et al. (2015) compared the usefulness of joint mobilisation therapy and exercises in the treatment of mechanical neck pain. Their research compared Maitland and Mulligan's mobilisation with exercises on three aspects of patients presenting with mechanical neck pain: pain response; range of motion (ROM); and functional ability. They did not find any evidence to suggest that manual therapy is better than supervised exercises at addressing the aforementioned three health concerns. These findings support the emerging trend in the studies discussed so far in this review; that a combination of techniques in the treatment of acute NSNP yields more substantive results in relieving neck pain.

2.5.5 Effectiveness of medication in the treatment of acute NSNP

In a randomised, double-blind, placebo-controlled study, Predel et al. (2013) examined the efficacy and safety of diclofenac diethylamine (DDEA) 1.16% gel in the treatment of acute neck pain and found the gel effective and well-tolerated. Besides reducing pain, the gel improves the functioning of the neck. On the other hand, the work of Slaven et al. (2013) on spinal joint pain examined the effects of a single session of joint mobilisation on pain and range of motion. They found that painful movement as well as pain at rest could be reduced by one session of joint

mobilisation. A systematic review conducted by Louw et al. (2017) examined the effectiveness of exercise therapy among office workers with neck pain. Although their work found level II evidence[2] of the effectiveness of strengthening exercises as a means of treating neck pain and improving the quality of life, they nonetheless felt that endurance and stretching exercises required further exploration for their effects to be better understood. A closely related study by Zronek et al. (2016) concerned with the influence of home exercise programmes (HEPs) for patients with neck pain associated with whiplash, non-specific or neck pain with or without radiculopathy, found the following: HEPs, whose focal point is strength, endurance and self-mobilisation, yield positive results when used exclusively or together with other conventional treatments. Also, HEPs effectively reduce neck pain and disability, thereby improving quality of life. Although there is evidence that the application of single modes of intervention can yield positive results, the conviction of experts who have taken this approach is not as definitive as the one displayed by those who have applied a multi-modal approach to treating NSNP. There is certainly an element of uncertainty in the conclusions of singular mode studies, which often call for follow-up studies even in instances where their results are positive.

But the scholarship on acute NSNP cannot be confined to a juxtaposition of the single and multi-modal approaches. Indeed, some studies on NSNP are unique, sometimes complex, and exhibit interesting and nuanced approaches to the alleviation of the condition. A study by Leininger, Evans and Bronfort (2014), for instance, explored satisfaction levels among patients. The study was essentially a randomised controlled trial (RCT) that compared patients' views on three treatment techniques (therapies), namely, spinal manipulation therapy (SMT), home exercise with advice (HEA) and medication (MED)[3]. The study found the following: (i) "individuals receiving SMT or HEA were more satisfied with the information and general care received than MED group participants" and, (ii) "SMT and HEA groups reported similar satisfaction with information provided during treatment. However, the SMT group was more satisfied with general care" (Leininger, Evans, & Bronfort, 2014, p. 593). These findings partly mirror those of Kaka and Ogwumike (2015), who investigated the effect of neck exercises on various aspects of

[2] Burns, Rohrich and Chung (2011) have stratified level II evidence into two segments and defined it as follows: Level 2a evidence is evidence obtained from a well-designed cohort or case study; on the other hand, Level 2b evidence is evidence derived from time series comparisons or dramatic results from uncontrolled studies or small RCTs with unclear results.

[3] These authors used the acronym "MED" to represent medication in their study.

NSNP including neck pain, disability, and fear avoidance beliefs in patients presenting with the condition. Kaka and Ogwumike (2015) concluded that "stabilisation exercises alone, as well as stabilisation plus dynamic or dynamic exercises, are effective in reducing pain, disability and fear avoidance beliefs in patients with non-specific neck pain" (p.17). Finally, there is the contribution of Yip and Tse (2006), who conducted an experimental study to assess the effectiveness of acupressure with aromatic lavender essential oil in the treatment of sub-acute NSNP. Conducted in Hong Kong, this study found that "eight sessions of acupressure with aromatic lavender oil were an effective method for short-term neck pain relief" (Yip & Tse, 2006, p. 18). Such is the exciting and complex nature of contemporary scholarly work on the effectiveness of treatment methods or therapies for neck pain. The following section discusses another dominant theme established by this research in the domain of NSNP, that is, the comparison of treatment methods for acute NSNP.

2.5.6 Comparison of treatment methods for acute NSNP

Another trend in contemporary scholarship on neck pain is the concentration by scholars on the comparison between treatment methods for acute NSNP. Verhagen et al. (2010) assessed the relationship between patient recovery and clinical factors at baseline in NSNP patients. To begin with, they found a correlation between the seriousness of the main complaint (and/or catastrophising) and treatment. Secondly, they found that manual therapy is better poised to address NSNP as opposed to physiotherapy as the acuteness or catastrophising increases. They concluded that "increased pain severity or catastrophising at baseline increased the chance of treatment success after manual therapy compared to physiotherapy"[4] and "severity of main complaint and catastrophising seem to modify treatment success" (Verhagen et al., 2010, p. 267). The latter finding, especially, tells us that a patient's perception of pain may affect the rate of healing following treatment. Accordingly, in devising a treatment protocol for acute NSNP, it is imperative that researchers consider the fact that the patient's brain may impede treatment success. Therefore, the management of patients who present with acute NSNP must consider psychological factors. Contemporary research on neck pain appears to be cognisant of this fact. Amongst other things, a biopsychosocial review conducted by Lumley et al. (2011), defined pain in a multidimensional way. Firstly, it stated that the phenomenon can be considered to refer to

[4] In this context, manual therapy represents hands-on or use of the hands to deliver the treatment whereas physiotherapy in general also includes exercises and other physical modalities.

unpleasant physical feelings caused by physical trauma, when the nervous system is compromised. Then, it brought in a second element, seeing pain as psychogenic in nature, that is, involving issues such as emotional life experiences, empathy, and social isolation, all of which stimulate the pain mechanisms in the brain. It has been argued that cognitive or emotional circumstances can play a significant role in causing neck specific disability. Accordingly, issues such as depression and anxiety, or pain catastrophising, may possibly contribute towards the progression of milder forms of structural pathology into disability (Walton, Balsor, & Etruw, 2012). And, a recent study, conducted by Cunningham, Kashikar-Zuck and Coghill (2019), has stated that psychological therapies, such as cognitive behavioural therapy, (CBT) are an important treatment component and that, when used, these approaches have been shown to reduce pain and improve functional activities in patients. These approaches include reducing catastrophic thinking about pain, increasing self-efficacy, mindfulness, anxiety symptom reduction, relaxation, and behavioural activation strategies to improve coping with pain and pain-related functioning. Furthermore, such strategies have the potential to normalise regional hyper activation and reduce hyper connectivity in brain regions associated with nociceptive processing, cognition, and emotion (Cunningham, Kashikar-Zuck, & Coghill, 2019).

Brockow, Heißner, Franke and Resch's (2008) study compared the efficiencies of subcutaneous carbon dioxide insufflations and sham ultrasound in the treatment of patients suffering from acute NSNP. Their results showed that the effectiveness of the two approaches to treatment is almost equivalent, but that sham ultrasound had a slight advantage over subcutaneous carbon dioxide insufflations. Also, to a large extent, both methods take a similar time period to relieve neck pain. An RCT carried out by Puentedura et al. (2011) compared thoracic spine Thrust Joint Manipulation (TJM) with cervical TJM in the treatment of patients with acute NSNP and found that the combination of cervical TJM and exercise yields profoundly better results than the duo of thoracic TJM and exercise in terms of the reduction of pain and disability. Still in this broad comparison category, an RCT by Saayman et al. (2011) comparatively assessed the effectiveness of joint manipulation therapy and low-level laser therapy (LLLT) in the management of patients with cervical facet dysfunction. The randomised trial comprised three treatment options: manual therapy of the cervical spine; LLLT applied to the cervical facet joints; and a combination of manual therapy and LLLT. Each patient was treated through exclusive application of one of the

three interventions. While improvements were noted in each of the three groups, combination therapy yielded better results than the exclusive application of either technique. Also, the two therapies proved beneficial in the treatment of facet dysfunction. Another study compared the effects of muscle energy technique (MET) and ischaemic compression (IC) on pain, cervical ROM and PPT, with a focus on upper trapezius trigger point in subjects with NSNP (Shah & Shah, 2015). Shah and Shah (2015) found both treatments effective insofar as pain reduction and the improvement of PPT and ROM were concerned. Moreover, their findings indicated that IC seemed to be more effective at improving PPT as opposed to MET. Also, the visual analogue scale (VAS) score difference between the two groups was negligible, and they found MET more useful at improving ROM than IC. In another study, Hussain, Ahmad, Amjad, Shafi and Shahid (2016) compared the effectiveness of NAGs (mobilisation of Mulligan) with Grade I and II Maitland mobilisation in patients with NSNP. They concluded that the former was more efficient in the reduction of neck pain and disability.

So far (as depicted by the above-mentioned studies), the current state of evidence for the effectiveness of physiotherapy treatment for patients with acute NSNP can be summarised as follows:

- Manual therapy (hands-on) outperforms physiotherapy (exercises and other physical modalities) in addressing NSNP as the acuteness or catastrophising increases.
- Sham ultrasound yields better results, albeit only slightly, compared to subcutaneous carbon dioxide insufflations.
- A combination of cervical TJM and exercise is considerably better than approaches that mix thoracic TJM and exercise in yielding improvements in pain and disability.
- Manual therapy, combined with LLLT, is more effective than either of the two modalities on its own.
- Compared to MET, IC is more effective at improving PPT.
- Mulligan (NAGS) cervical spine mobilisation yields better results than Maitland Grade I and II cervical spine mobilisation.

Evidently, different methods yield different results at different paces (various rates of application). Moreover, the myriad approaches at the disposal of the physiotherapist may put the

latter in a dilemma of choice in cases where defined treatment protocols are non-existent. No single protocol (tested or untested, empirical or anecdotal) can be proffered as the most superior at addressing a health condition such as neck pain. Nonetheless, in the interest of all stakeholders, patients, therapists and policymakers alike, tested approaches may be considered ideal for they may help overcome the confines of cost, ambiguity, and urgency, and pave the way further for more improvements based on empirical observations. Hence the need for a study such as this.

Similar research, which focuses on the comparison of treatment methods for acute NSNP, abounds (Breed, Van Rooijen, & Marais, 2014; Cleland et al., 2007; Creighton, Gruca, Marsh, & Murphy, 2014; De Meulemeester et al., 2017; Deepa, Dabholkar, & Yardi, 2014; Metgud & Kapila, 2015). In their study of patients with mechanical neck pain, for example, Deepa, Dabholkar and Yardi (2014) compared the efficiency of Maitland thoracic mobilisation and deep neck flexor (DNF) endurance training with only DNF endurance training on cervical range of motion (CROM), NPRS and NDI. Their findings indicated that Maitland thoracic mobilisation is more effective than (DNF) endurance training and that the combination of the two therapies achieves greater results with respect to pain reduction, and the improvement of cervical lateral flexion and rotation ROM. Interestingly, they found that the two options were equally effective in increasing cervical sagittal mobility and alleviating neck disability. Cleland et al.'s (2007) RCT, centred on patients presenting with mechanical neck pain, compared the efficacy of thoracic spine thrust manipulation to that of non-thrust manipulation. It found that, concerning short-term pain and disability reduction, thoracic spine thrust manipulation yields far greater results than thoracic non-thrust manipulation. Another RCT by Metgud and Kapila (2015) studied the treatment of acute trapezitis through therapeutic ultrasound and compared the following two transmission mediums: an extract of ilex paraguariensis (Biofreeze gel) and Diclofenac sodium gel. It concluded that, while both transmission mechanisms were considerably effective, Biofreeze gel yielded better results than Diclofenal sodium gel. De Meulemeester et al. (2017) compared the effects of dry needling (DN) to those of manual pressure (MP) technique on pain, disability and muscle characteristics. Their research centred on women presenting with myofascial neck and shoulder pain. According to their findings, both techniques yield short- and long-term benefits, and none is superior to the other. Finally, a retrospective study by Breed, Van Rooijen and Marais (2014) compared joint mobilisation with

mechanical traction in the treatment of NSNP in adult patients. They found that, when combined with exercise and short tissue mobilisation, joint mobilisation yielded far better results than mechanical traction.

Again, from the above-mentioned studies, the current state of evidence for the effectiveness of physiotherapy treatment for acute NSNP can be summarised as follows:

i. Maitland thoracic mobilisation may be more effective at addressing NSNP than deep neck flexor (DNF) endurance training (Deepa, Dabholkar, & Yardi, 2014).
ii. In terms of short-term pain and disability reduction, thoracic spine thrust manipulation may perform better than thoracic non-thrust manipulation (Cleland et al., 2007).
iii. Although almost equally effective, Biofreeze gel may be better than Diclofenal sodium gel at addressing neck pain (Metgud & Kapila, 2015).
iv. In terms of positive short- and long-term treatment effects, DN and MP technique may be equally effective (De Meulemeester et al., 2017).
v. Joint mobilisation combined with exercise and soft tissue mobilisation may yield better results compared to mechanical traction in cases of NSNP (Breed, Van Rooijen, & Marais, 2014).

In summary, researchers have compared the effectiveness of many treatment techniques in the treatment of patients with NSNP. Their primary finding is that combined or multimodal therapy is better at reducing pain and disability than the exclusive application of a single therapy (Saayman et al., 2011; Puentedura et al., 2011; Hidalgo et al., 2017).

2.5.7 Other less dominant themes on acute NSNP

Scholarship regarding neck pain remains fluid and is continuously evolving as researchers look for better and more effective ways to approach the condition. Accordingly, other approaches are increasingly emerging. This sub-section discusses some of the less dominant and emergent research in the sphere of acute NSNP and paves the way for a summary of the research trends pertaining to acute NSNP that have been covered in this chapter.

2.5.7.1 Progressive concern over new episodes of neck pain

Progressive concern over new episodes of acute NSNP is discernible in the literature on neck pain (Leaver et al., 2013a; Leaver et al., 2013b; McLean, May, Klaber-Moffett, Sharp, & Gardiner, 2010, Wirth, Humphreys, & Peterson, 2016). Leaver et al. (2013a), for instance, reported on the demographic and clinical characteristics of patients seeking manual therapy for new episodes of NSNP. According to their findings, the following symptoms are often present in patients presenting with new episodes of acute NSNP: upper limb pain; headache; upper back pain; lower back pain; dizziness; and nausea. They also found that there is a higher likelihood of the occurrence of functional disability as pain increases in patients suffering from acute NSNP. Their findings also show that neck manipulation is appropriate for those new episodes of neck pain in which the pain and disability levels are high and accompanied by related symptoms. In another closely related study, Leaver et al. (2013b) investigated the clinical course of new episodes of NSNP in patients treated with multimodal physical therapies in primary care settings. Their observational study, which investigated clinical and demographic characteristics as potential predictors of recovery, yielded the following results, among others: i) over half of the study's participants reported absolute recovery before three months had lapsed; ii) there was significant reduction in pain at the end of three months; and iii) disability reduced remarkably after three months. Leaver et al. (2013b) concluded that new, severe episodes of neck pain react very positively to physical treatment forms. They also noted that, despite the fact that close to half of patients with neck pain do not fully recover within three months, the pain that persists after this period of treatment is, typically, not a concern for the patient.

2.5.7.2 Psychological factors pertaining to neck pain

It has been argued that early phase interventions on patients with acute non-specific neck pain are paramount in the mitigation of psychological factors such as persistent anxiety, depression, high levels of pain, fear-avoidance beliefs, and unfavourable work environments, which may lead to poor prognoses and delays in self-reported recoveries, which may contribute to the transition from acuteness to chronicity (Basson, Olivier, & Rushton, 2019; Wirth, Humphreys & Peterson, 2016). Furthermore, according to the biopsychosocial model, pain is not essentially caused by contributing pathology, but can continue after the initial impairment has been alleviated. Thus, psychological and social influences are worthwhile to consider in the

improvement and maintenance of complaints (Vonk, Verhagen, Geilen, Vos & Koes, 2004). Behavioural therapies acknowledge that maladaptive behaviours are learned and consequently, can be adapted to new learning practices. This can be done by explaining the nature of the pain to the patient and reassuring them that it is advisable to increase the level of activities they engage in in order to promote healing (Vonk, Verhagen, Geilen, Vos, & Koes, 2004).

A study by Wirth, Humphreys and Peterson (2016) delved into the importance of psychological factors pertaining to recovery from inaugural episodes of acute NSNP. According to this study, psychological factors, such as fear, anxiety and depression are prominent in the early stages of acute neck pain. If left unaddressed, anxiety and depression may lead to chronic pain. Accordingly, these psychological factors should inform early management efforts in the attempt to address new episodes of neck pain. The points raised above highlight the need for contemporary research in the domain of neck pain to consider psychological factors.

2.5.7.3 Barriers to effective treatment of neck pain

Whilst decrying sub-standard management of acute pain, Sinatra (2010) examined barriers to effective treatment. According to Sinatra (2010), the following factors impede efficient treatment of acute neck pain: educational inadequacies and improper attitudes on the part of both physicians and patients; and inherent shortcomings in the treatment techniques available to therapists. Ashwini, Karvannan and Prem (2018) attributed neck pain to computer use, which is associated with prolonged static or awkward work postures. They concluded that exercise therapy, continuously administered for a month, effectively relieves pain and reduces dysfunction in computer users with mechanical neck pain. Exercise therapy is, therefore, appropriate for application in cases of scapular impairment syndrome. Amongst researchers who believe in education and professional development as contributors to better management of neck pain, Cleland et al. (2009) has argued that overall clinical performance and treatment outcomes could be improved through continued education on the part of physiotherapists. Cleland et al. (2009) found a direct correlation between higher levels of therapist education and training, and improvements in the area of disability. They concluded by stressing the value of ongoing training, linking it to reduced visitations to the therapist by patients with neck pain.

A similar study by Iles and Davidson (2006) analysed Australian graduate physiotherapists, in both the private and public sectors, with a special focus on their levels of training and work experience. The results of their study were as follows: firstly, whereas new graduates thought of themselves as being in possession of relatively considerable evidence-based practice skills, it is their experienced counterparts who performed more evidence-based tasks; secondly, highly trained physiotherapists consulted search databases more regularly, as part of their continuing professional development; and thirdly, practitioners in both private and public hospitals considered themselves equally prepared in terms of evidence-based practice skills and engaged in evidence-based activities on an equal basis, in terms of regularity. Iles and Davidson (2006) reached the following two main conclusions: firstly, there is generally an appreciation for evidence-based practice; and secondly, the major barriers to evidence-based practice in the field of physiotherapy include time, lack of access to evidence, deficient database search skills, and lack of sufficient analytical ability. The lack of consensus on the relationship between the level of education of the physiotherapist and the nature of the treatment outcome calls for more research in the neck pain sphere.

2.5.7.4 Prognostication, diagnosis, and recovery aspects of neck pain

Prognostication, diagnosis and recovery from acute NSNP are also among the strong emergent themes in this research sphere. Hush, Lin, Michaleff, Verhagen and Refshauge (2011), for instance, have conducted a systematic review and meta-analysis on the prognosis of acute NSNP and disability. They found evidence to suggest that the likelihood of suffering from acute idiopathic neck pain is far greater than previously thought. Although they acknowledge that the use of evidence is a crucial factor in clinical diagnostic practice, they nonetheless contend that there remains a need for further research to better understand diagnostic factors and the long-term outcomes of treatment. Concerned with the identification of prognostication factors for recovery and sick leave, similar research by Vos et al. (2008) set out to explain the natural course taken by patients presenting with acute NSNP. The research found that, despite a favourable prognosis for most patients with acute NSNP, there remains a considerable portion of the latter who still report pain in the duration of one year following treatment.

Wingbermühle et al. (2018) designed a systematic review to evaluate multivariable prognostic models for recovery in patients with NSNP undergoing primary care. Their evaluation focused on the following three variables: pain reduction; reduced disability; and, perceived recovery (short- and long-term). Of the 53 models evaluated by Wingbermühle et al. (2018), only three were deemed to be practical, owing to their low levels of bias. However, even among this promising trio of models, two exhibited noticeable subjective elements of predicting recovery in people with neck pain. Nonetheless, they concluded that the three models identified as feasible in their study should be subjected to further research before, they could be validated fully and adopted for wider clinical use (Wingbermühle et al., 2018). Generally, from the above-mentioned studies, it can be concluded that the prognosis, diagnosis and recovery aspects of acute NSNP have not been exhaustively identified and fully understood, necessitating the need for more research in the sphere of acute NSNP.

2.5.7.5 A cluster of three themes: Management, conservative treatments, and lifestyle factors

The final set of emergent scholarship is built around the following less dominant three themes: management of acute NSNP; conservative treatments for acute NSNP; and, lifestyle risk factors (see, for examples, Fernández-de-las-Peñas, Alonso-Blanco, Alguacil-Diego, & Miangolarra-Page, 2007; Johnston, 2016; Jun, Zoe, Johnston, & O'Leary, 2017; Spearing et al., 2005; Vernon, Humphreys, & Hagino, 2005; Vos et al., 2008). In their assessment of the management of acute musculoskeletal pain Spearing et al. (2005) have argued that the occurrence of chronic pain could be avoided through proper management of acute pain. Centred on the following five specific conditions – acute low back pain, acute thoracic spinal pain, acute neck pain, acute shoulder pain and anterior knee pain – they summarised evidence from Australia and reached the following broad conclusion: in most instances, when managed properly, acute musculoskeletal pain will not develop into chronic pain. They recommended the following: the adoption of a partnership approach between therapists and patients, reinforced by clear, effective communication that yields understanding on the part of the latter. And therapists should ensure that appropriate clinical assessments are carried out. Besides efficient communication between therapists and patients, other elements that would ensure effective management of neck and other

forms of musculoskeletal pain include customised treatment, the provision of reassurance and information, and the encouragement of early resumption of the normal activity of daily living.

Johnston's (2016) survey and clinical assessment examined the impact of neck pain among office workers and the strategies employed by this group to manage the condition while working. Johnston (2016) found that the severity of the condition was inversely related to its impact; while the intensity of the pain felt was low, its effect on work and leisure was considerable. Moreover, the women office workers in this particular study attended to the pain themselves by either reducing their workload or involvement in leisure activity. They also made use of other passive coping strategies to continue working in spite of the pain. A prospective study carried out by Vos et al. (2007) evaluated the management of acute neck pain in general practice (GP). Besides the objective of detailing the diagnostic and therapeutic trends amongst GPs and safe-care patients, the study sought to describe how GPs manage acute NSNP. Vos et al.'s (2007) research yielded insightful findings and knowledge concerning the approach taken by GPs when attending to patients presenting with acute NSNP. At the onset, for instance, GPs prescribe medication for about two-fifths of their patients (nonsteroidal anti-inflammatory drugs or muscle relaxation medication) and about half are referred to a physiotherapist. They also found that, on most occasions, the GP advises neck pain patients to either wait and see, improve their posture, or take a rest, respectively (Vos et al., 2007).

In summary, the evidence-base for work-related acute neck pain interventions discussed in this sub-section is as follows:

i. The severity of work-related acute NSNP has been found to be inversely related to its impact; while the intensity of the pain felt could be low, its effect on work and leisure is often considerable.
ii. The adoption of a partnership approach between therapists and patients, reinforced by clear, effective communication that yields understanding on the part of the latter.
iii. Women office workers presenting with work-related NSNP prefer to attend to the pain themselves by either reducing their workload or through involvement in leisure activity.

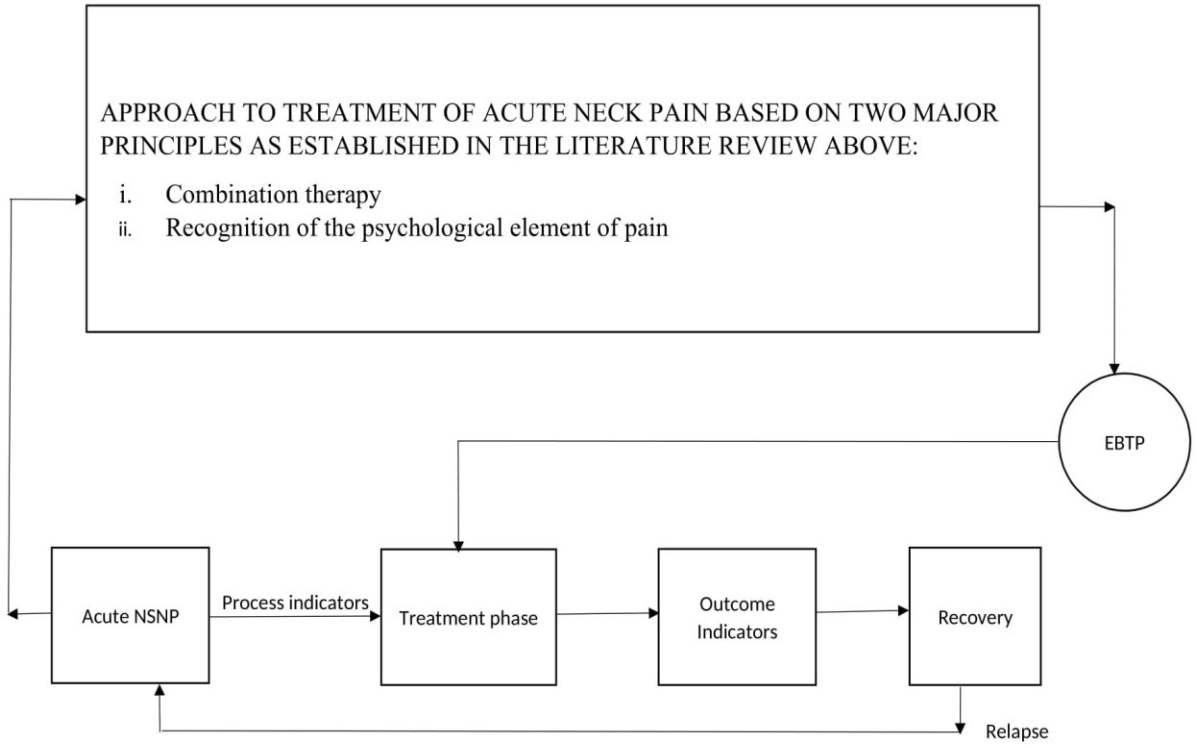
They also employ other passive coping strategies to continue working in spite of their pain.

iv. Successful management of acute pain is paramount if chronic pain conditions are to be avoided.

v. When managed properly, acute musculoskeletal pain, in most instances, will not develop into chronic pain.

2.6 Conceptual framework

Owing to the lack of firm or established acute NSNP theories in contemporary scholarship, the researcher found the trends discussed in this chapter, and the evidence-base on acute neck pain arising from it, to be crucial in informing and formulating a conceptual framework to guide the study (see Figure 2.3 below).



KEY: Process indicators (Diagnostic phase) = History taking; physical examination; analysis and conclusion;

Outcome indicators include the following: post-treatment neck pain, disability and QoL; EBTP = Evidence-based treatment protocol.

Figure 2.3: The conceptual framework

Fundamentally, borrowing from the insights discussed in this chapter, the conceptual framework outlined in Figure 2.3 above acknowledges combination therapy, for it features strongly as a

viable approach to treatment in literature on neck pain. Evidence, as depicted in this chapter, shows that multimodal treatment outperforms singular treatment in terms of efficiency and outcome. Also, the generated framework considers the psychological aspect of pain, which may have escaped therapists before, but is now gaining traction, as being crucial to the treatment process. Accordingly, the aforementioned two elements have contributed to informing the structure of the EBTP presented in Chapter 6.

2.7 Summary of the chapter

This chapter has presented a more comprehensive contextual background on the organisation of physiotherapy practice in Ethiopia and given an outline of healthcare policy in the African country. It has also provided an overview of scholarship on neck pain in Ethiopia. Additionally, it has examined and analysed the current scholarly work and analytical trends on neck pain generally, and on acute NSNP in particular. It has presented the review systematically by thoroughly scrutinising the contemporary literature on acute NSNP. This was followed by a summary of the research trends pertaining to acute NSNP. Finally, the conceptual framework, which derived from the review itself, and guided this study, was presented.

The examination of contemporary literature on acute NSNP has revealed three dominant themes in the field. They are the following: The effectiveness of treatment methods employed in addressing acute NSNP has been a major concern to several researchers in this sphere. Many scholars have assessed the effectiveness of various treatment techniques, including neurostimulation therapy, different types of manual and exercise therapies, and conventional physical therapy, among others. Likewise, the effectiveness of singular therapy has been assessed by scholars of neck pain. Single modes of physiotherapy treatment on patients with acute NSNP, such as dry needling, and low-level laser therapy (LLLT), are dominant in neck pain studies.

Joint mobilisation and manipulation are very well presented in the neck pain research literature. Many investigations have been done on these two discrete techniques to establish which technique works better to improve pain, function/disability, patient satisfaction, and quality of life. Various studies have also sought to determine whether manipulation alleviates neck pain

faster than mobilisation or vice versa. Also, amongst the numerous insights emanating from this literature review, perhaps the most crucial observations have been the following: firstly, combination therapy works better than singular therapy in the treatment of acute NSNP. Secondly, neck pain research is increasingly beginning to identify the psychological aspects associated with the condition. These fundamental findings have contributed to informing the conceptual framework crafted to guide this study, illustrated in Figure 2.3 above.

It is also noteworthy that the abundant research discussed in this literature review has occurred in the context of the Western or developed world. Indeed, insights from emerging economies are conspicuous by their absence. Juxtaposing findings from developed countries, with knowledge obtained from similar research carried out in countries whose resource bases are relatively challenged, such as Ethiopia, would enable generalisations. It is hoped that the outcome of this research presents a platform for such comparisons to be made. Chapter 3 describes the research methodology that was employed to meet the study objectives.

Chapter 3

Methodology

3.1 Introduction

This chapter discusses the research methodology that was employed to meet the objectives of this study. It begins with a detailed description of the research design that was adopted for the study. Then it discusses each of the four components of the design adopted, that is, the survey, the systematic review, the e-Delphi study, and the feasibility study, giving specifics of the methods, steps and procedures that were followed to obtain data for the study. The chapter ends with a summary of the overarching methodology of the current study.

3.2 Research method and design

This study employed a mixed methods research design (MMR). This is "an approach … in which the investigator gathers both quantitative (close-ended responses) and qualitative (open-ended responses) data, integrates the two, and then draws interpretations based on the combined strengths of both sets of data to understand research problems" (Creswell, 2015, p. 2). The study employed an explanatory sequential mixed methods research design, as depicted in figure 3.1 below.

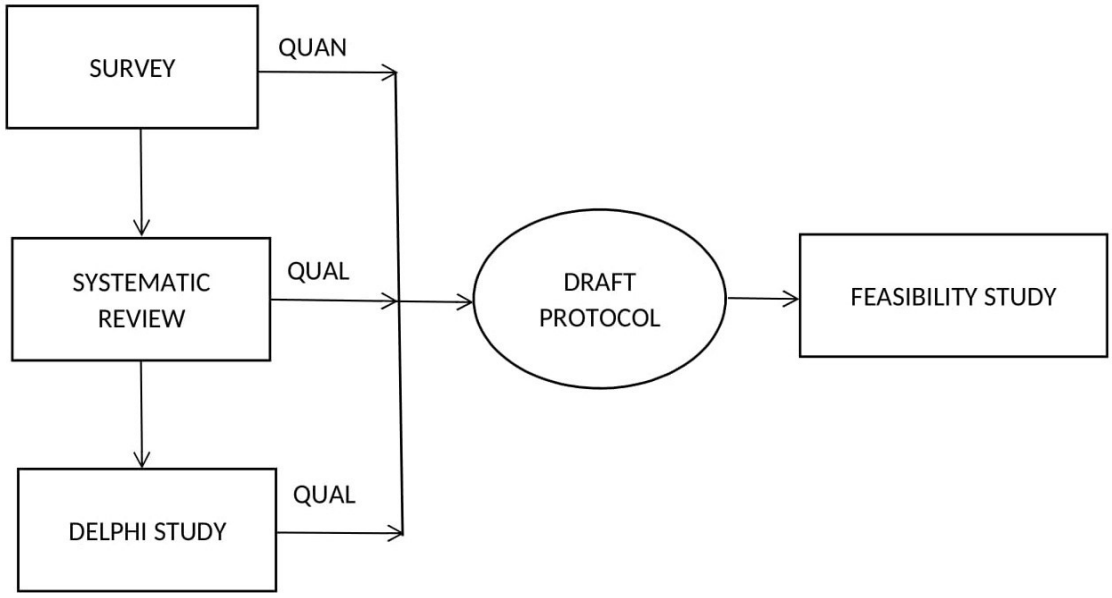


Figure 3.1: The research design

An explanatory sequential design, according to Creswell (2015, p. 6), "first use[s] quantitative methods and then use[s] qualitative methods to help explain the quantitative results in more depth." As depicted in Figure 3.1 above, the study began with a quantitative survey to establish common practices for effective treatment of NSNP according to the opinion of a subset of Ethiopian physiotherapists. This survey data was then used to establish how common practice in Ethiopia compares to global, contemporary best practice, by moving to a second phase – a systematic review – the purpose of which was to identify the best evidence on the effectiveness of treatment protocols used by physiotherapists, worldwide, for patients with acute NSNP. This was followed by a third phase, an e-Delphi study, aimed at refining the findings of the survey and the systematic review, which, in the process, yielded an initial draft of an evidence-based treatment protocol (EBTP). This treatment protocol was then subjected to a feasibility study, the fourth and final phase of the project.

3.3 Rationale for the explanatory sequential MMR design

The main aim of this study was to develop, through an empirical process, an EBTP for patients presenting with acute NSNP. For this to be accomplished, it was inevitable that this research would have to pass through various distinct stages in order to incorporate the views of various stakeholders. Indeed, in carrying out this study, the researcher had to seek out and rely on comments, views and responses of the following colleagues: physiotherapists in Ethiopia and in other countries; expert physiotherapists in Africa; and the therapists who implemented the draft protocol during the feasibility study. The aforementioned realities made it necessary for the researcher to employ an explanatory sequential MMR design for this "is the most straightforward design that lends itself to emergent approaches where the second [or subsequent] phase[s] can be designed based on what is learned from the initial quantitative phase" (Creswell & Plano, 2011, p. 83).

A further rationale for using this particular MMR design stems from the fact that neither quantitative nor qualitative methods would be sufficient by themselves to capture the trends and details around the management of patients presenting with acute NSNP. The combination of quantitative and qualitative research made it possible for the researcher to obtain two different outlooks: one drawn from closed-ended response data (quantitative) and one drawn from open-

ended data (qualitative) (Creswell & Plano, 2011, p, 304). Indeed, the MMR adds quantitative information details about setting, place, and qualitative information such as context of personal experiences (Creswell, 2015, pp. 14–15). Furthermore, in this research, the collection of data, its analysis, and interpretation, were carried out separately during each distinct phase. Although inferences were drawn after each stage, the final treatment protocol, tested for feasibility, was the product of a combination of each of the first three stages' findings. This was informed and facilitated by the tenets of the explanatory sequential MMR design (Creswell & Plano, 2011, p. 237). Having specified the research methodology and design adopted for this study, the nature and procedures of each distinct stage of the research carried out to develop a treatment protocol for acute NSNP is outlined.

3.4 Phase 1: Survey of physiotherapists

This survey phase of the study was conducted to meet the objective of establishing the current practices and patterns around the modalities and techniques used by physiotherapists to treat patients with acute NSNP in Ethiopia. This was done to shed light on the preferred treatment methods for the condition among the country's physiotherapists. Furthermore, the survey was conducted to generate profile data for physiotherapists which, in the process, helped the researcher to begin drafting an outline of an initial draft treatment protocol. As various scholars and experts have argued (see, for example, Doehring, Durno, Pakenham, Versi, & DePaul, 2016), current evidence-based practice should not mask the value gained from practice-based evidence, which is what this survey aimed to provide. Accordingly, existing physiotherapy practice and additional research will help to inform the direction of future knowledge translation. Certainly, it is wise to employ previous informally identify experiences for a critical appraisal of the current evidence as they are closely interrelated with one another for decision-making (Nibbelink, & Brewer, 2018, McCracken & Marsh, 2008). Undoubtedly, understanding existing practice plays a crucial role in helping researchers and practitioners appreciate emerging evidence, and how the evidence is impacting on physiotherapy practice. This in turn aids with the identification of treatment areas where greater efforts are required. Moreover, since the envisaged draft protocol was to be tested for feasibility in Ethiopia, the researcher had to establish the common techniques used by Ethiopian physiotherapists in order to make sure that the data obtained at the systematic review level was of a corresponding nature. This would

ensure contextual relevance. It would be unwise, for example, to employ search terms laden with treatment techniques that are not in use in Ethiopia. Hence, the importance of understanding common practices among local Ethiopian physiotherapists before embarking on the systematic review stage was appreciated. With the aim of outlining the methodologies employed and procedures followed in conducting the survey, this section discusses the following: the research setting and target population; the sampling technique used; the data collection procedures (administration of questionnaire); data processing and analysis; and the manner in which the findings (processed data) of this particular phase are presented.

3.4.1 Research setting and data collection procedure for the survey

The cross-sectional survey targeted physiotherapists in all government and private hospitals and clinics in the following ten geographical zones of Ethiopia: Addis Ababa, the capital city, as well as Tigray, Afar, Amhara, Oromia, Somali, Benishangul, Southern Peoples' State, Gambella, and Harari. It was easier to administer the survey questionnaire in Addis Ababa, which has good infrastructure and is easily accessible (there, questionnaires were physically delivered). The other nine regions of Ethiopia, which are remote and less developed with relatively poor infrastructure required a strategic approach, as discussed further below.

In Addis Ababa, the researcher personally administered the questionnaire with the help of a team of research assistants (informal research assistants who helped the researcher to carry the questionnaires while moving from place to place). The researcher contacted the physiotherapists in their private capacity. Together with the assistants, the researcher visited all hospitals for face-to-face meetings with physiotherapists who were recruited for participation after the study had been explained to them (see Appendix F). Participation was voluntary and their written consent was obtained (see Appendix G). After having received consent, the researcher provided the self-administered questionnaire to the participants, who completed it at a time of their convenience (see Appendix A). The completed questionnaires were personally collected by the researcher and his team at agreed upon times.

For the physiotherapists who work outside of Addis Ababa, who could not be physically accessed easily, the researcher employed the following strategy: first, the researcher distributed the questionnaires – along with information sheets, requests for voluntary participation, and

informed consent forms – to peers at an annual conference for physiotherapists held in Addis Ababa, in 2019, and attended by practitioners from all over the country. Then arrangements were made with several conference attendees, representing the other eight Ethiopian regions, to distribute additional questionnaires to their colleagues who were not in attendance. The questionnaires were accompanied by information sheets, requests for voluntary participation, and informed consent forms. The completed questionnaires were mailed back to the researcher.

3.4.2 Target population and sample size

All practising physiotherapists in both private and public health institutions were targeted by invitation to participate in the survey (the sample frame). At the time of the survey, there were about 300 practising physiotherapists in Ethiopia (World Confederation for Physical Therapy [WCPT], 2015).[5] The sample size was calculated using the formula below:

$$\mathbf{n} = \frac{N}{1+N*e^2}$$

Where n = sample size, N = population size, and e = Margin of error (MoE), set at 0.05.

Sample size $n = \frac{300}{1+300*0.05^2} = \frac{300}{1.75} = 171$

Accordingly, the sample size for the survey was 171 participants. Questionnaires were sent to all 300 physiotherapists to allow for non-response.

3.4.3 Instrument development and piloting

The researcher could not find a suitable pre-existing questionnaire, so a self-administered, structured questionnaire was developed by the researcher and used to collect data for this phase of the study. In order to ensure content validity, the researcher first conducted the comprehensive literature review (presented in Chapter 2) to identify the key concepts that aided in the formulation of the research questions. The rationale behind the questions posed to the physiotherapists who participated in the survey is presented in Table 3.1 below.

[5] At the time of the survey, the researcher tried to obtain current figures, but could not access reliable information, particularly on the northern provinces, because of the civil war in Ethiopia.

Table 3.1: Rationale behind the question posed by the survey questionnaire

SECTION	QUESTIONS	JUSTIFICATION/LITERATURE REVIEW
A Demographic information	1-2	Demographic information
B Basic practice profile	3-8	Questions 3-4 were posed to assess the trajectory taken by physiotherapy practice as it develops for, as a field, it is still in its nascent stages of development as described in the short history of physiotherapy practice and curriculum provided in section 1.5 of chapter 1 (for more details on Ethiopian physiotherapy, see Footer et al., 2017). Questions 5-6 were posed to gauge the knowledge, approaches and attitudes of Ethiopian physiotherapists. They are inspired by a study by Kutty, Gebremichael & Vargehese (2013), which assessed knowledge, attitude and practice (KAP) of physiotherapy and factors associated with it among Medical Doctors in Tigray, Northern Ethiopia and found inadequacy and negativity to be of high prevalence amongst Medical Doctors in the country. Questions 7-8 are inspired by some of the principles of Ethiopia's health extension program (HEP), described in more detail in chapter 2, which prioritizes the training, collaboration and the establishment of occupational standards. As noted by Wang et al. (2016), "[t]he HEP benefits from close collaboration with technical vocational education training (TVET) institutions under the Ministry of Education." Also, [t]he TVET institutions provide theoretical

		training for deployed health extension workers (HEWs). In addition, TVET institutions develop a health extension service occupational standard" (p. 22).
C Treatment preferences	9-17	Question 9 was posed to assess the prevalence of NSNP in Ethiopia and is inspired by studies on Ethiopia which suggest that the ailment affects a considerable number of the country's citizens across all ages (cf. e.g., Biadgo, Tsegay, Mohammednur, & Gebremeskel., 2018; Weleslassie, Meles, Haile, & Hagos., 2020; Temesgen, Belay, Gelaw, Janakiraman, & Animut., 2019; Balcha, Getaneh, & Woldeyohannes, 2021; El-Sayed et al., 2010; Mengistu, 2021.; Tafese, Kebede, Medhin, Mariam, & Kindu., 2018; Delele, Janakiraman, Abebe, Tafese, & Van de Water., 2018). Inspired by the fact that Ethiopian physiotherapy practice is still in its infancy in many respects (see Footer et al., 2017), Questions 10-17 were included in this review to assess how the country's physiotherapists operate in a scenario that is devoid of a standardised approach.
D Attitudes	18-23	Questions 18-23 are also inspired by a study by Kutty, Gebremichael & Vargehese (2013), which assessed knowledge, attitude and practice (KAP) of physiotherapy and factors associated with it among medical doctors in Tigray, Northern Ethiopia and found inadequacy and negativity to be of high prevalence amongst medical doctors in the country.

With regard to specifics, the questionnaire used to gather data from Ethiopian physiotherapists was designed in such a manner that it obtained information on three parameters: i) the basic practice profile; ii) treatment preferences; and iii) general attitudes towards various approaches to the treatment of patients with NSNP. With regard to the basic practice profile component, the questions posed were aimed at assessing physiotherapy patterns – personal practitioner behaviour and sectoral trends at large – in Ethiopia. The following aspects of the basic practice profile were sought: the years of practice as a physiotherapist since graduation; the current area(s) of practice; the availability (or lack thereof) of a treatment protocol for management of patients with acute NSNP; perspectives on the importance of a treatment protocol for managing patients with NSNP; awareness on developments in physiotherapy practice; and involvement in the development of physiotherapy protocols. Concerning their treatment preferences, the questions posed in the questionnaire were aimed at obtaining insights on the preferred treatment method(s) for patients with acute NSNP among the country's physiotherapists. The third component of the questionnaire was largely an exploration of the attitudes of these professionals towards current practices and patterns regarding the modalities and techniques used by physiotherapists to treat patients with acute NSNP in Ethiopia.

To improve the validity and reliability of the questionnaire, it was piloted by experts involved in the treatment of patients with acute NSNP. These experts – two practising physiotherapists with decades of experience in the profession – helped the researcher to determine whether the questionnaire was adequately constructed (content validity) and also to determine whether it would assess what it was planned to assess (face validity) (Bolarinwa, 2015, Boynton & Greenhalgh, 2004). To evaluate its reliability (consistency), test-retest was conducted on a sub-sample of the physiotherapists in Ethiopia (Helmerhorst, Brage, Warren, Besson, & Ekelund, 2012). These pilot study participants were excluded from the main survey. Following the test-retest endeavour, amendments were conducted as appropriate (questions 9 and 10 of the survey were similar and were then removed to avoid repetition of questions). There was no need to translate the questionnaire into the local language since all physiotherapists in Ethiopia were educated in English.

3.4.4 Analysis of the survey data

The quantitative data deriving from the survey was analysed using the Statistical Package for Social Sciences (SPSS), version 24. Since the data was primarily nominal, it is presented in Chapter Four using descriptive statistics with the aid of Tables and Figures and analysed discursively. Discursive analysis begins by introducing the subject matter and, thereafter, examining each theme that falls under the subject matter individually or in an independent fashion. The researcher found this approach appropriate for this stage of the research as it facilitated the smooth movement of one theme to the next, establishing what physiotherapists in Ethiopia consider to be the most effective interventions (most popular) for treating patients with acute NSNP. Pierce (2015) has lauded discursive analysis for facilitating balanced, objective arguments. Discursive analysts do not concern themselves with neutrality but seek evidence through which they then draw informed conclusions on their subject(s) of analysis and present it to concerned parties. The results from this survey were used to inform the systematic review and the e-Delphi study in the next phase as discussed in Section 3.5 below.

3.5 Phase 2: Systematic review (SR)

The second phase of this study consisted of a systematic review of the latest available evidence for the treatment strategies for patients presenting with acute NSNP. Evidence on the treatment of acute NSNP is scarce; therefore, the researcher, at this systematic review stage, included all types of studies that assessed effectiveness (in this case, treatment that showed improved patient outcomes, such as pain reduction, increased range of motion etc. for short and long terms) including systematic reviews of any physiotherapy treatment for acute NSNP. Smith, Devane, Begley and Clarke (2011) have vouched for such an approach, arguing that it could assist clinicians to assess existent research methodically and boost the process of making evidence-based choices.

Systematic reviews (of randomised control trials, other systematic reviews, observational, experimental, exploratory, and case studies) are the chosen standard for synthesising evidence in health care because of methodological consistency (Moher et al., 2015). Systematic reviews are considered to be the highest level in the hierarchy of scientific evidence, and they are used to support the development of treatment protocols as they are of fundamental importance in

decision-making by healthcare providers (Kapadia et al., 2016). Accordingly, the following main question was addressed in the systematic review: What is the current state of evidence for effectiveness of physiotherapy treatment for patients with acute NSNP, and how does it compare to the most common practices among Ethiopian physiotherapists? The limitations of standard practice in Ethiopia were considered during the search itself.

3.5.1 Data search strategy

The researcher was guided by the principles devised by Hawker, Payne, Kerr, Hardey and Powell (2002) who advocate for a check-list guide when addressing the review objective. Literature was retrieved by searching the following databases for all relevant articles published in English: Medline, PubMed, CINAHL, Cochrane Library, PEDro, and Science Direct. The search results were imported into Endnote. The reference lists of these key articles were hand-searched to identify further relevant articles. The use of Google Scholar and manual searches of indexes were also included to ensure that all relevant data were obtained, including the grey literature. Literature on the topic of study was not limited by the date of publication of the articles. It is important to keep up to date with recent research findings, new inventions, current trends in patient problems, and trends in patient outcomes in the context of the healthcare we provide. Nonetheless, it is also important to look back as we move onward to see where the new research has come from and perhaps to pick up an advisable suggestion and to acknowledge the foundation it has been built on.

3.5.2 Data Search Terms

The search terms were determined through preliminary reviews of the literature in the early stages of the search as well as the outcomes of the survey in Chapter 4. Accordingly, the researcher made sure to include manual therapy techniques, for the “state of the art” in Ethiopian physiotherapy (obtained from the survey) shows that therapists are still very much focused on manual therapy and so an evidence-based treatment protocol that is practical should also focus on those approaches (Bizzarri & Foglia, 2020; Bronfort, Haas, Evans, Leininger, & Triano, 2010). The focus, however, was not on manual therapy, per se, but on physiotherapy techniques as applied in other jurisdictions, to enable a comparison between global best practice and common practices among Ethiopian physiotherapists. The data obtained from this systematic review was aimed at finding gaps in the current treatment strategies employed in Ethiopia.

Addressing such gaps – through the incorporation of some elements of global best practice – in the researcher's view, could aid in uplifting Ethiopian physiotherapy practice standards. The search was done by combining acute NSNP "AND" physiotherapy treatment. Acute NSNP was substituted with "OR". Table 3.2 below gives more details.

Table 3.2: Description of search terms

Acute NSNP	AND	physiotherapy treatment	OR	Physiotherapy
Acute neck pain	AND	physiotherapy treatment	OR	effective physical therapy
Acute myofascial neck syndrome	AND	physiotherapy treatment	OR	exercise therapy
Cervical spondylosis	AND	physiotherapy treatment	OR	intervention exercises
Cervicogenic headache	AND	physiotherapy treatment	OR	manual therapy
Cervical spine sprain,	AND	physiotherapy treatment	OR	Mobilisation
Acute mechanical neck pain	AND	physiotherapy treatment	OR	manipulative therapy
Acute cervical spine pain	AND	physiotherapy treatment	OR	hands on treatment
Acute idiopathic neck pain	AND	physiotherapy treatment	OR	Rehabilitation
Acute cervical spine facet joint pain	AND	physiotherapy treatment	OR	physical therapy management,
Recent neck pain	AND	physiotherapy treatment	OR	trigger point therapy

Each of the search terms depicted in Table 3.2 above was entered separately during the search. Studies which assessed the effectiveness of any physiotherapy treatment for acute NSNP among adults, aged 18 years and above, and reported outcomes of these treatments were considered for inclusion. Studies which did not report on the outcomes of effectiveness of physiotherapy treatment in this population were excluded.

3.5.3 Overview of the review process, selection and data extraction

After the initial search, duplicates and irrelevant articles in the Endnote database were removed and the search data was exported to Excel. Articles for review were screened in three phases. *Abstract and title screening:* In this phase potentially appropriate articles or studies were screened by two independent reviewers (the researcher and the supervisor) to ensure minimal bias (Chorwe-Sungani & Chipps, 2017). The two reviewers examined the identified titles and abstracts in Excel and selected the articles they considered to be appropriate, based on the

following parameters: participants (patients with acute non-specific neck pain); intervention (treatment for acute NSNP); and outcomes (pain relief, increased ROM). Where the abstracts did not present enough information, or the reviewers were uncertain, the associated full-text articles were retrieved and reviewed. Any disagreements were mediated by a third reviewer, whose main role in this research involved determining what articles would either be included or excluded in the research following the review.

Screening based on the Problem, Intervention, and Outcome (PIO) criteria: The second phase of selection consisted of a review of articles informed by the problem, intervention, and outcome (PIO) framework (Chorwe-Sungani & Chipps, 2017; Tsafnat et al., 2014). Reasons for exclusion have been presented in Table 3.3 below (see also Figure 5.1 in Chapter 5). In the present study, the specifics of the PIO acronym are the following: "P" stands for population (patients presenting with acute NSNP); "I" stands for intervention (treatment of acute NSNP); and "O" outcome (pain relief, increased ROM, decreased disability).

Table 3.3: Guidelines for inclusion and exclusion of studies in this systematic review

Parameters	**Description**
Types of participants	All adult patients aged 18 years and above with acute NSNP were included. All patients with acute NSNP (neck pain that has been present for less than 3 months). Neck pain of less than 3 months' duration, including intermittent episodes of neck pain that are short in duration but over periods of time not longer than 3 months. Sufficient pain intensity (greater than 2 out of 10 on a NPRS) to allow treatment, neck pain with cervicogenic headache, able to understand or speak local or English language, must be willing to participate Be oriented to person, time and present place
Types of studies	All types of studies that assessed effectiveness (in this case, treatment that showed improved patient outcomes, such as pain reduction, increased range of motion etc. for short and long terms) of any physiotherapy treatment for acute NSNP in English were included.
Types of interventions	Any form of physiotherapy interventions that reduced acute neck pain, either locally or systemically, by means of therapeutic exercise, manual therapy, electrotherapy, cryo-therapy, or massage therapy.

Types of studies **not** included	Any given specific findings such as prolapsed disc, trauma or surgery in the neck area, fracture, infection, tumour, inflammatory systemic disease, mental disorders, pregnancy, osteoporosis, and chronic non-specific neck pain, spondylolisthesis and spinal stenosis, were not included.

Article review: In this third phase, the full texts of the articles were reviewed for the reported evidence on the effectiveness of the treatment of patients with acute NSNP. The articles were independently examined by two reviewers (researcher and supervisor) to confirm their inclusion. Both quantitative and qualitative studies were considered for possible inclusion. The combination of qualitative and quantitative studies can advance an evaluation by ensuring that the limitations of one type of studies are balanced by the strengths of another (Hong, Pluye, Bujold, & Wassef, 2017). Research conducted by Hollis et al. (2016), noted that systematic reviews of qualitative and descriptive studies exploring patients' experiences of treatment, particularly when considering the perceived clinical efficacy of the treatment, have substantial value.

Studies which assessed the efficacy of physiotherapy treatment for acute NSNP were eligible for inclusion, including systematic reviews, randomised controlled trials, cohort studies, and case studies.

3.5.4 Assessment of methodological critical appraisal for SR

The quality of the methodological rigour of all studies was assessed using a critical appraisal tool devised by Hawker, Payne, Kerr, Hardey and Powell (2002), which allows for the appraisal of evidence from studies with disparate or heterogeneous designs. This tool was found to be appropriate, because this review included studies of various designs. The appraisal was done to ensure the reliability and effectiveness of the findings in terms of informing health care decisions. The critical appraisal was done by the researcher and reviewed by the doctoral supervisors. According to Hawker et al. (2002), the checklist for critically appraising each article should include the abstract and title, introduction and aims, method and data, sampling, data analysis, ethics and bias, findings or results, transferability and implications, and usefulness (see Appendix L). Each aspect of the criteria had a range of scores from Good (4) to, Fair (3), Poor (2) and Very poor (1). These criteria and the scoring system were applied consistently to each study. Therefore, each study had a total score that would determine its methodological quality. In

accordance with Hawker et al.'s (2002) criteria, any study which scored more than 18 out of 36 was included in the review.

3.5.5 Data extraction and analysis

The included study results were not sufficiently methodologically homogeneous to combine in a meta-analysis in this systematic review. Pooling was not possible, as the included study results varied. Pooled analyses can only be conducted if studies use the same study design and statistical models, and if their respective populations are homogeneous (Price, Rushton, Tyros, Tyros, & Heneghan, 2020, p. 14, von Hippel, 2015, pp. 1-2). Therefore, a narrative synthesis of results was performed without being selective or emphasizing some findings over others. The aim of this systematic review was to find the studies that were effective in the reduction of acute NSNP, to pave the way for the e-Delphi expert opinion and refinement. Accordingly, this review was analysed qualitatively.

Data from included studies were extracted using evidence summaries designed by Hawker et al. (2002). A form was devised for data analysis consisting of a table of study characteristics, namely: author and year of publication; title; place of study; design; participants; parameter of interventions; outcome measurement methods; and the main findings of the study. Narrative synthesis, which is interpretive in nature, was used to summarise and synthesise disparate primary studies for this review, because the included studies were heterogeneous (Green, Johnson, & Adams, 2006). Narrative synthesis helps to organise, describe, explore and interpret findings of different studies and provide explanations for those findings (Mays, Pope, & Popay, 2005). The process of conducting the narrative synthesis was systematic and transparent and generated new insights and knowledge (Mays et al., 2005) regarding physiotherapy treatments for patients with acute NSNP. It involved (1) the development of a preliminary synthesis; (2) the exploration of relationships in the findings to understand the effectiveness of physiotherapy treatments, and then (3) the assessment of how robust the findings were (Mays et al., 2005).

3.5.6 Synthesis of Findings

Narrative synthesis, which is interpretive in nature, was employed to summarise and synthesise the disparate primary studies identified in this review (Popay *et al*., 2006). Narrative synthesis helps to organise, describe, explore and interpret findings of different studies and provide

explanations for those findings (Popay et al., 2006). The researcher ensured, to the best of his ability, that the process of conducting the narrative synthesis was systematic, transparent, and that it generated new insights and knowledge (Mays et al., 2005) regarding physiotherapy treatments for patients presenting with acute NSNP.

The narrative synthesis involved the following three steps: (1) development of a preliminary synthesis; (2) exploration of relationships in the findings to understand the effectiveness of physiotherapy treatments, and then (3) assessing how robust the findings were (Popay et al., 2006). These steps are explained below.

3.5.6.1 Development of a preliminary synthesis

This procedure was to identify, critically evaluate, and synthesise the effectiveness of the physiotherapy treatment for the management of patients with acute NSNP as reported in the literature. During the preliminary synthesis phase of the data extraction for this systematic review, a comprehensive search of appropriate articles in the electronic database and University of Western Cape (UWC) library shelves was performed. The initial framework of findings from the included article (identifying typologies and theme for acute NSNP protocol) was developed by the two reviewers (the researcher and one supervisor) in order to explore commonalities and differences, and it was then further critically reflected upon and refined.

3.5.6.2 Exploration of relationships within and between studies

The relationships within and across the included studies for this review were examined by the reviewers in relation to the initial framework that was developed from the preliminary synthesis phase. This phase includes the criteria in selecting the articles for this review and the screening of potentially appropriate articles making use of two independent reviewers (the researcher and the supervisor). Due consideration was given to review articles in relation to methodology, participants and/or style of intervention when synthesising results. Articles were then selected to either include or exclude the various studies, based on titles, informed by the problem, the intervention, and outcome (PIO) criteria.

3.5.6.3 Assessment of robustness

The robustness of the over-arching framework for the articles was examined with the framework being refined accordingly and through appropriate processes in line with guidance from Popay et al., (2006). The quality of the eligible articles was also assessed using the quality appraisal tools suggested by Hawker et al., (2002) checklist. The methods for the following stage of the research – the e-Delphi study – is discussed next.

3.6 Phase 3: e-Delphi study

In this phase of the study, an e-Delphi technique was used to capture the collective opinion of physiotherapy experts on the efficacy of implementing a treatment protocol based on the findings of the survey and systematic review. The e-Delphi technique is a useful and recognised data collection tool that gathers information from experts regarding their opinion on a topic on which there is not much that is known, and for which there is a high level of uncertainty. The e-Delphi technique is also "a multi-staged survey which attempts ultimately to achieve consensus on an important issue" (Keeney, Hasson & McKenna, 2011, p. 3). As a method, it is "used to obtain the most reliable consensus of opinion of a group of experts by a series of questionnaires interspersed with controlled feedback" (Keeney et al., 2011, p. 3). The technique is an iterative process and is an appropriate means of eliciting ideas, insights and judgements from the experts (Guzys, Dickson-Swift, Kenny, & Threlkeld, 2015; Habibi, Sarafrazi, & Izadyar, 2014) and was therefore used to obtain consensus and to validate the findings of the systematic review and survey that were subsequently used to design the draft treatment protocol. For the present study, an e-Delphi survey was employed. According to Toronto (2017), the e-Delphi survey denotes the newest effort to digitalise the e-Delphi process so as to enhance the method's ability to survey a group of experts that are in a geographically dispersed location that might be inaccessible face to face. The e-Delphi is very similar to other e-Delphi survey approaches, but is only carried out online in their own available time in their locations to solve problems until consensus is achieved (Msibi, Mogale, De Waal, & Ngcobo, 2018).

The chosen experts reviewed the evidence that had been generated by the study to date and considered its feasibility in a local context. Their opinions contributed immensely in the formulation of the evidence-based treatment protocol that was subsequently tested for feasibility

in the final phase of the study. The experts provided their opinion on nineteen selected studies, which were obtained through the systematic review and are presented and discussed in Chapter 6.

3.6.1 Sampling and selection of experts for the e-Delphi study

There is no agreement or recommendation on the ideal sample size for the expert panel in e-Delphi studies (Habibi, Sarafrazi & Izadyar, 2014, Steurer, 2011), although authors have suggested a panel of 8 to 10 experts (Akins, Tolson, & Cole, 2005; Santaguida et al., 2018, Vergouw, Heymans, De Vet, Van der Windt, & Van der Horst, 2011). Therefore, ten (10) physiotherapy experts were purposively sampled from Ethiopia and other African countries to get a wider and more international consensus from different perspectives. These included four physiotherapists from Ethiopia, and one each from South Africa, Tanzania, Nigeria, and Botswana, all drawn from the researcher's and supervisor's professional networks, and selected based on their relevant knowledge and experience on this topic. The participants did not know each other, and their individual responses were kept anonymous. To ensure their anonymity and privacy, specific codes were used instead of names during the process.

The details of the participants, including postgraduate qualifications, and years of experience in the topic area are presented in Table 3.4 below.

Table 3.4: Description of experts who participated in the e-Delphi study

ID	*Years of experience*	*Area of practice*	*Post graduate qualification*
P1	>20	Musculoskeletal physiotherapist and sport medicine	PT, MPT, DPT*
P2	>18	Orthopaedics and musculoskeletal physiotherapist	PT, PhD
P3	14	Musculoskeletal physiotherapist	PT, DPT
P3	13	Orthopaedic physical therapy and sport physical therapist	PT, DPT
P5	>17	Orthopaedic rehabilitation	PT, MPT
P6	13	Orthopaedics and musculoskeletal physiotherapist	PT, DPT
P7	15	Musculoskeletal physiotherapist (both practice	PT, MPT

		and teaching)	
P8	>27	Musculoskeletal physiotherapist	PT, MPT

*** DPT = Doctor of physiotherapy**

The willingness of the chosen experts to participate was sought prior to sending them the detailed information on the study (see Appendices H and I). A 2-round e-Delphi study was used to achieve consensus on the draft treatment protocol (McMillan, King, & Tully, 2016) and is explained below.

First-round: The panel experts were presented with a draft treatment protocol derived from the systematic review and survey that described a clear aim and objectives of the study in order to elicit their opinion of the protocol. Respondents were asked to write comments and express their ideas freely (see Appendix C1).

Second-round: The data from each participant was gathered, analysed and summarised from the responses in the first-round in order to provide the basis for the second-round questionnaire. The questionnaire was then sent to the experts again (see Appendix C3). The aim was to identify common ground with respect to the most important components of the treatment protocol to seek consensus from the group. The threshold of expert consensus in this study was pegged at 70% agreement and above, as suggested by Giannarou and Zervas (2014). Once the level of accepted consensus was achieved, the areas of agreement were used to make all necessary amendments (based on the information provided by the experts in rounds 1 and 2, the experts' opinions were combined and used to draft a treatment protocol appropriate for the feasibility study in the context of Ethiopian clinical practice).

3.7 Phase 4: Feasibility study

This final phase of the research made use of a feasibility study to determine whether the draft protocol could potentially be used on patients with acute NSNP in Ethiopia.

3.7.1 The feasibility study

During this phase, participants were assigned to two groups at four hospitals in Addis Ababa. Two hospitals were purposively selected for the recruitment of the patients who would be treated

with methods in common practice (in other words, whatever techniques these therapists would have chosen in their default practice) and a further two were also purposively selected to recruit participants who would be treated with interventions from the draft EBTP.

Institutions that would implement the draft protocol were matched with those that were to apply the default treatment in order to ensure that the patient and institutional profiles were similar. The details of these are presented in Table 3.5 below. This was geared towards addressing the concern that any changes in outcome would be the result of recruiting patients from different populations. Therefore, all patients presenting with NSNP in the two evidence-based treatment institutions received interventions from the draft treatment protocol.

This helped to reduce the chances of patients in the evidence-based treatment group contacting those in the default treatment group, thereby limiting possibilities of data contamination. Feasibility studies do not only render treatment groups comparable, in respect of known prognostic factors, but also attempt to remove the effects of possible outside influence on the treatment outcomes (Stang, 2011).

3.7.2 Research setting of the feasibility study

The feasibility study was carried out in the physiotherapy facilities of four tertiary hospitals in Addis Ababa. The details of each of the hospitals are presented in Table 3.5 below.

Table 3.5: Description of the research settings

<table>
<tr><th colspan="4">EVIDENCE-BASED TREATMENT INSTITUTIONS[6]</th></tr>
<tr><th>Hospital</th><th>Characteristics</th><th>Hospital</th><th>Characteristics</th></tr>
<tr><td rowspan="5">Yekatit 12 hospital</td><td>Public tertiary hospital</td><td rowspan="5">Myungsung christian medical centre (Korean hospital)</td><td>Private Tertiary hospital</td></tr>
<tr><td>260 bed capacity</td><td>200 bed capacity</td></tr>
<tr><td>Estimated 600 patients attend daily</td><td>Estimated 500 patients attend daily</td></tr>
<tr><td>Has all specialised services including physiotherapy</td><td>Has all specialised services including physiotherapy</td></tr>
<tr><td>Has 8 Physiotherapists</td><td>Has 5 Physiotherapists</td></tr>
<tr><th colspan="4">DEFAULT TREATMENT INSTITUTIONS</th></tr>
</table>

[6] In these two evidence-based institutions, the researcher asked clinicians to treat patients with anything from the draft protocol.

Zewuditu hospital	Public Tertiary hospital	Alert Centre	Public tertiary hospital
	bed capacity 305		500 beds
	Estimated 550 patients attend daily		Estimated 400 patients attend daily
	Has all specialised services including physiotherapy		Has all specialised services including physiotherapy
	Has 6 Physiotherapists		Has 8 Physiotherapists
	Service charges are subsidised by government		Fee paying hospital

3.7.3 Sample size, inclusion and exclusion criteria.

The G*Power Software-generated sample size, with 80% statistical power, was a total of 122 participants (sixty-one participants in the evidence-based treatment group and sixty-one participants in the common treatment group). The description of the inclusion and exclusion criteria has been provided in Table 3.6 below.

Table 3.6: Description of inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
All patients with acute NSNP (neck pain that has been present for fewer than 3 months). Neck pain of less than 3 months' duration, including intermittent episodes of neck pain that are short in duration but over periods of time not longer than 3 months. Sufficient pain intensity (greater than 2 out of 10 on a NPRS) to allow treatment Neck pain with cervicogenic headache Age 18 years and above. Able to understand or speak local or English language. Must be willing to participate. Be oriented to person, time and present place.	Fractures or dislocations of cervical spine Osteoporosis, myelopathy Acute prolapsed disc and neural entrapment Spondylolisthesis and spinal stenosis Recent trauma or surgery in the neck area Tumours as these are causes of specific neck pain Rheumatoid arthritis and other inflammatory systemic diseases Infections, mental disorders, pregnancy Not enough understanding of the local language

3.7.4 Feasibility study procedure

The researcher coordinated all research activities in the feasibility study. Prior to data collection, permission was sought from hospital authorities to determine the feasibility of the draft EBTP. Meetings were held with the physiotherapists in each of the two evidence-based treatment hospitals to lobby and motivate them to participate in this study. In addition, physiotherapists from the evidence-based treatment institutions received a week-long training session by the researcher, on how to utilise the treatment protocol in practice. The Research Assistants (RAs) recruited for this study also attended the training sessions.

These RAs were physiotherapists with not less than five years' experience in musculoskeletal physiotherapy practice. They also received training related to the administration of the data collection tools for the experiment. The RAs were assigned to the hospitals that were to implement some aspects of the draft EBTP where they were responsible for the recruitment of participants and implementation of the intervention. The RAs worked together with the physiotherapists in each of the two hospitals chosen to implement some aspects of the EBTP to recruit participants for this study. The physiotherapists, who had been trained to use the draft protocol, provided treatment to subjects in the evidence-based treatment group. Physiotherapists in the default treatment institutions did not receive any training on the proposed protocol; they provided their usual treatment for patients with acute NSNP. Study subjects were recruited through liaison with outpatient department medical doctors who referred patients presenting with neck pain to the physiotherapy department. The study subjects included all patients 18 years and above, who presented with NSNP of less than three months. Physiotherapists were asked to record their usual treatment techniques and associated patient outcomes, including demographic information, to enable comparisons with the evidence-based treatment group. These physiotherapists were asked to record patient outcomes using the same instruments that were used for patients in the evidence-based treatment institutions. The RAs were also responsible for assessing the treatment outcome measures in both the evidence-based and default treatment groups.

3.7.5 Treatments (interventions) plan

The details of the treatment protocol (for example, specific techniques, frequency and duration of intervention) were informed by phase 2 (systematic review and e-Delphi) of the study.

3.7.6 Outcome assessment instruments

The feasibility study pro forma was used by the trained RAs to collect data about the effect of the treatments and the physical conditions of the patients (see Appendix D). The pro forma consisted of the following three sections: **Section I** included the socio-demographic characteristics of patients. **Section II** comprised a numerical pain rating scale (Akad et al., 2013; Hawker, Mian, Kedzerska, & French, 2011) that was used to measure baseline pain intensity, which was the primary outcome. **Section III** consisted of the neck pain disability index questionnaire (Farooq, Mohseni-Bandpei, Gilani, & Hafeez, 2017), which was used to measure neck stiffness and the consequent patient disabilities as secondary outcomes. All the above assessment instruments were adopted from available online sources (Akad et al., 2013; Hawker, Mian, Kedzerska, & French, 2011, Farooq, Mohseni-Bandpei, Gilani, & Hafeez, 2017). In addition, the assessors were urged to ensure objectivity in the assessment of patients, a task which was partly accomplished using a goniometer, which is used to examine neck-joint ROM.

All adverse events, if any, during and after the intervention, including the type and severity, were monitored with a questionnaire for the treatment groups and addressed by immediate discontinuation. Concerned patients were taken for standard treatment (medical emergency in this case). In addition, an appropriate referral was made to a prearranged nearby professional for further assistance or intervention where this was deemed necessary. Data on adverse events were not collected for the common treatment group as their treatment was not based on the draft protocol. Rather, their treatment was based on the discretion and skill levels of a subset of Ethiopian physiotherapists. Participants were asked to report back to the researcher if any serious adverse events occurred during the course of their standard treatment sessions.

3.7.7 Data analysis

Data collection included both personal demographic information (such as age, sex, marital status, educational qualification, and occupation) and clinical information (pain, stiffness, disability). All the collected data was recorded in the structured pro forma. The data yielded was largely descriptive, involving frequencies, means, and standard deviations. It was analysed discursively to explore the differences between the evidence-based and common treatment groups. As Pierce (2015) has argued, being both formal and impersonal, discursive analysis begins by introducing the subject matter and then discussing each item under the subject matter individually or independently. It is appropriate in cases where the aim is to present balanced, objective analysis

of the phenomena under study. The researcher found this approach suitable for the study, because it facilitated smooth movement from one theme to another.

3.8 Ethics

Prior to the commencement of the entire study, ethics clearances were obtained from both the Biomedical Research Ethics Committee at the University of the Western Cape in South Africa, and the Ministry of Health in Addis Ababa, Ethiopia (see Appendices J and K). Following the approval from Ethiopia's Ministry of Health, permission was obtained from the management of all four selected hospitals. Participation in this study was voluntary. The researcher informed potential participants of the study's purpose and objectives and answered their questions before inviting them to join the study to enable them to make informed decisions. Those who agreed to participate in the study were asked to sign a written consent form. Where participants were unable to write, they were asked to make their thumb print on a consent form along with their name with the help of the research assistant. With respect to the principle of autonomy, participants were informed of their right to withdraw from the study at any time with no negative consequences. The principles of beneficence and justice were maintained by guaranteeing participants privacy and concealment. The dignity and respect of the participants was prioritised. It was explained to the patients who agreed to participate in the study that their refusal to join the study would not jeopardise their access to treatment. Confidential information, such as the data collected in this study, was continuously kept in a secured and locked location that was only accessible to the researcher to protect the participants from any potential harm. The collected data will be kept for five years, after which the hard data will be destroyed by shredding and the soft data will be deleted from the computer. The participants in the survey were not asked to include personal details that could associate them with the data. They were also assured of their anonymity, which was ensured by the substitution of names with identifiers in the questionnaires. Anonymity has also been prioritised during the reporting of aggregated data, as will also be the case with any publications that arise from the study. The e-Delphi study participants were "blinded," to ensure that they could not communicate with one another and their responses were kept anonymous. To ensure their anonymity and privacy, identifiers were used instead of names (see Table 3.4). The researcher applied the principle of non-maleficence to minimise any harm by acting promptly to assist participants whenever they experienced any

discomfort, psychological or otherwise, during the process of their participation in this study. During the feasibility study, whenever the condition of the patients worsened, the treatment was discontinued immediately and the adverse events of the standard treatment sessions was reported. Thereafter, the patient was taken for standard treatment or an appropriate referral made to a prearranged suitable professional for further assistance or intervention. Reporting the adverse events of the standard treatment sessions is important to detecting subject safety issues. Each clinical trial protocol should clearly state the method(s) by which adverse events will be observed and reported. Provisions to ensure proper care for those experiencing unfavourable and unintended signs or symptoms associated with their participation in a clinical trial are a necessary component (Shapiro 2013). It also helps protect healthcare organizations from costly liability claims and financial losses caused by reduced reimbursement for the treatment of preventable conditions acquired while in hospital care.

3.9 Summary of the chapter

This chapter presented the details of the research methodology that was employed to meet the objectives of this study. It began with a detailed description of the research design that was adopted for the study and its rationale; it discusses each of the four components of the design adopted for this study, that is, the survey, the systematic literature review, the e-Delphi study, and the feasibility study. The methods, steps, and procedures that were used to obtain data for the studies were also presented in this chapter.

The survey of physiotherapists was conducted to meet the objective of establishing the current practices and patterns around the modalities and techniques used by physiotherapists to treat patients with acute NSNP in Ethiopia. A self-administered, structured questionnaire was used to obtain information from the participants. The quantitative data obtained from the survey were analysed using the Statistical Package for Social Sciences (SPSS), version 24.

A systematic review was employed to obtain available evidence for the treatment strategies for patients with acute NSNP, as reported in the literature, which were informed by data collected in the cross-sectional survey. Studies which assessed the effectiveness of any physiotherapy treatment for acute NSNP among adults aged 18 years and above and reported outcomes of these

treatments were considered for inclusion. Studies which did not report on outcomes of the effectiveness of physiotherapy treatment were excluded.

The e-Delphi study was used to capture the collective opinion of physiotherapy experts on the potential value of a contextually relevant treatment protocol based on the findings of the survey and systematic review. The final phase made use of a feasibility study to evaluate the outcome of the preliminary EBTP on patients with acute NSNP in Ethiopia.

Chapter 4

Phase 1: Survey of Physiotherapists

4.1 Introduction

This chapter presents the results of the quantitative survey that was administered to practising physiotherapists in Ethiopia with the objective of determining the current, most popular modalities used in the treatment of patients with acute NSNP. The logic behind this survey was: firstly, the process of conducting a systematic review, which employs elimination methodology, is laborious, extensive, and largely exploratory in nature. Accordingly, the findings of the quantitative survey were strategically used to reduce the uncertainty with respect to the upcoming review in Chapter 5. Secondly, establishing the common techniques used by Ethiopian physiotherapists would make it possible for comparisons to be made with the data obtained from the systematic review with the objective of establishing gaps in the current treatment strategies employed in Ethiopia. Since the envisaged draft protocol was to be tested for feasibility in Ethiopia, the researcher had to understand common practices among local Ethiopian physiotherapists in order to assess the contribution that the draft protocol would be making in this particular setting. The chapter begins with a summary of the descriptive statistics of the respondents. It then presents a systematic analysis of the results to the questions that were posed to the respondents with the aid of illustrations (see Appendix B for the detailed tabular results). Following this, a general summary of survey findings regarding physiotherapy practice with respect to the treatment of patients with NSNP in Ethiopia is presented. The chapter concludes with a summary of the components of common practice for the treatment of patients with NSNP.

4.2 Descriptive summary characteristics of respondents

The descriptive summary characteristics of the survey respondents (study population) are presented in Table 4.1 below. Two hundred and three (203) questionnaires were completed from the two hundred and fifty-six (256) that were distributed, yielding a response rate of 79%. In this study, the response rate may have been so high because the researcher was able to make a follow-up during and after the distribution of the questionnaires through phone calls and e-mail.

Table 4.1: Descriptive summary statistics of respondents

Characteristics of Respondents (n = 203)	Frequency (%)
Gender of Respondent	
Male	153 (75%)
Female	50 (25%)
Age of Respondent (Years)	
22 – 26	48 (23.64%)
27 – 31	60 (29.56%)
32 – 36	56 (27.59%)
37 – 41	18 (8.87%)
42 and above	21 (10.34%)
Highest Educational Level Achieved	
Bachelor's Degree	135 (66.50%)
Master's Degree	38 (18.72%)
DPT Degree	12 (5.91%)
PhD Degree	2 (0.99%)
DPT and PhD	1 (0.49%)
Diploma	9 (4.43%)
Others (e.g., certificate)	6 (2.96%)
Primary Workplace	
Always inpatients	10 (4.93%)
Most of the time inpatients	44 (21.67%)
Most of the time outpatients	113 (55.67%)
Always outpatients	36 (17.73%)

4.3 Results

4.3.1 Years of practice as a physiotherapist since graduation

With regard to the number of years of practice as a physiotherapist since graduation, the response is depicted in Figure 4.1 below.

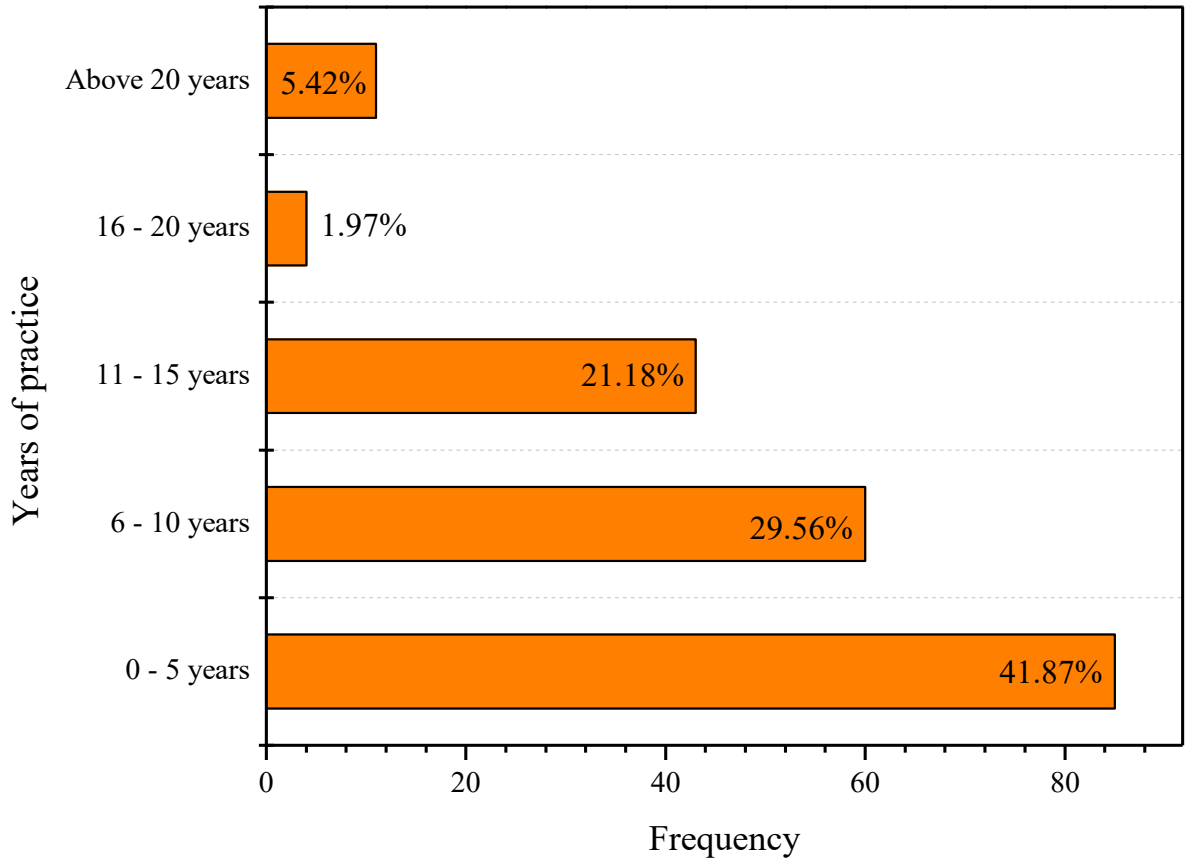


Figure 4.1: Years of practice as a physiotherapist since graduation (n = 203)

Regarding years of practice as a physiotherapist, the majority of the respondents had practised for 5 years or less. In addition, more than half of the physiotherapists surveyed had 6 to 15 years' experience, and only a small portion of the respondents had practised for more than 15 years.

4.3.2 Current area of practice

Concerning the current area of practice of the respondents, it was important to know the demographic distribution of the respondents' main area of practice. The findings are depicted in Figure 4.2 below.

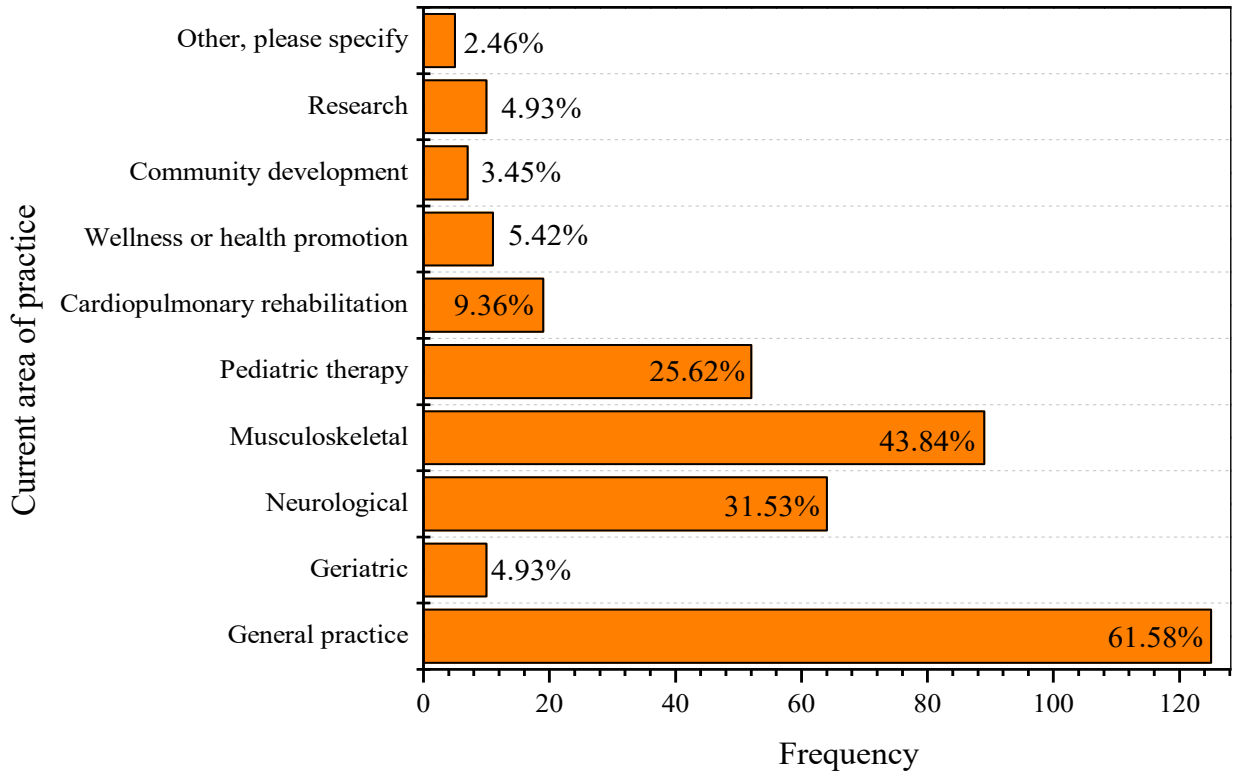


Figure 4.2: Current area of practice (n = 203, respondents could select more than one option)

In relation to the current area of practice of the respondents, the majority of the respondents were involved in general practice. In terms of prevalence, the other areas of practice rank as follows, from the most to the least common: musculoskeletal practitioners; neurological settings; paediatric therapy; cardiopulmonary rehabilitation; wellness or health promoters; geriatric settings; research; community development; and other activities (such as clubfoot management, orthopaedics, and the manufacture of orthotic appliances).

4.3.3 Availability of a treatment protocol for the management of patients with NSNP

Regarding the availability of physiotherapy treatment protocol(s) for the management of patients with NSNP in Ethiopia, 15.7% of the respondents indicated that they have a treatment protocol for managing patients with NSNP, while 47.78% of the respondents said they do not, However, 47.78% of the respondents' stated that they were not sure of the availability of a treatment protocol for managing patients with NSNP in Ethiopia.

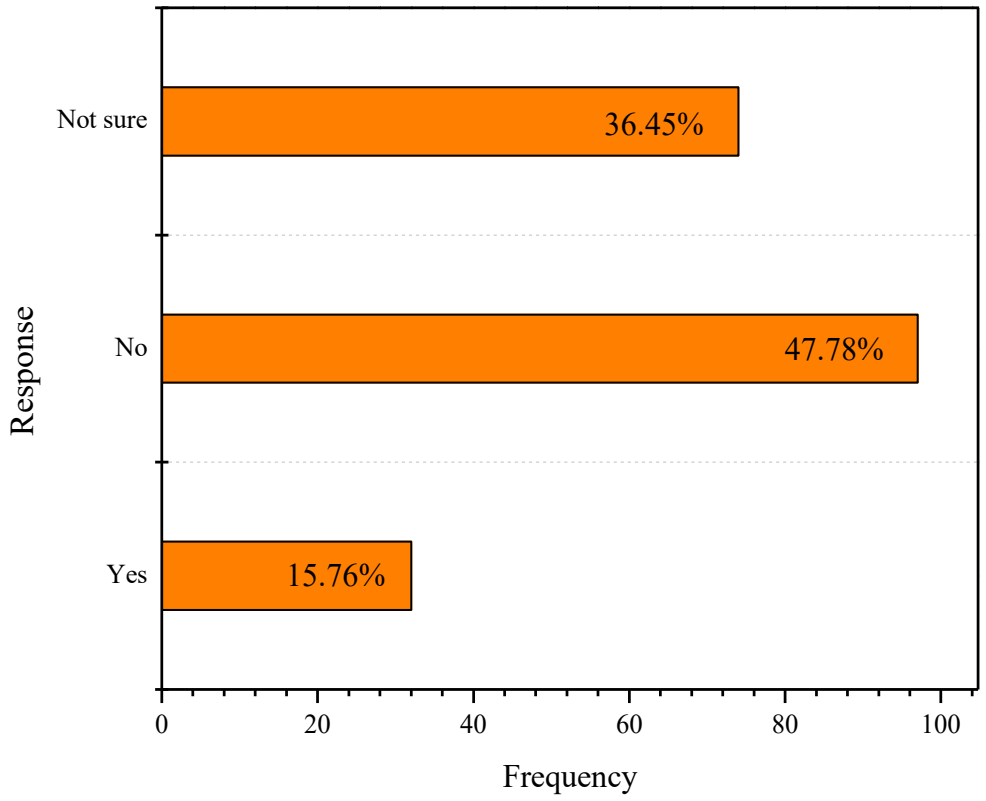


Figure 4.3: Availability of treatment protocols for managing patients with acute NSNP (n = 203)

4.3.4 Importance of treatment protocol for the management of patients with NSNP

The opinion of the participants on the importance of a treatment protocol for the management of patients with NSNP is presented in Figure 4.4 below.

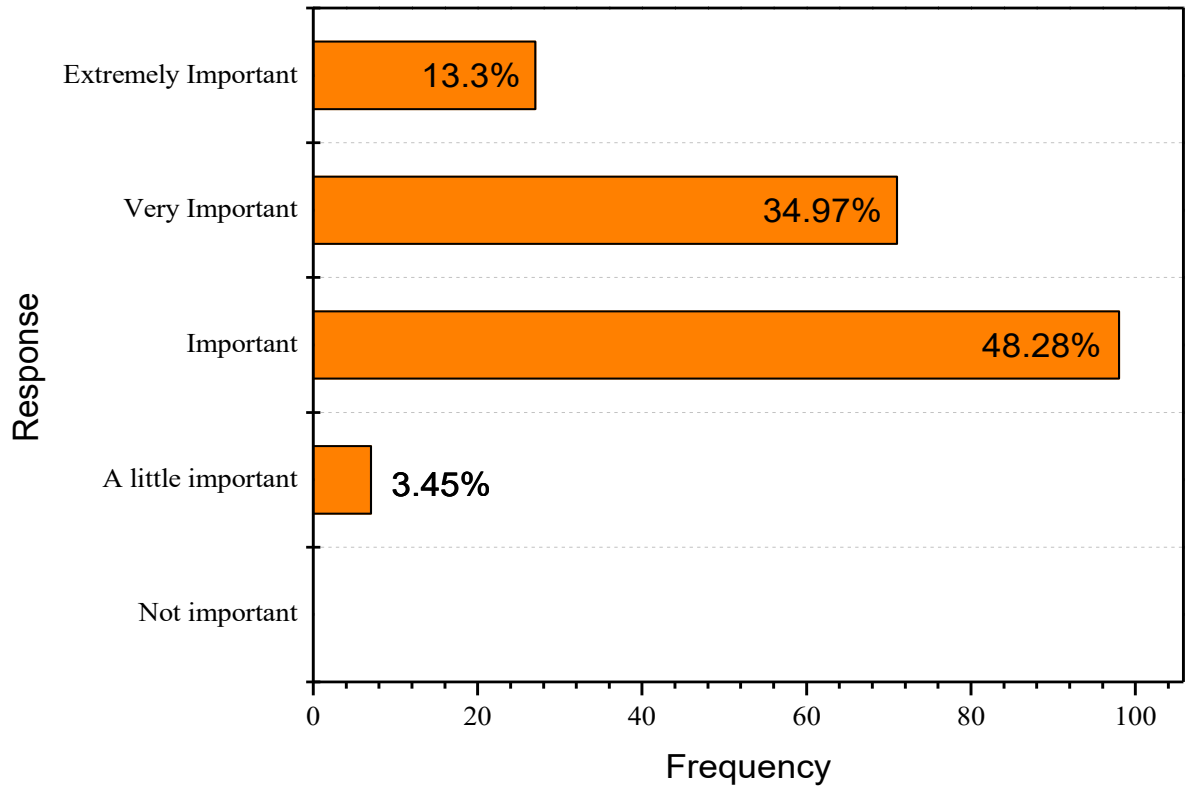


Figure 4.4: Importance of treatment protocol for managing patients with NSNP (n = 203)

While 48.28% indicated that such a treatment protocol is important, 34.97% stated that it is very important, and 3.45% suggested that it is of little importance.

4.3.5 Enlightenment on developments in physiotherapy practice

In Figure 4.5 below, the means and methods through which the participants in this study stay apprised of developments in the broad field of physiotherapy are presented.

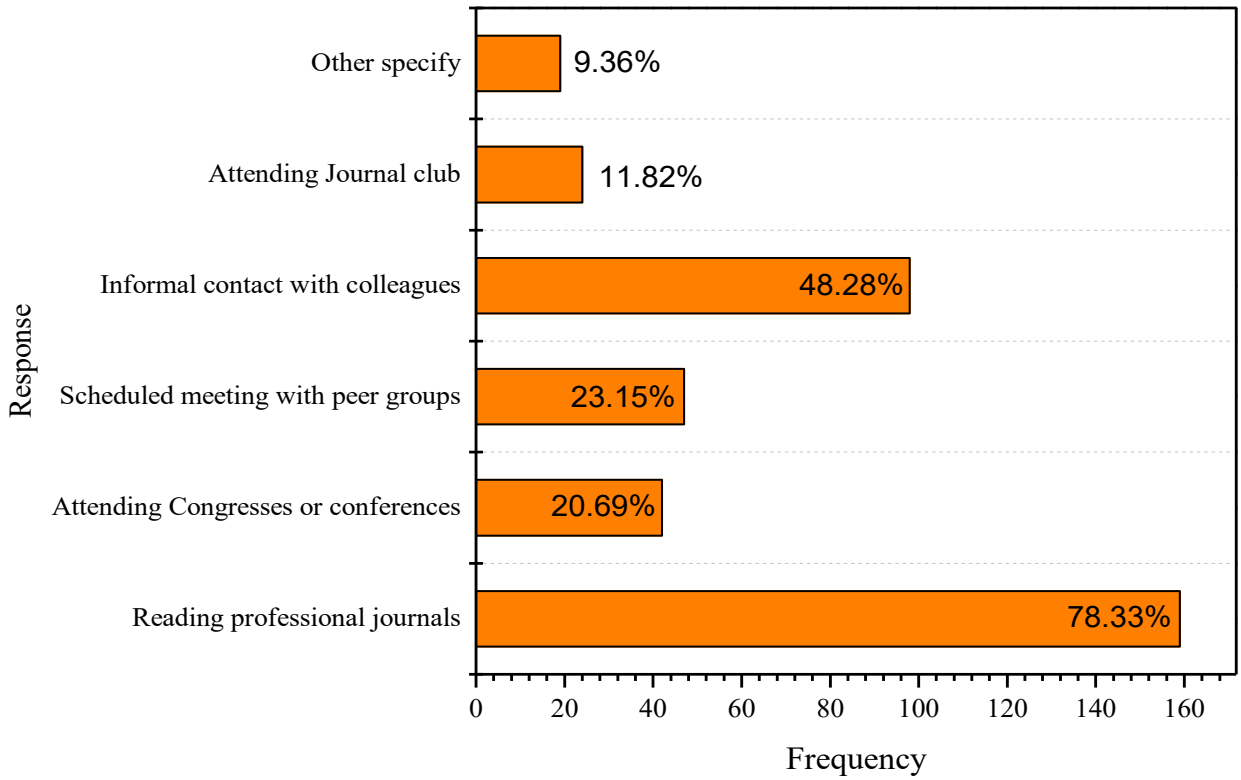


Figure 4.5: Awareness of new developments in physiotherapy practice (n = 203, respondents could select more than one option)

In relation to how respondents keep up-to-date with new developments, such as protocols, in their professional field, the survey found that the majority of respondents relied substantially on the following four avenues: professional journals, informal contact with colleagues, peer-group scenarios, and conference and congress attendances.

4.3.6 Involvement in the development of physiotherapy protocols

When asked whether they had been consulted by various stakeholders (including the Ministry of Health, and private researchers) in the process of developing physiotherapy treatment protocols, participant responses are presented in Figure 4.6 below.

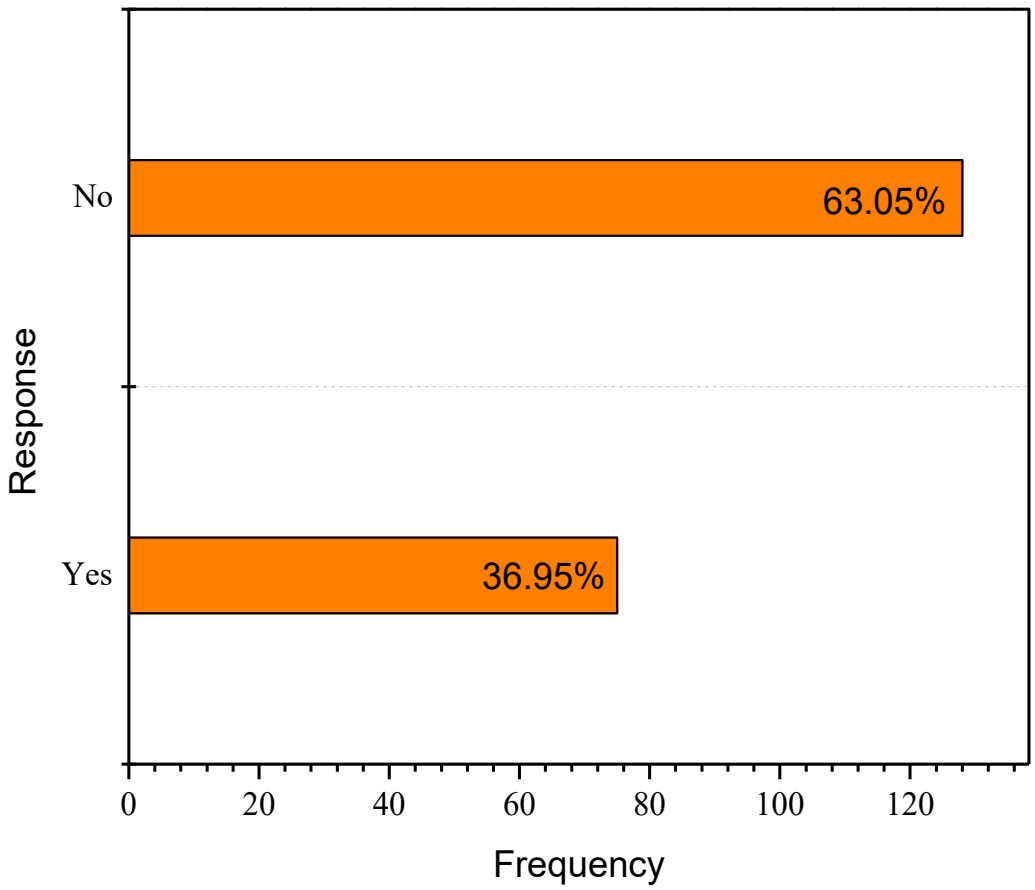


Figure 4.6: Involvement in the development of physiotherapy protocols (n = 203)

The majority of respondents indicated that they had not been consulted in any development of treatment protocols for acute NSNP.

4.3.7 Patients presenting with acute NSNP during the last two weeks

Concerning the number of patients presenting with acute NSNP attended to by the participants in the two weeks prior to the administration of the questionnaire, the responses are depicted in Figure 4.7 below. While 54.68% of the physiotherapists had treated 1-5 patients, 11.33% had treated 6-10. On the other hand, 5.91% had attended to 11-15 patients, 4.43% had seen 16-20 patients, and 0.99% had seen more than 21 patients. However, 22.66% of the respondents had not come across a patient presenting with the ailment.

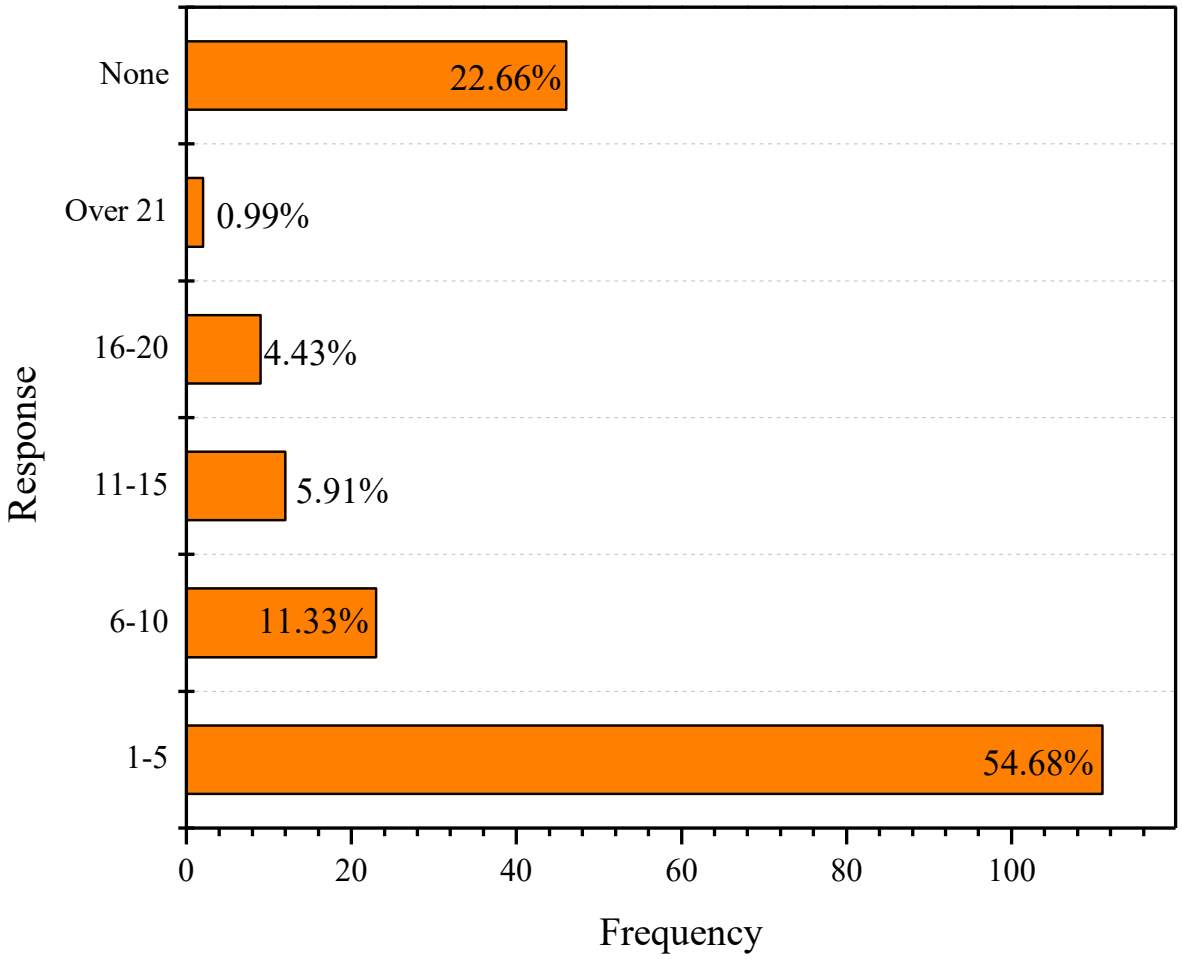


Figure 4. 7: Patients presenting with acute NSNP during the last two weeks (n = 203)

4.3.8 Number of treatment sessions for acute NSNP patients

Regarding the number of treatment sessions for patients with acute NSNP, the responses are shown in Figure 4.8 below. Note that 23.15% of respondents conducted one to two sessions per week, 46.31% had three sessions per week, 9.85% had four sessions per week, and 12.81% had five sessions per week. Notably, about 7.88% of the respondents used other approaches outside the confines of the categories indicated in the survey. For instance, one respondent would attend to a patient presenting with the condition on a daily basis without a predetermined treatment duration. Another in this category recommended one to two sessions per month. Still another two conducted six and seven sessions per week, in the treatment of patients with acute NSNP, respectively.

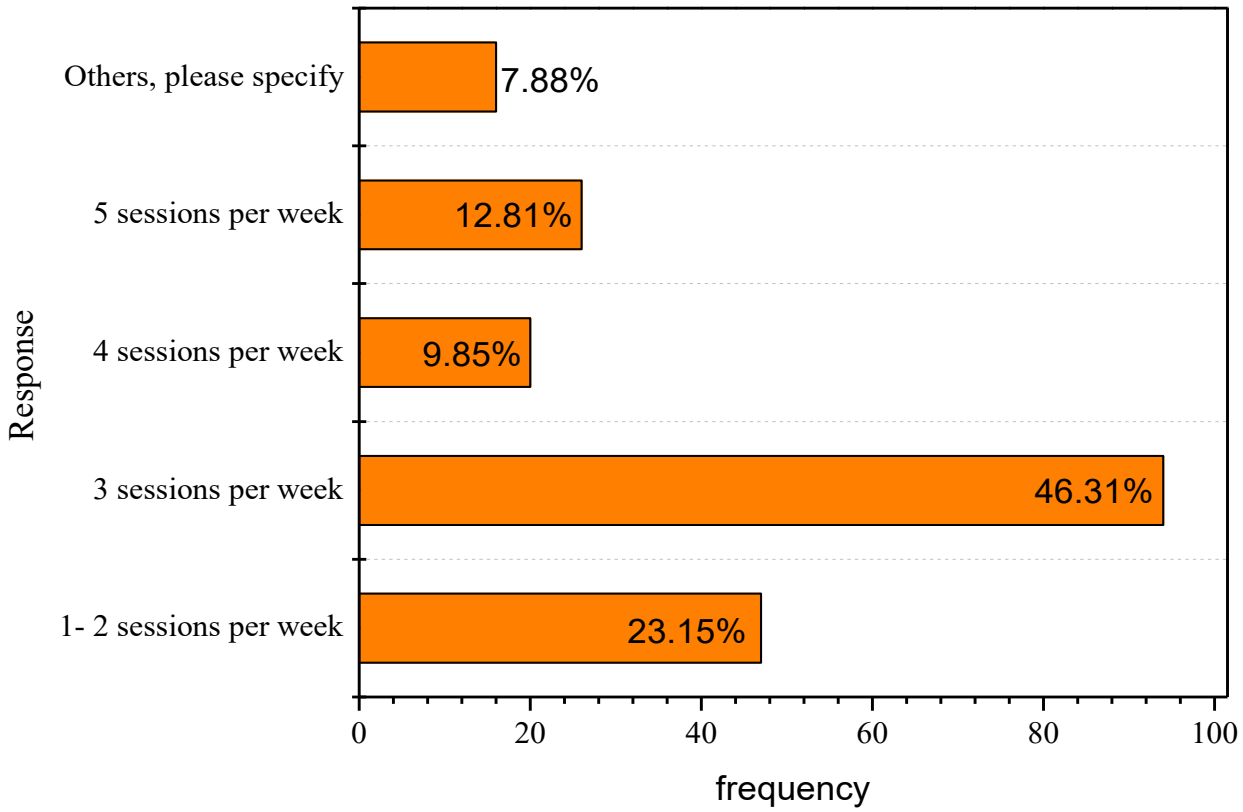


Figure 4.8: Number of treatment sessions for acute NSNP patients (n = 203)

4.3.9 Joint mobilisation approaches for treating acute NSNP

With regard to joint mobilisation approaches for the treatment of acute NSNP, the responses were the following: 49 (24.14%) of the respondents make use of Maitland joint mobilisation, 43 (21.18%) treat with Mulligan's technique, 85 (41.87%) employ the McKenzie approach, while 15 (7.39%) utilise the Cyriax method for the treatment of patients with acute NSNP. However, 59 (29.06%) respondents do not confine themselves to any particular technique. These responses are portrayed in Figure 4.9 below.

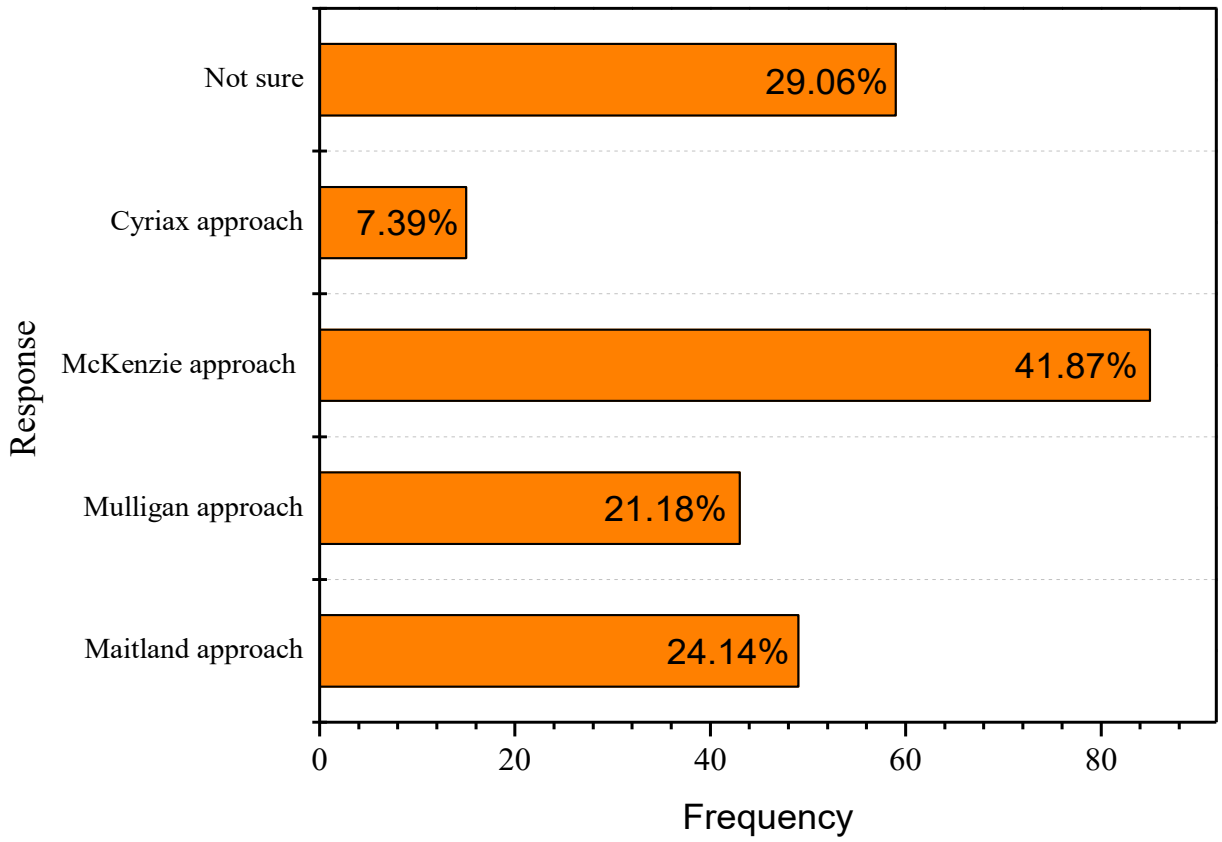


Figure 4.9: Joint mobilisation approaches for treatment of acute NSNP (n = 203, respondents could select more than one option)

4.3.10 Type of exercise most prioritised for treatment of acute NSNP

In the quest to determine the most common exercise for the treatment of acute NSNP in Ethiopia, participants were asked to select more than one response. The totals for each category (see Table A11 in Appendix B), are presented in Figure 4.10 below.

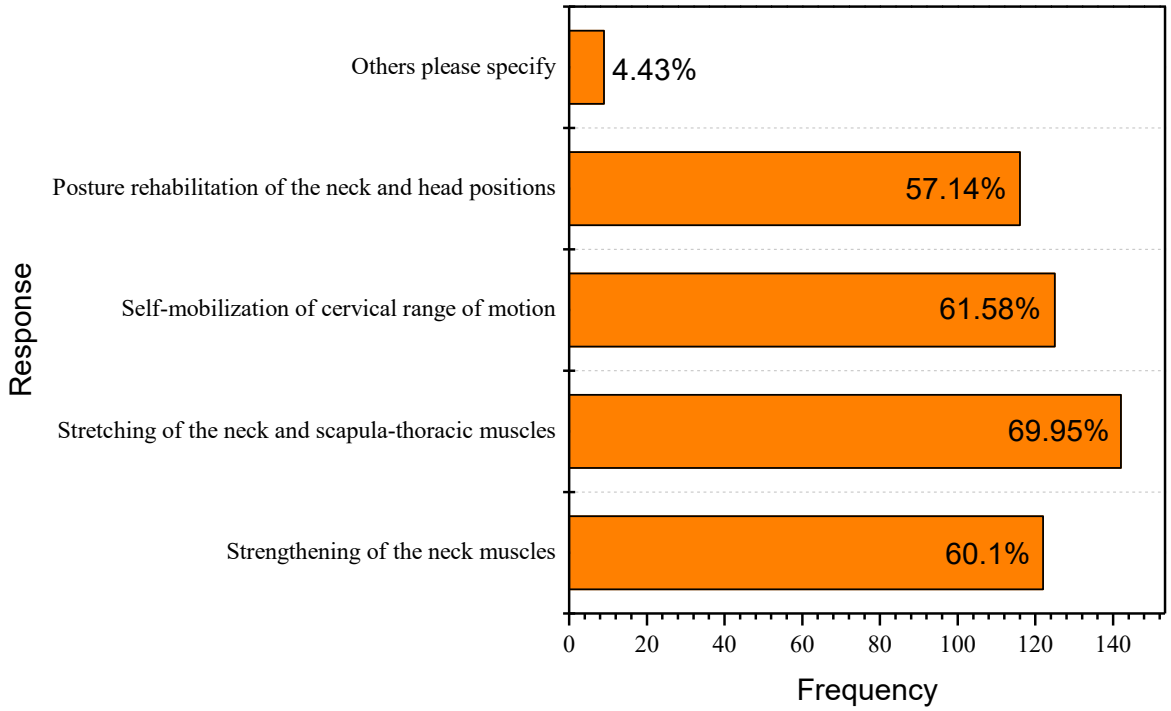


Figure 4.10: Most common types of exercise for the treatment of patients with acute NSNP (n = 203, respondents could select more than one option)

As shown in Figure 4.10 above, 122 (60.1%) participants included "Strengthening of the neck muscles" in their responses, and 142 (69.95%) included the "Stretching of the neck and scapula-thoracic muscles" in theirs. The remainder of the categories presented to participants were the following: while self-mobilisation of cervical range of motion was selected 125 (61.58%) times, "Posture rehabilitation of the neck and head positions" was chosen 116 (57.14%) times, and others 9 (4.43%) times. The respondents that selected the "Others" option, recommended the following exercises and alternative treatments in the place of the given categories of exercises: cervical vertebral mobilisation or manipulation, electrotherapy, dry needling, cervico-thoracic mobilisation or manipulation, manual traction and the use of modalities (hot pack, Transcutaneous Electrical Nerve Stimulation [TENS] plus above treatments), 1-2 days' rest, traction, and taping.

4.3.11 Type of soft tissue approach prioritised for the treatment of acute NSNP

Concerning the type of soft tissue approach prioritised for the treatment of patients with acute NSNP, respondents could choose more than one category in their response. While 31.53% chose

massage of the shoulder girdle muscles, 10.34% utilise myofascial trigger point therapy, and 23.65% use myofascial release of the shoulder girdle muscles. Furthermore, 32.02% chose passive stretching of the neck muscles, whereas 2.46% made use of other methods, in the treatment of acute NSNP. These included stretching, hold-relax, muscle energy techniques, self-stretching education, neck massage and electrical stimulation. These findings are as presented in Figure 4.11 below.

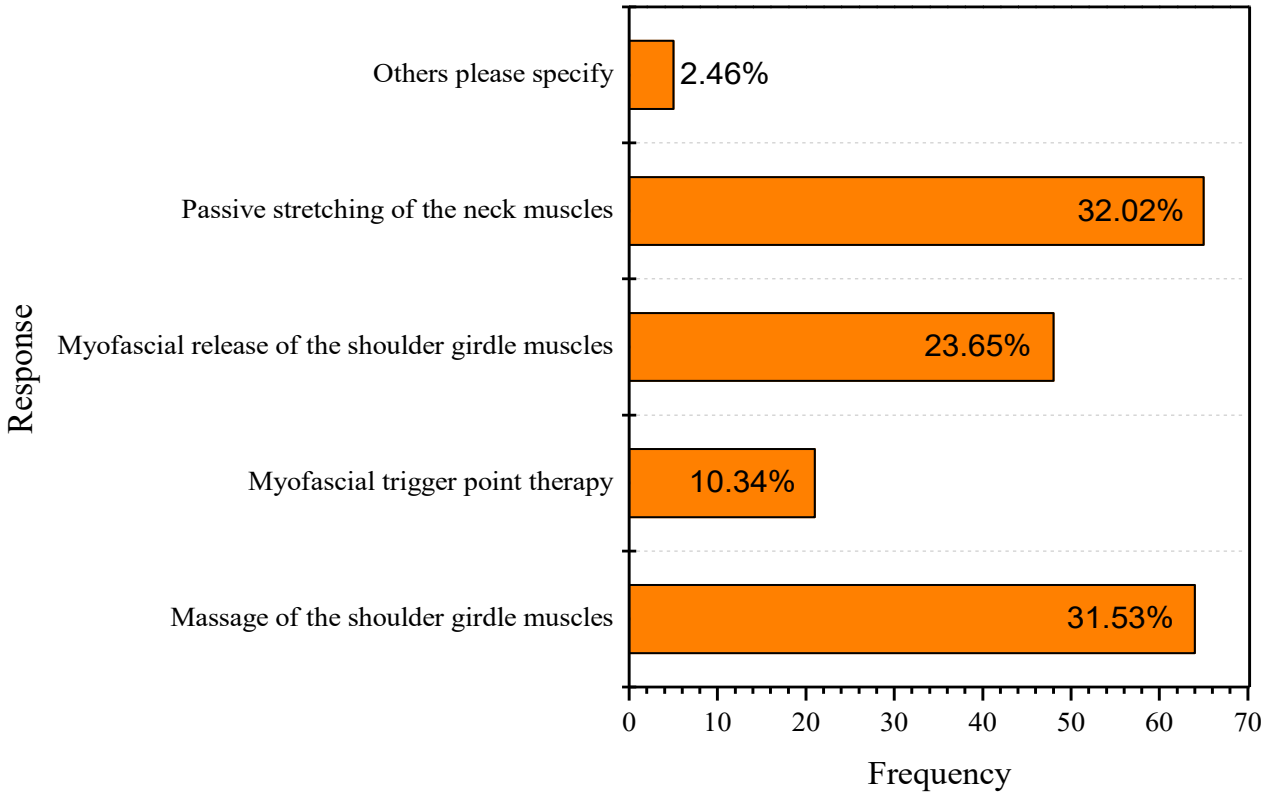


Figure 4.11: Type of soft tissue approach prioritised for the treatment of patients with acute NSNP (n = 203)

4.3.12 Type of electro-physical modality prioritised for the treatment of patients with acute NSNP

With regard to the electro-physical modalities used by the physiotherapist when treating patients with acute NSNP, the respondents selected from a number of predetermined categories. They could choose as many categories as appropriate in order to show the modalities they employed, either exclusively or in combination with others. The responses of the participants are depicted in Figure 4.12 below.

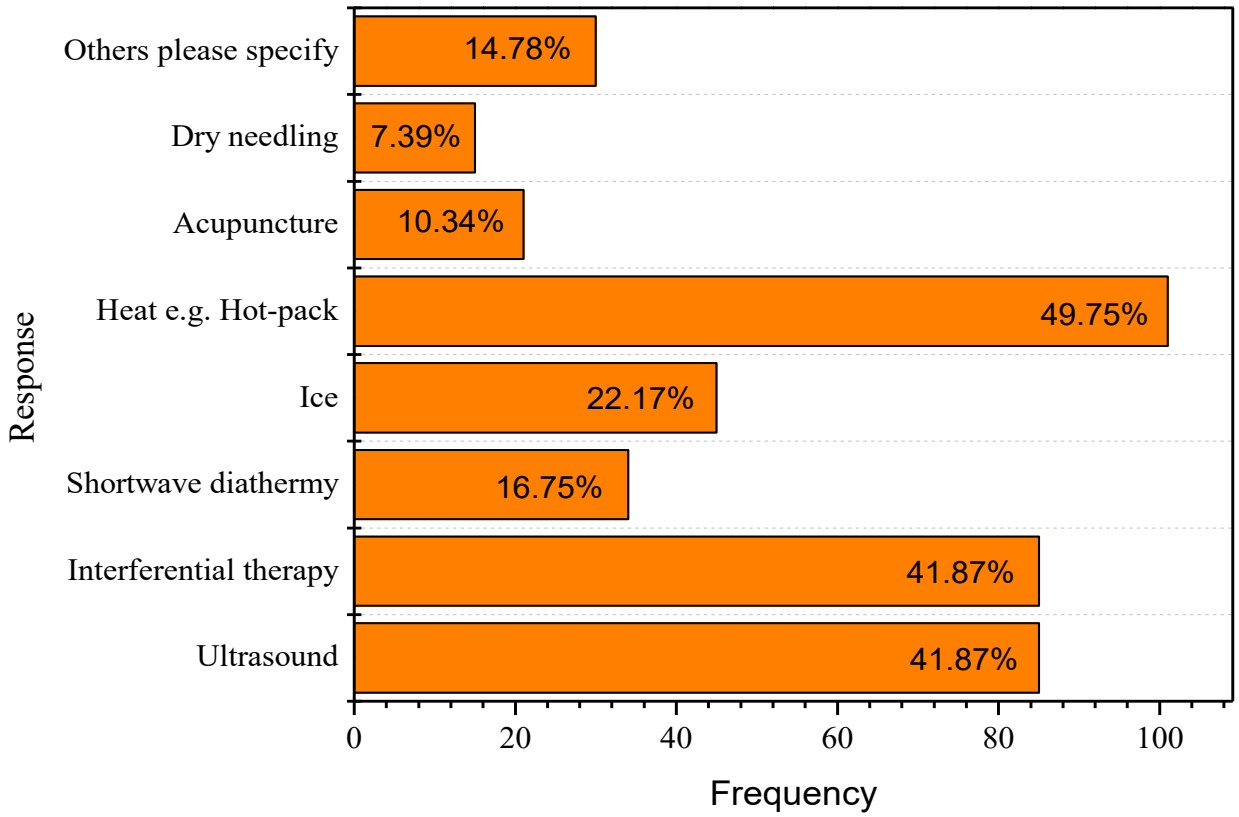


Figure 4.12: Type of electro-physical modality prioritised for treatment of acute NSNP (n = 203, respondents could select more than one option)

Eighty-five (41.87% of the total number of participants) selected ultrasound, and the same number chose interferential therapy. Whereas 34 (16.75%) selected shortwave diathermy, and 45 (22.17%) responded positively to ICE, 101 (49.75%) indicated that they treated the condition with heat, for example, hot-packs. However, 21 (10.34%) selected acupuncture, and 15 (7.39%) chose dry needling. Thirty (14.78%) indicated that they employed other methods such as TENS, infrared (IR), traction, and rest.

4.3.13 Most important approach to relieving pain and promoting healing in acute NSNP patients

With regard to importance, in terms of relieving pain and promoting healing in patients with acute NSNP, the responses of the surveyed respondents are depicted in Figure 4.13 below.

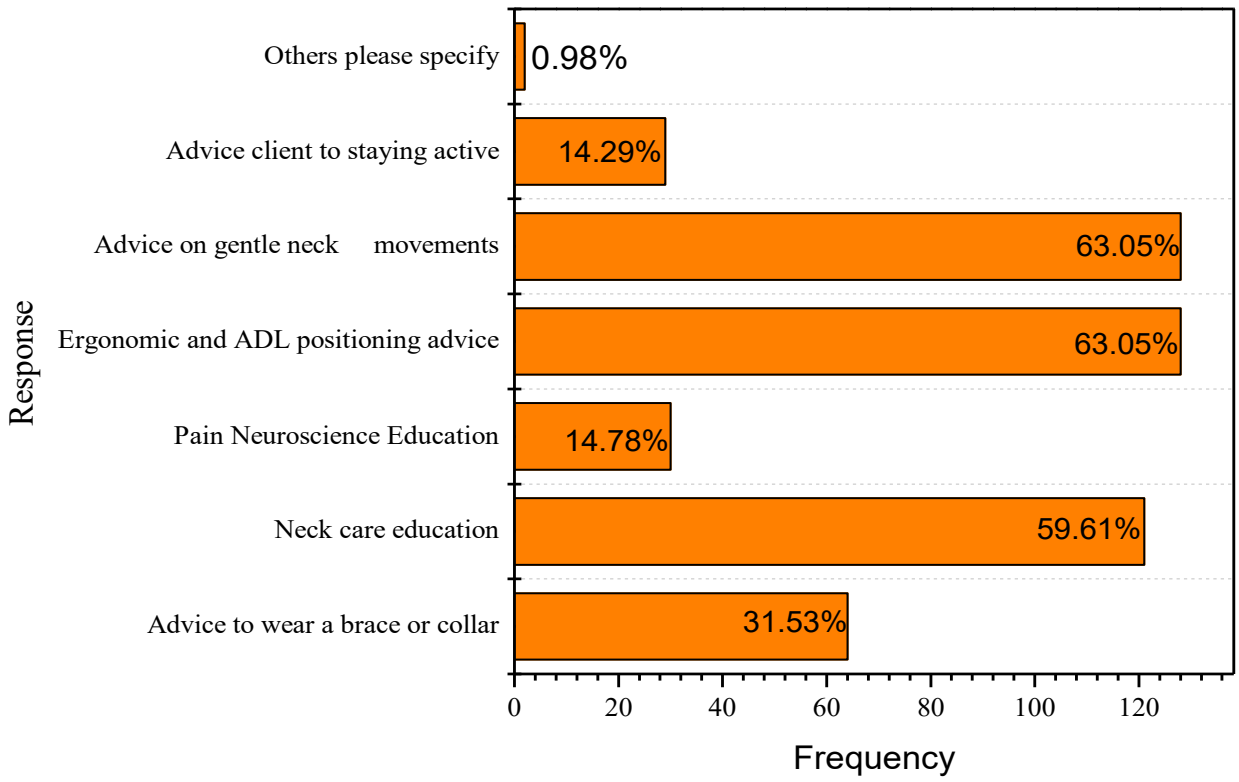


Figure 4.13: Most important approach to relieving pain and promoting healing in acute NSNP patients (n = 203, respondents could select more than one option)

While 64 (31.53% of the total number of the participants) respondents said they would advise patients to wear a brace or collar, the remainder responded as follows: 121 (59.61%) chose neck care education, 30 (14.78%) selected pain neuroscience education, 128 (63.05%) chose ergonomic and ADL positioning advice, 128 (63.05%) chose advice on gentle neck movements, 29 (14.29%) advised the client to stay active, and 2 (0.98%) respondents preferred other forms of treatment, such as postural education.

4.3.14 Peripheral neural mobilisation approach prioritised in the treatment of acute NSNP

With respect to peripheral neural mobilisation approaches, that participants prioritised in the treatment of patients with acute NSNP, the results are presented in Figure 4.14 below.

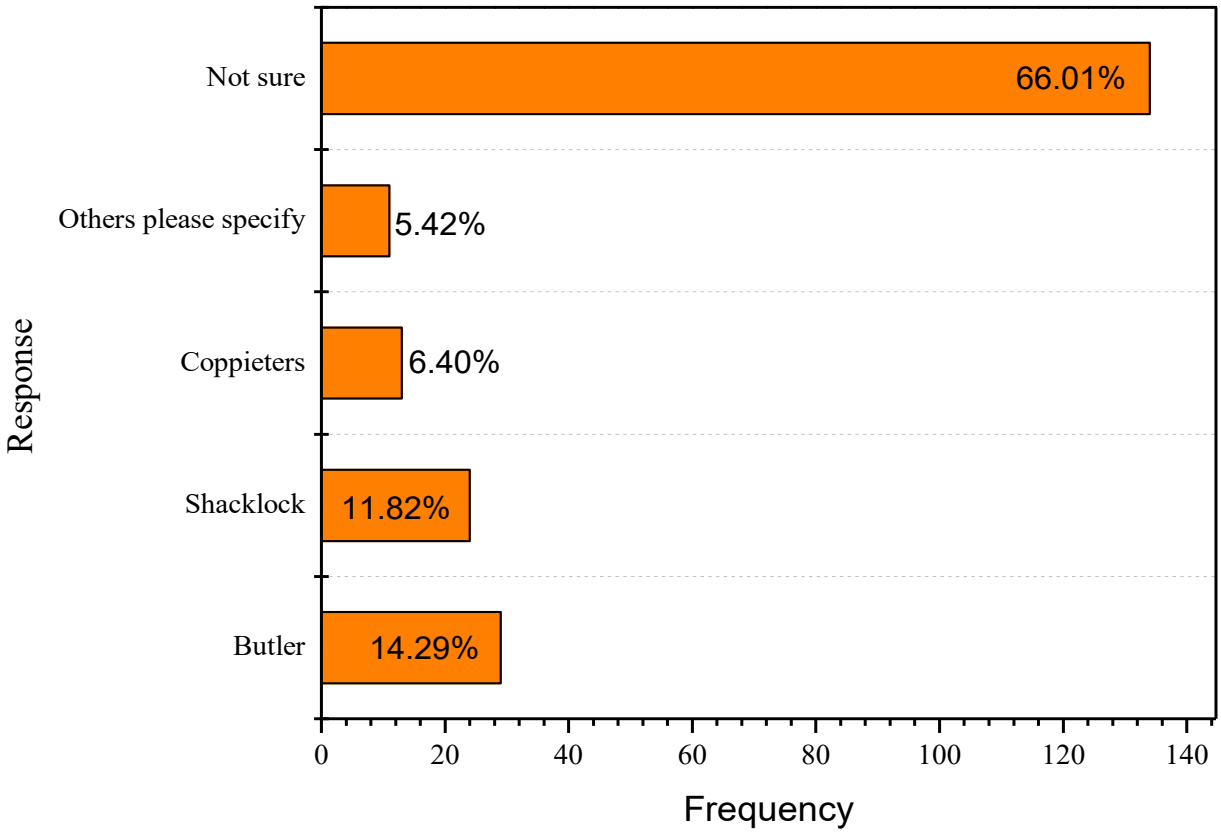


Figure 4. 14: Peripheral neural mobilisation approach prioritised in the treatment of acute NSNP (n = 203, respondents could select more than one option)

While 134 (66.01% of the respondents) participants were uncertain, 29 (14.29%) favoured the Butler approach, 24 (11.82%) utilised Shacklock, 13 (6.40%) Coppieters, and 11 (5.42%) used other approaches (such as median radial and ulnar nerve flossing or gliding), and the Maitland technique, respectively.

4.3.15 Modalities or techniques preferred in the treatment of acute NSNP

The respondents were asked to select three modalities or techniques in their preferred package of care for patients with acute NSNP. The responses are depicted in Figure 4.15 below.

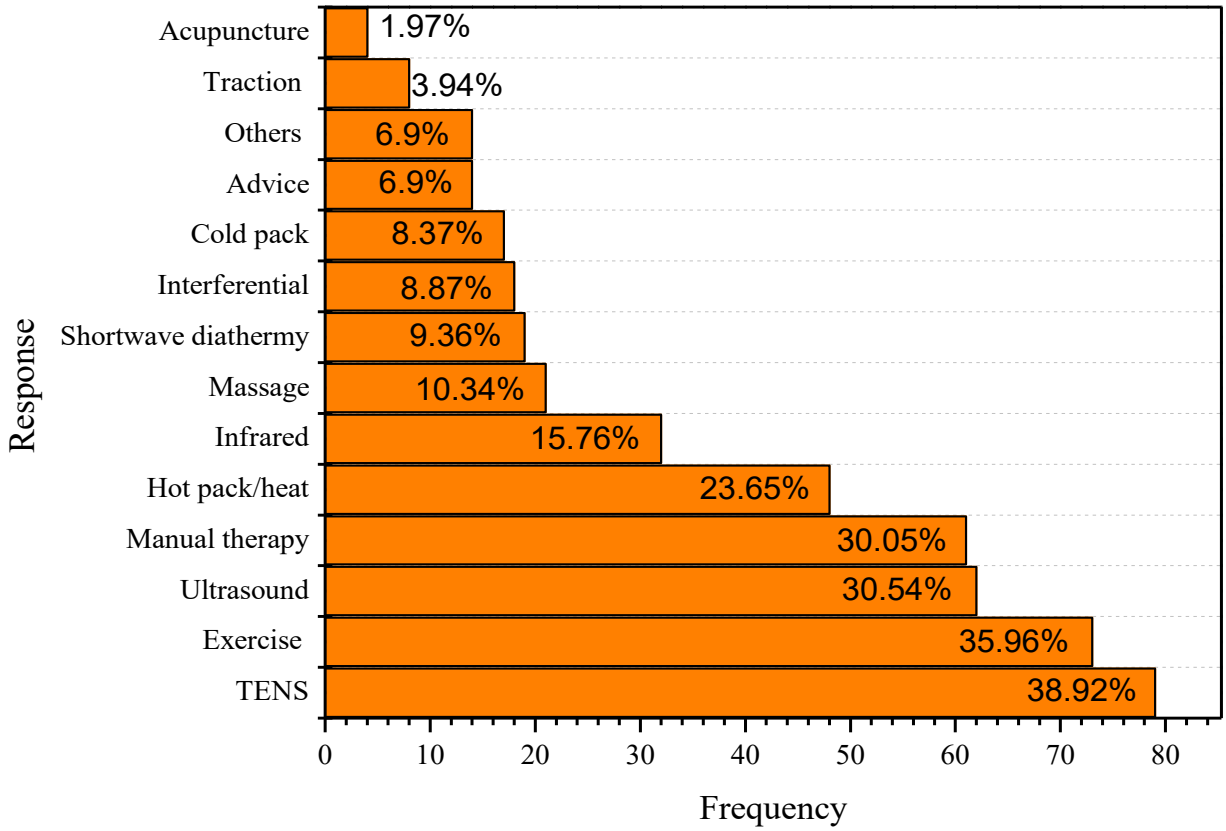


Figure 4. 15: Modalities or techniques preferred in the treatment of acute NSNP (n = 203, respondents could select more than one option)

Cumulatively, 79 (38.92% of respondents) selected TENS and 73 (35.96%) chose exercise. The other results were as follows: 62 (30.54%) ultrasound, 61 (30.05%) manual therapy, 48 (23.65%) hot pack/heat, 32 (15.76%) infrared, 21 (10.34%) massage therapy, 19 (9.36%) shortwave diathermy, 18 (8.87%) interferential, 17 (8.37%) cold pack, 14 (6.9%) advice, 14 (6.9%) others (such as dry needling, tapping, cervical collar, encourage activity of daily living [ADL], avoid high pillow), 8 (3.94%) cervical traction, and 4 (1.97%) acupuncture, respectively.

4.3.16 Opinion on evidence-based management of acute NSNP physiotherapy treatment

Regarding the prevalence of the evidence-based management of patients with acute NSNP, participant responses are presented in Figure 4.16 below. While 14.78% responded with Very poor (referring to severe lack of adherence to, or dependence on, and appreciation for evidence while treating the condition), 27.57% selected Poor (general lack of adherence to evidence),

32.02% chose Good (awareness of importance of evidence), 12.81% chose Very good (greater awareness), and 12.81% selected Not sure.

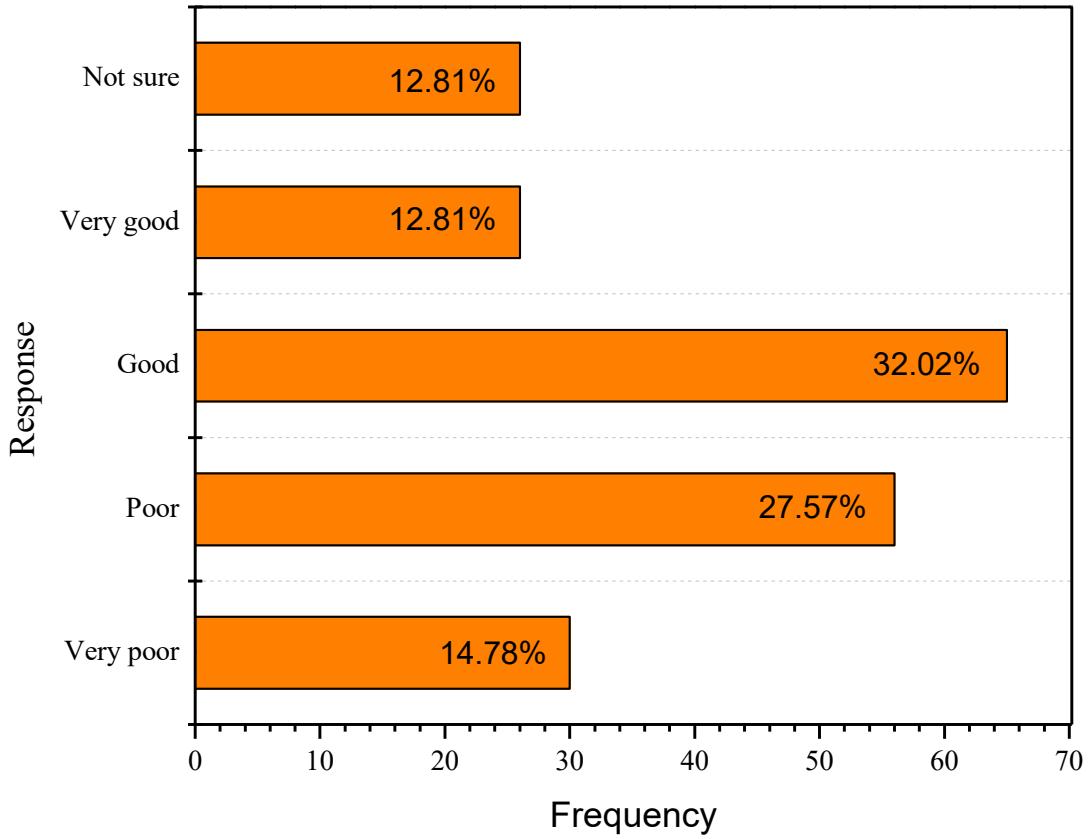


Figure 4.16: Opinion on evidence-based management of acute NSNP physiotherapy treatment (n = 203)

4.3.17 Effectiveness of cervical manipulation approaches combined with supervised exercises in treating acute NSNP

With regard to whether the combination of cervical manipulation approaches and supervised exercises are effective in the treatment of patients with acute NSNP, the responses were the following: 2.46% said it was Not effective, 4.43% said that it was Less effective, 61.58% said it was Effective, and 25.62% thought it was the Most effective approach. The remaining 5.91% indicated that they were Not sure. Figure 4.17 below shows these responses on the effectiveness of cervical manipulation approaches combined with supervised exercises in the treatment of patients with acute NSNP.

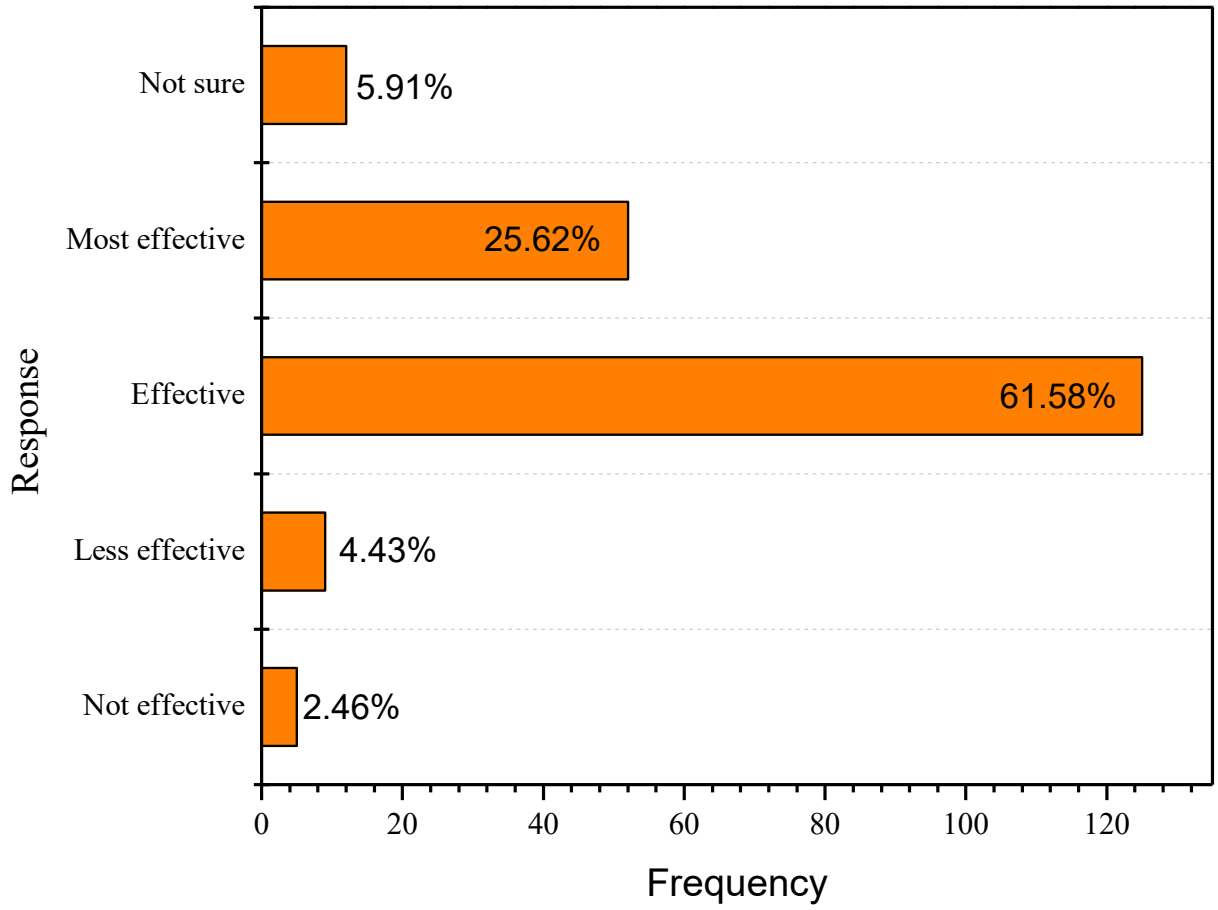


Figure 4.17: Effectiveness of cervical manipulation approaches combined with supervised exercises in treating patients with acute NSNP (n = 203)

4.3.18 Special education required in the field of acute NSNP

The opinion of the respondents on whether special education in physiotherapy amongst practitioners is required to effectively treat patients suffering from acute NSNP is presented in Figure 4.18 below.

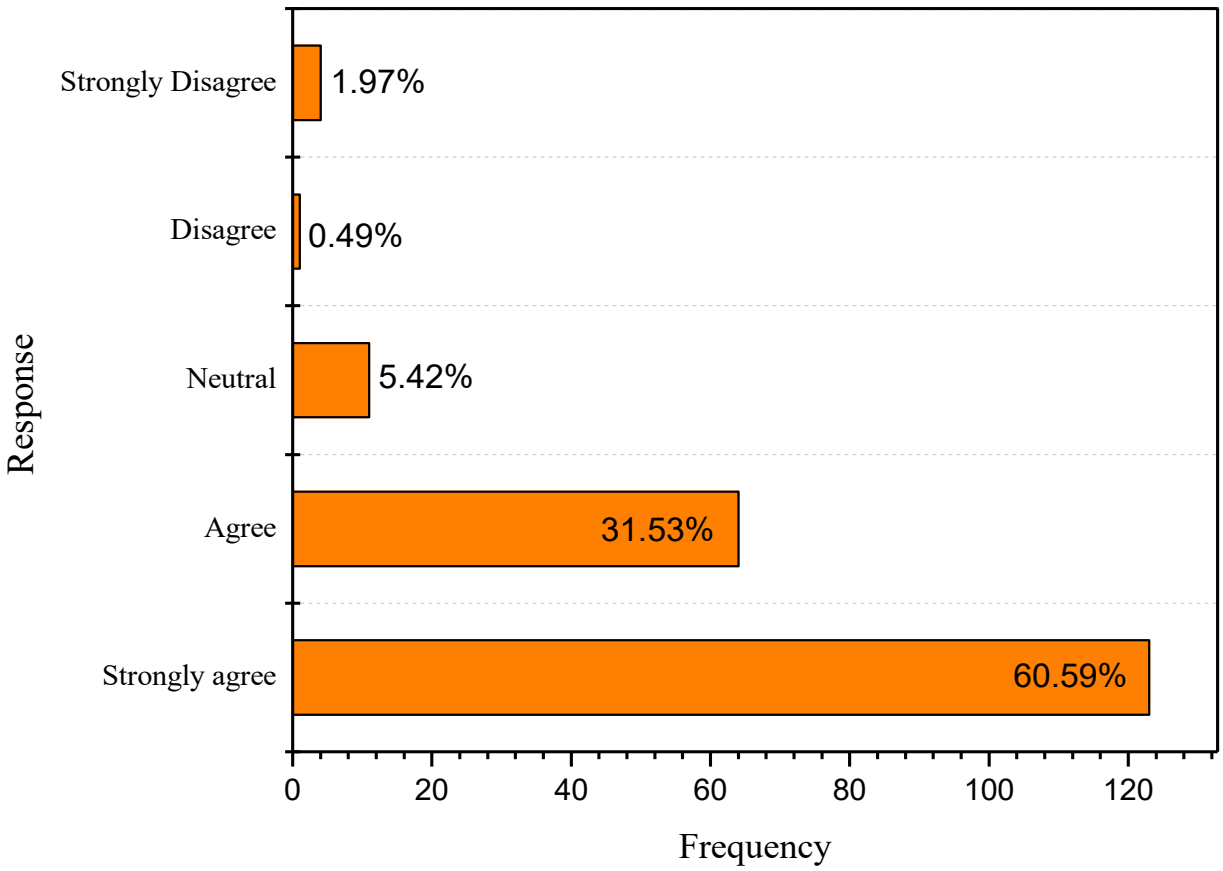


Figure 4.18: Opinion whether special education in the field of acute NSNP is required (n = 203)

While 60.59% of the respondents Strongly agree with this proposition, that special education in physiotherapy amongst practitioners is required to effectively treat patients suffering from acute NSNP, 31.53% Agree, 5.42% take a Neutral stance, 0.49% Disagree and 1.97% Strongly disagree.

4.3.19 Comparison between development of new neck pain and counselling or lifestyle education from physiotherapists

When asked whether patients at risk of developing new neck pain need counselling or lifestyle education from physiotherapists, participants responded as shown in Figure 4.19 below.

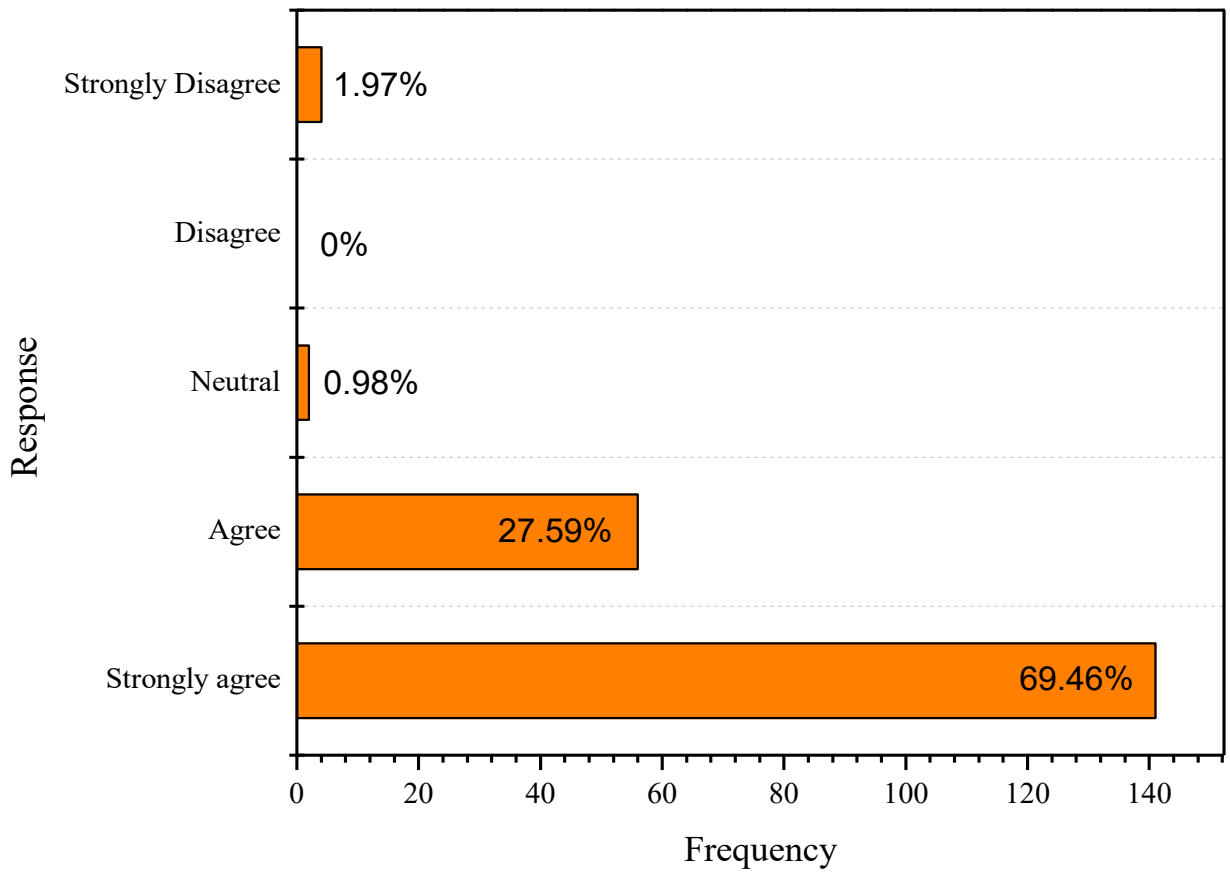


Figure 4.19: Opinion on relationship between development of new neck pain and counselling or lifestyle education from physiotherapists (n = 203)

While 69.46% of the respondents strongly agreed that counselling or lifestyle education from physiotherapists would play an important role in the lives of patients who risk developing acute NSNP, the rest take the following positions: 27.59% Agree, 0.98% assume a Neutral stance, and 1.97% Strongly disagree.

4.3.20 Need for counselling or education from physiotherapists for patients at risk of developing chronic neck pain

In terms of the need for counselling or education from physiotherapists for patients at risk of developing chronic neck pain, the responses, presented in Figure 4.20, were the following: 71.41% Strongly agreed, 24.63% Agreed, 1.48% were Neutral, 0.98% Disagreed and 0.49% Strongly disagreed.

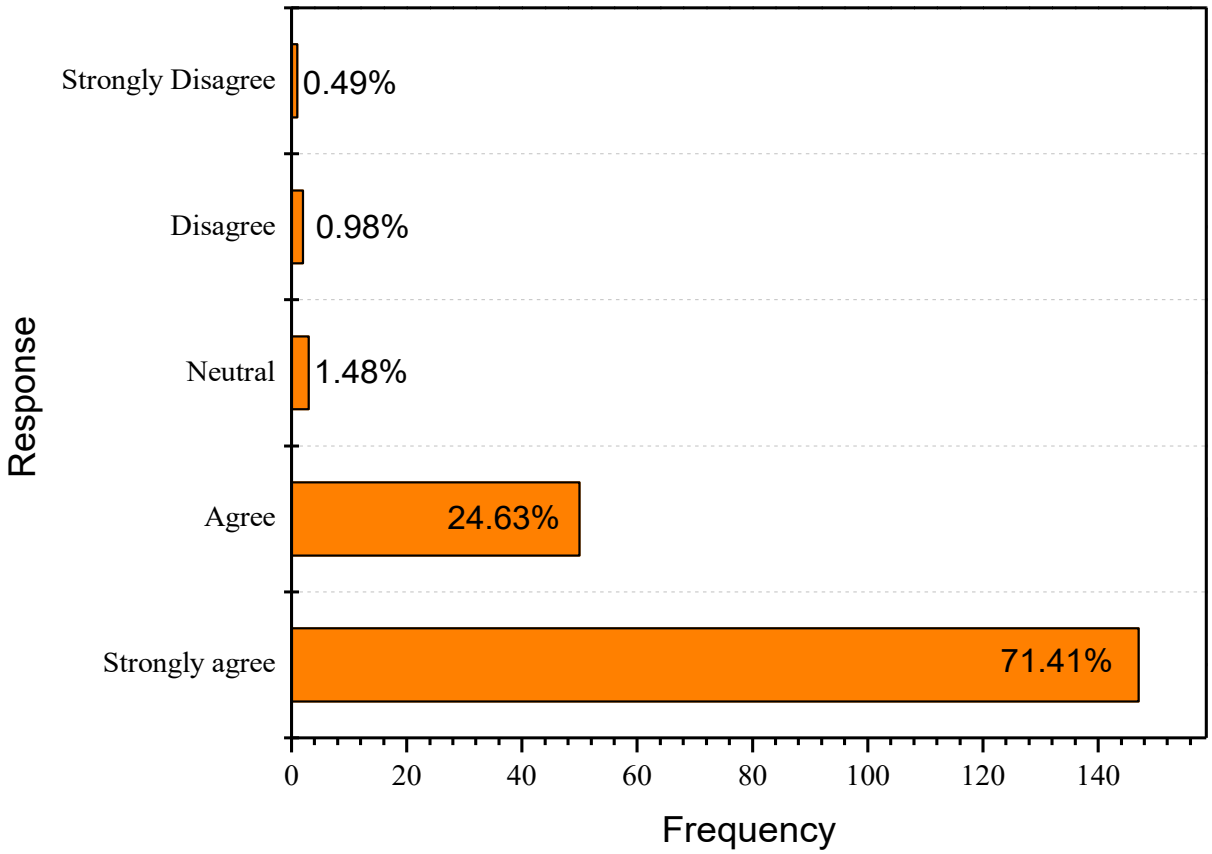


Figure 4.20: Need for counselling or education from physiotherapists for patients at risk of developing chronic neck pain (n = 203)

4.3.21 Time most appropriate for the referral of acute NSNP patients to relevant health care practitioners

Regarding the time that is most appropriate for the referral of acute NSNP patients to relevant health care practitioners, participant responses are depicted in Figure 4.21 below (please note that the respondents could select more than one response).

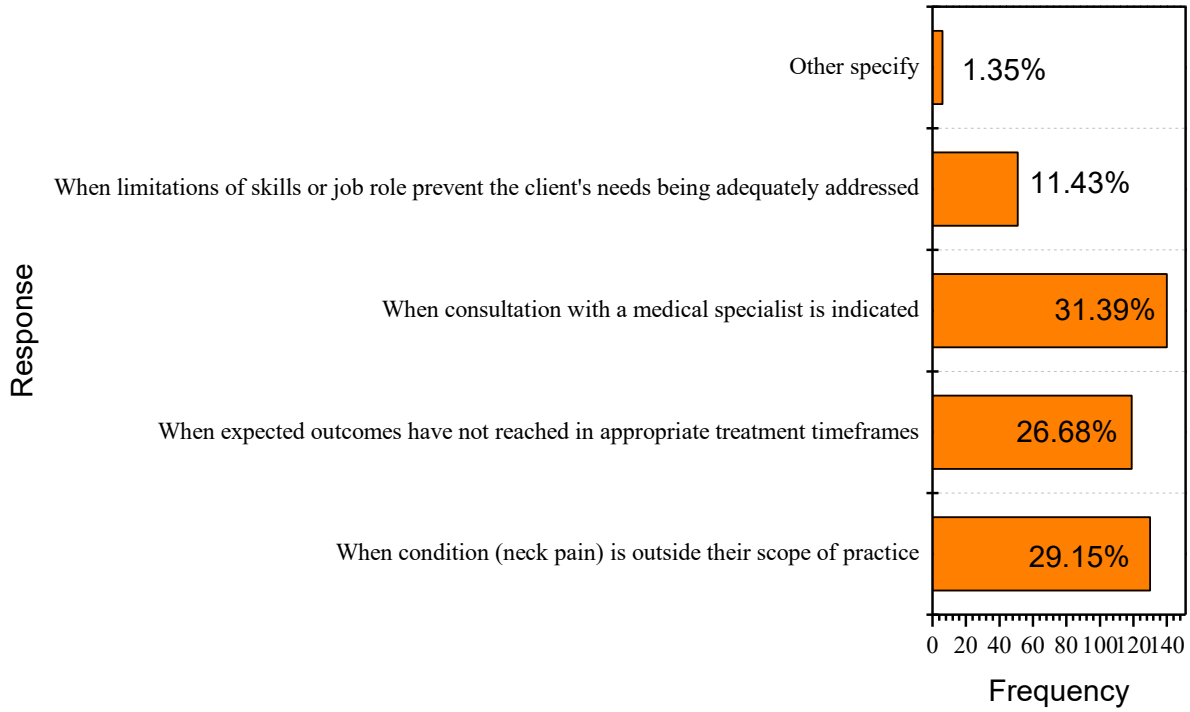


Figure 4.21: Time most appropriate to recommend a referral during the treatment process of acute NSNP (n = 203)

While 130 participants (60.04% of respondents surveyed) reported that they would refer their patients to relevant health care practitioners whenever the condition (neck pain) is outside their scope of practice, 119 (58.62%) would only make the referral when the expected outcomes had not been achieved within the appropriate time frame. Furthermore, 140 (68.97%) would refer their patients whenever they were of the opinion that consultation with a medical specialist was necessary, while 51 (25.12%) preferred to make the referral when limitations of skill or job role prevented clients' needs from being adequately addressed. The remaining 6 (2.96%) respondents would make referrals to relevant health care practitioners for other reasons outside the scope of the given categories such as the following: as early as possible; if they do not get better after each session; if the condition gets worse after three or four physiotherapy treatment sessions; in cases of patients presenting with hyper cervical mobility; and, if there are red and yellow flags.[7]

[7] In this study, Red flags refer to clinical findings that are possible indicators of spinal pathology (Yusuf, Finucane, & Selfe, 2019). The authors describe the following conditions as red flag for neck pain: signs of spinal cord compression, osteoporosis, history of cancer, previous neck surgery, vascular insufficiency, unexpected weight loss, fever, and infections like tuberculosis (TB). On the other hand, the term yellow flags are used to describe psychological prognostic factors such as worry, fear, anxiety, and lack of activities due to pain, which may lead to the development of disability following musculoskeletal pain (Nicholas et al., 2011).

4.4 Discussion of the findings

The findings of this quantitative phase of the study suggest that the physiotherapy profession in Ethiopia is a male-dominated domain. Also, most Ethiopian physiotherapists are young. The majority of physiotherapists in Ethiopia are considerably well-educated too. The findings of this study also indicate that many physiotherapists in the country are in the early stages of their careers. It is difficult to find a physiotherapist with 20 or more years of experience in Ethiopia. This may be attributed to the lack of overt government funding and public support for the physiotherapy profession in the country, despite the fact that the situation is now gradually beginning to change, as the country's authorities appear to be paying more attention to the profession (see Footer et al., 2017). Owing to discouragement arising from the lack of governmental support (such as limited bursaries to study physiotherapy, and inadequate state-funded posts), the first group who first took physiotherapy in Ethiopia appear to have deviated into other areas of the health profession (such as laboratory technician and health officer posts, which appear to be more marketable) (see Frantz, 2007; Weldegebriel et al., 2016). In the context of developing a new protocol for treating patients with acute NSNP, another argument could also be made: the fact that most of the country's physiotherapists are in the early stages of their careers could be a good thing, as it could mean that the physiotherapy sector has a young workforce who might be more likely to adapt to new approaches, such as the protocol suggested in this thesis.

In this study, most Ethiopian physiotherapists worked as general practitioners; the musculoskeletal domain of practice was predominant, followed by the neurological and paediatric domains. Other areas of practice, such as geriatric, cardiopulmonary, wellness or health promotion, community development, and research have attracted very few practitioners as the findings of this study have revealed (see Figure 4.2). Alongside these findings, the study notes that there was a lack of schools involved in the teaching of specific areas of physiotherapy practice that would enable specialisation in the country. Also, neurological, musculoskeletal and paediatric therapy are gradually increasing in popularity in the Ethiopian physiotherapy sphere.

A substantial portion of physiotherapists in Ethiopia do not know if there is a physiotherapy treatment protocol in their department (see Figure 4.3). Nonetheless, the study finds that many

physiotherapists appreciate the need for a protocol to guide the treatment of patients with NSNP. These findings support the FMHACA (2014) contention that Ethiopian physiotherapists use their discretion or skill level to select the treatment approach or method for acute NSNP patients. They also call for research aimed at developing a contextually appropriate treatment protocol for acute NSNP, such as the current study.

In their quest to remain apprised of clinical developments in the field of physiotherapy practice, the majority of Ethiopian physiotherapists depend largely on physiotherapy journals. They also stay updated through informal contact with colleagues, meetings with peer groups and conference attendances. A smaller number use online sources such as YouTube, Google and Physiopedia. The fact that most Ethiopian physiotherapists depend on professional journals to keep apprised of developments in the field alludes to the importance that they attach to research. Accordingly, the Ethiopian Physiotherapists' Association could take measures, such as lobbying other stakeholders, at both the national and international levels, for funding and other resources aimed at, among other objectives, gaining members access to more evidence-based physiotherapy information from the above-mentioned sources.

From the findings of this survey, it appears that the most common frequency to treating patients with acute NSNP is three times a week. There is no agreed upon or universal approach to the treatment of the condition insofar as the number of treatment sessions is concerned, which suggests that further research may be warranted. Although preferences abound and are varied, the McKenzie joint mobilisation approach seems to be the most common in the treatment of patients with acute NSNP amongst Ethiopian physiotherapists. From the findings it appears that the most preferred exercise in the treatment of acute NSNP is the stretching of the neck and scapula-thoracic muscles. Amongst the various choices available, passive stretching of the neck muscles and the massage of the shoulder girdle muscles appear to be the most popular soft tissue approaches to the treatment of acute NSNP and they are employed in almost equal measure. Furthermore, the findings of this study revealed that hot-pack, ultrasound, and interferential therapy are the most popular electro-physical modalities for the treatment of acute NSNP. It is important to note that these findings are largely representative of the opinions of practitioners who studied under a relatively constricted curriculum as discussed in chapter 1. Given that the

physiotherapy curriculum in Ethiopia has since been expanded, other options may come to the fore in terms of popularity. Indeed, the new content taught under the Generic DPT curriculum introduces new knowledge, and varieties of evidence-based contemporary physiotherapy treatment options, ensuring the profession in Ethiopia is up-to-date with global practice.

Also, these survey findings are consistent with those of a study conducted by Celik, Ketenci, Esmaeilzadah and Sindel (2013) on the efficacy of therapeutic ultrasound in non-specific mechanical neck pain. Celik, Ketenci, Esmaeilzadah and Sindel (2013) found that therapeutic ultrasound is effective in the reduction of the severity of neck pain and the sensitivity level of the painful point on the cervical region. It increases the pressure pain threshold (PPT). Furthermore, it affects the functional status of the cervical region by increasing its range of motion (Celik, Ketenci, Esmaeilzadah & Sindel, 2013). However, research by Beatti, Rayner, Souvlis and Chipchase (2010) on the effect of interferential therapy on induced pain reported that there is inadequate evidence in their study to support the effectiveness of interferential therapy in pain management. It was also revealed that ergonomic and ADL positioning advice, advice on gentle neck movements, and neck care education are the most popular approaches to relieving acute NSNP. The present findings are consistent with a study conducted by So, Szetou, Dai and Tsang (2019) on the effects of ergomotor intervention on improving work-related neck-shoulder pain among occupational health workers. In that study it was reported that in the production of a favourable occupational health outcome, ergomotor intervention is more effective when compared to other forms of therapy, such as electrotherapy and exercise. Furthermore, this finding is consistent with the study of Koh et al. (2014) on the effect of neck education to decrease the severity of neck pain where it was revealed that neck care education, and postural advice are effective in the reduction of the incidence and severity of neck and shoulder pain.

An overwhelming majority of participants were unsure of the most effective peripheral neural mobilisation approach in the treatment of patients with acute NSNP. This finding implies that a significant number of Ethiopian physiotherapists are not familiar with the aforementioned joint mobilisation approaches. Among the survey participants, TENS appears to be the preferred modality in the treatment of patients with acute NSNP, followed closely by exercise, ultrasound, and manual therapy, in that order.

From the above-mentioned findings, we may also conclude that special education in physiotherapy is required to deal effectively with patients presenting with acute NSNP. It is also evident that patients at risk of developing new neck pain need counselling or lifestyle education from physiotherapists. Finally, we may conclude that Ethiopian physiotherapists refer patients suffering from acute NSNP to specialists mainly for the following three reasons: whenever they are of the opinion that consultation with a medical specialist is necessary; whenever the condition (neck pain) is outside their scope of practice; and, where expected outcomes have not been attained within appropriate treatment timeframes.

4.5 Summary of the chapter

The main objective of this phase of the study was to establish the dominant trends and patterns around the treatment of patients with acute NSNP in Ethiopia, to aid in the process of developing an empirically founded treatment protocol for this ailment. This final section, therefore, presents a summary of the findings on the actual treatment of patients with acute NSNP by physiotherapists in Ethiopia. The main findings of this study, with regard to the actual treatment of patients with acute NSNP by physiotherapists in Ethiopia are the following: the majority of Ethiopian physiotherapists conduct three sessions per week for every patient; the most widely used neck joint mobilisation treatment approach is Mckenzie. The type of exercise most prioritised for the treatment of patients with acute NSNP is the stretching of the neck and scapula-thoracic muscles. The type of soft tissue approach prioritised is passive stretching of the neck muscles. The most utilised type of electro-physical modality is heat; the most popular approaches to relieving pain and promoting healing in acute NSNP patients are ergonomic and ADL positioning advice. With respect to peripheral neural mobilisation, the Butler approach is the most widely used; TENS is the preferred modality with respect to electro-physical approaches; and the combination of cervical manipulation with supervised exercises is found to be most common in the treatment of patients with acute NSNP. The aforementioned salient features that characterise physiotherapy practice in Ethiopia, with a specific emphasis on the current modalities used in the treatment of patients with acute NSNP, partly informed the treatment protocol that was devised through this research. The subsequent chapter of this study will present the systematic review of the evidence on the effectiveness of these treatment strategies to develop a protocol for patients with acute NSNP.

Chapter 5

Phase 2: Systematic Review

5.1 Introduction

This chapter presents a systematic review of the evidence on the effectiveness of some of the common treatment strategies identified in the previous chapter, in addition to others that emerged from the preliminary literature review in Chapter 2. The literature review findings in Chapter 2 revealed that combination therapy works better than singular therapy in the treatment of acute NSNP (see, for example, Saayman et al., 2011; Puentedura et al., 2011; Hidalgo et al., 2017). The systematic review presented in this chapter considered these important findings. Also, as argued in the previous chapter, the survey phase of this study served to alleviate incertitude and the strenuous elements associated with the process of conducting a systematic review. The question that guided the systematic review was: What is the current state of evidence for the effectiveness of physiotherapy treatment for patients with acute NSNP, and how does it compare to the most common practices among Ethiopian physiotherapists? Establishing the common techniques used by Ethiopian physiotherapists have made it possible for comparisons to be made with the data obtained from this systematic review with the objective of finding gaps in the current treatment strategies employed in Ethiopia. Addressing such gaps – through the incorporation of some elements of global best practice – in the researcher's view, could aid in uplifting Ethiopian physiotherapy practice standards. The various parts of the chapter are arranged and presented in the following sequence: search results; assessment of study quality and reporting; general data extraction and characteristics of the included studies; discussion of the findings; limitation of the review; and summary of the chapter.

5.2 Search results

The electronic database search led to the retrieval of 2 710 potentially relevant citations. The results were imported into Endnote and duplicate articles were then removed. Following the removal of duplicates and other irrelevant articles (such as articles on traumatic, specific neck pain, and other acute pain), letters, commentaries, editorials and conferences, 192 potentially suitable articles were left to be screened by reading the abstracts. Following this, 109 articles were removed for various reasons, leaving 83 articles that were read in full and assessed against the eligibility criteria. Finally, 20 studies were considered to be potentially appropriate for

inclusion in the review. The extensive search process, and its results, are captured in Figure 5.1 below, a flow chart depicting the different phases of the review.

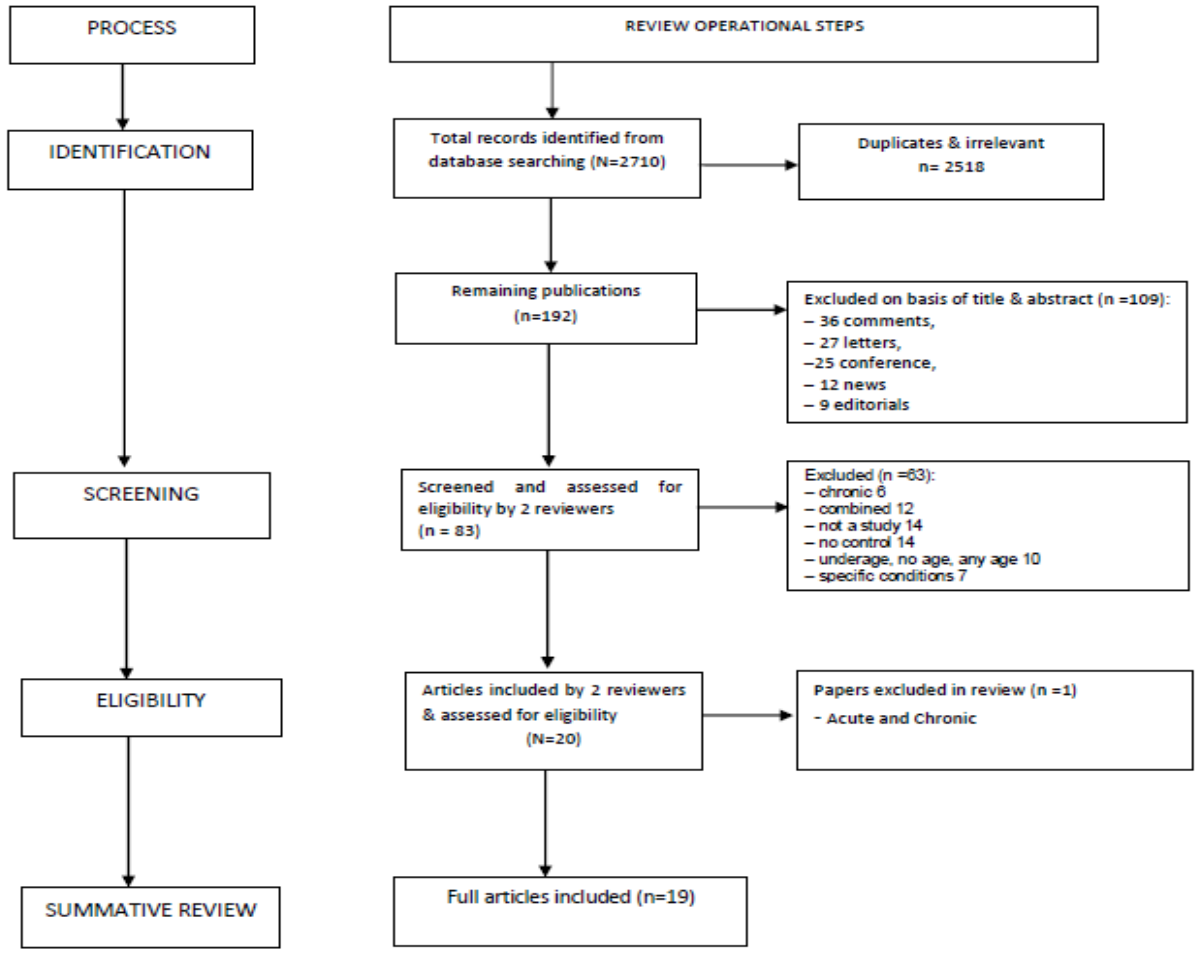


Figure 5.1: Extensive search results retrieved from electronic database and the flow chart of studies through the different phases of the review

Table 5.1 below gives more details of the characteristics of the 20 studies that were assessed for eligibility.

Table 5.1: Characteristics of the 20 studies assessed for eligibility

Authors/years	Sample size	Place of study	Study design	Level of evidence
McNair et al. (2007)	1 (male)	Auckland, New Zealand	Case study	III
González-Iglesias et al. (2009)	45 (20 males, 25 females)	Madrid, Spain	RCT	I
Desai et al. (2013)	26 (17 males, 9 females)	Maharashtra, India	RCT	I
Leaver et al. (2013)	181 (64 males, 117 females)	Sydney, Australia	Observational	II
Shah and Shah, (2015)	30 (11 males, 19 females)	Ahmedabad, India	RCT	I
Predel et al. (2013)	72 (36 males, 36 females)	Düsseldorf, Germany	RCT	I
Brockow et al. (2008)	128 (28 males/98 females)	Saxony, Germany	RCT	I
Naik et al. (2016)	30 participants, male & female	Dr Prahakar Kore Hospital & Dr BMK Ayurverdic Hospital Belgaum, India	Quasi-experimental	II
Javaid et al. (2016)	48 (25 males, 23 females)	University of Lahore, Pakistan	RCT	I
Hussain et al. (2016)	50 participants, gender not reported.	Shalamar Hospital; Lahore, Pakistan	RCT	I
Nagrale et al. (2010)	60 (25 males, 35 females)	Dhamtari, India	RCT	I
Puentedura et al. (2011)	24 participants, gender not reported.	University of Las Vegas, USA	RCT	I
Leaver et al. (2010)	64 males/ 118 females	University of Sydney, Australia	RCT	I
González-Iglesias et al. (2009)	45 (24 males, 21 females)	Escuela de Osteopata de Madrid, Spain	RCT	I
Gemmell et al. (2008)	45 participants, gender not reported	Anglo-European College of Chiropracitc, UK	RCT	I

Bronfort et al. (2012)	272 participants gender not reported	Minneapolis, Minnesota, USA	RCT	I
Masaracchio et al. (2013)	64 (13 males, 51 females)	Long Island University & Nova Southeastern University, USA	RCT	I
Ganesh et al. (2015)	60 (38 males, 22 females)	Orissa, India	RCT	I
Leininger et al. (2014)	261 participants gender not reported.	Minneapolis, Minnesota, USA	RCT	I
Groeneweg et al. (2017)	181 participants	The Netherlands	Observational study	II

The level of evidence used in this thesis, which was determined with the recommendations of a rating scheme devised by the Johns Hopkins University (2017) as shown on Table 5.2 below.

Table 5.2: Rating scheme

Evidence Levels	**Quality Guides**
Level I Experimental study, randomized controlled trial (RCT)	High quality: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on a comprehensive literature review that includes thorough reference to scientific evidence
Level II Quasi-experimental and observational study	Good quality: Reasonably consistent results; sufficient sample size for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on a fairly comprehensive literature review that includes some reference to scientific evidence

Level III Systematic review of a combination of RCTs, quasi-experimental and non-experimental studies, Qualitative study and case study	Low quality evidence: RCT evidence combined with low evidence level of qualitative and case study. Consistent results and sample size of RCT combined with one case study and qualitative studies results; and insufficient sample size for the study design. Evidence of conclusions drawn for the combined RCT, qualitative and case study systematic review.

Source: The Johns Hopkins Hospital/ Johns Hopkins University School of Nursing (2017)

5.3 Assessment of study quality and reporting

The purpose of the critical appraisal process is to assess the methodological rigour of all the included studies up to this point. This study made use of a quality appraisal tool presented by Hawker et al. (2002), which allows for the appraisal of evidence from studies with disparate or heterogeneous designs (see Appendix L). This tool was appropriate because this review included studies of various designs. The researcher conducted the critical appraisal and the study supervisor reviewed the outcomes. As recommended by Hawker et al. (2002), the checklist for critically appraising each study comprised of reviewing the abstract and title, introduction and aims, method and data, sampling, data analysis, ethics and bias, findings or results, transferability and implications, and usefulness. Each aspect of the above-mentioned criteria was apportioned a score based on the following scale: Good (4), Fair (3), Poor (2) and Very poor (1). This criterion and scoring system were applied consistently to each study. Therefore, each study obtained a total score that would determine the quality of the evidence it presented. In accordance with the recommendations of Hawker et al. (2002), each study with a score higher than 18, out of the possible total of 36, was included in the review. Table 5.3 below, gives the specifics of the scores awarded to the 19 studies that were finally included in this review.

Table 5.3: Methodological quality scores of the 19 included studies

Authors & Years	Abstracts & Titles	Introduction & Aims	Methods & Data	Sampling	Data Analysis	Ethics & Bias	Results	Transferability & Generalisability	Implications & Usefulness	Total score maxi = 36
McNair et al. (2007)	3	3	4	4	3	1	4	2	2	26
Shah and Shah, (2015)	4	3	3	3	4	3	4	2	2	28
Hussain et al. (2016)	4	3	3	4	3	2	3	3	3	28
Ganesh et al. (2015)	3	3	4	4	3	4	3	2	2	28
Leininger et al. (2014)	4	3	3	3	3	4	3	3	3	29
Desai et al. (2013)	4	4	4	4	3	4	2	2	3	30
Gemmell et al. (2008)	4	3	4	3	3	4	4	3	3	31
Leaver et al. (2013)	3	3	4	4	4	4	4	3	3	32
Naik et al. (2016)	4	4	4	4	4	3	4	2	3	32
Javaid et al. (2016)	4	3	3	4	4	2	4	4	4	32
Puentedura et al. (2011)	4	4	4	3	4	4	2	3	4	32
Bronfort et al. (2012)	4	2	4	4	4	4	3	4	3	32
González-Iglesias et al. (2009)	4	4	4	3	4	4	3	3	4	33
Brockow et al. (2008)	4	4	4	3	4	4	4	3	3	33
Leaver et al. (2010)	3	3	4	4	4	4	4	4	3	33
Nagrale et al. (2010)	3	4	4	4	4	4	4	3	4	34
González-Iglesias et al. (2009)	4	4	4	4	4	4	4	3	3	34
Predel et al. (2013)	4	4	4	4	3	4	4	4	4	35
Masaracchio et al. (2013)	4	4	4	4	4	4	4	4	4	36

5.4 General data extraction and characteristics of the 19 included studies

Data from included studies was extracted using evidence summaries designed by Hawker et al. (2002). The selected articles in this review are summarised in Table 5.4 below, including specific parameters such as author, year, gender, age, title, study place, study design, interventions, outcome measures, and results. Types of included studies in this review were 1 case study, 13 RCTs, 1 observational study, 2 quasi-experimental studies, 1 research report, and 1 exploratory study. All studies were conducted between 2018 and 2019. The age of participants ranged from 18 to 70 years, and both male and female participants were included in the studies.

5.5. Outcome measures.

The main result tests: cervical spine ROM by (Goniometry, CA6000 spine (motion analyser), Zebris CMs 70p system), cervical spine pain (NPRS) (numeric pain rating scale)), and (VAS) (visual analogue scale)), cervical spine disability (NDI, (neck disability index)), fear-avoidance beliefs questionnaire (FABQ) and pressure pain threshold (PPT) (Algometer) were employed in the selected reviews.

The detailed data extraction form, containing the specifics of the 19 studies chosen for this systematic review is presented in Table 5.4 below.

Table 5.4: The results of the 19 systematically reviewed articles

Authors/years	Gender Male/Female	Age	Title	Study place	Study design	Intervention	Outcome measured	Results
1. McNair et al. (2007)	1 male/0 female	44	Acute neck pain: cervical spine range of motion and position sense prior to and after joint mobilisation.	Auckland New Zealand	Case study	Grade III downslope mobilisations on the left at C5-6 & C6-7 undertaken in lying position & then progressed to a sustained natural apophyseal glide (SNAG) technique (mulligan). 3 sets of 20 mobilisations done for both techniques for 1day duration.	Cervical spine (VAS), Cervical spine ROM (Zebris CMs 70p system)	Immediate decrease in cervical spine pain (6/10 to 2/10), increased cervical ROM (flexion 55%, extension 35%, left rotation 56%, left lateral flexion 22%)
2. González-Iglesias et al. (2009)	20 males/ 25 females	23-44	Inclusion of thoracic spine thrust manipulation into an electrotherapy or thermal program for the management of patients with acute mechanical neck pain: A randomised	Madrid Spain	RCT	Experimental groups received 6 sessions of a standard electro/thermal program (infrared lamp & TENS) for 3 weeks & thoracic thrust manipulation once per week for the 3 weeks. Comparison groups received 6 sessions of electrotherapy/thermal program an infrared for 15 min. TENS	Cervical spine pain (NPRS), Cervical spine disability (NPQ), Cervical spine ROM (Goniometer)	Patients receiving thoracic spine manipulation experienced greater in both neck pain with between differences of 5.6 to 2.3 on the NPRS & disability with between group

			clinical trial.			applied for 20 min. to the spinous process of C7 vertebra for 3weeks.		differences of 27.8 to 15.2 in the NPQ
3. Desai et al. (2013)	17 males/ 9 females	20-40	Immediate effect of scapular repositioning with active cervical rotation in acute spasmodic torticollis.	Maharashtra India	RCT	The conventional treatment groups received physiotherapy treatment in the form of microwave diathermy, submaximal isometrics & advice. The study groups received conventional treatment & an additional intervention in forms of scapular repositioning. 3 sets of 10 reps with 30 seconds rest between each application. This study only measured the immediate effect	Cervical spine pain (VAS), Pressure pain threshold (PPT) (Algometer) Cervical spine ROM (Goniometer)	significant improvements in the intensity of pain ($p < .01$), cervical rotation to the ipsilateral side ($p < .01$), cervical spine side flexion to the contralateral side ($p < .01$) & PPT ($p < .01$) immediately after the treatment of the scapular

						of scapular repositioning.		repositioning & conventional therapy, compared with the conventional therapy alone
4. Leaver et al. (2013)	64 males/ 117 females	Mean age 38.8 ±10. 7 years	People seeking treatment for a new episode of neck pain typically have rapid improvement in symptoms: an observational study.	Sydney Australia	Observationa l study	Neck manipulation or neck mobilisation & multimodal physical agents (exercise, advice & electro physical agents) were applied pragmatically according to the judgment of the treating practitioner. All patients received 4 treatment sessions over 3-month period.	Cervical spine pain (NPRS) Cervical spine disability (NDI)	On NPR scale from 0 (none) to 10 (worst) pain improved from 6.1 (SD 2.0) at baseline to 2.5 (SD 2.1) at 2 weeks to 1.5 (SD 1. 8) at 3 months. On NDI scale from 0 (none) to 50 worst) disability improved from 15.5 (SD 7.4) at baseline to 5.4 (SD 6.4) at 3 months.
5. Shah &Shah, (2015)	11males/ 19 females	30-50	Comparison of two treatment	Ahmedabad India	RCT	Group A received post isometric relaxation (PIR)	Cervical spine (VAS), PPT	Both MET & IC were found to be

			techniques: muscle energy technique and ischaemic compression on upper trapezius trigger point in subjects with non-specific neck pain.			technique of muscle energy technique (MET) light resisted effort for 7-10 seconds, 3-4 per sessions. Group B patients received ischaemic compression (IC) on the trigger point for 90 seconds tolerably painful (7-8 on a client pain scale of 10), 3 reps per sessions plus isometric neck exercise & upper trapezius stretching exercise. Both groups were treated for 1week.	(Algometer) Cervical spine ROM (NDI)	effective on decreasing pain, improving CROM & PPT. MET was more effective than IC technique in improving CROM. IC appeared to be more effective than MET in improving PPT. Difference in VAS (pain) score between groups was not significant.
6. Predel et al. (2013)	36 males/ 36 females	18 & over	Efficacy and safety of diclofenac diethylamine 1.16% gel in acute neck pain: a randomised, double-blind,	Dusseldorf Germany	RCT	Experimental group treated with topical diclofenac diethylamine (DDEA) 1.16% gel and control group treated with	Cervical spine pain (VAS) Cervical spine disability (NDI)	A topical DDEA 1.16% gel with diclofenac was fast-acting effective & well tolerated for the relief

			placebo-controlled study.			DDEA 1.16% gel without diclofenac (placebo) and paracetamol 2000 gm daily. Both groups were treated for 5 days.		of acute neck pain (17.5 mm) at baseline to (19.5) vs placebo (77.2 mm) to (73.8 mm) VAS & improved cervical spine ROM.
7. Brockow et al. (2008)	28 males/ 98 females	18-65	Evaluation of the efficacy of subcutaneous carbon dioxide insufflations for treating acute non-specific neck pain in general practice: a sham randomised controlled trial.	Saxony Germany	RCT	For Group A carbon dioxide gas was insufflate subcutaneously at the sites of muscle tenderness. 25 ml carbon dioxide gas was administered per tender site with the maximum dose limited to 100 ml 3 times per week for 3 weeks. Group B Sham ultrasound with a common transmission gel applied at the sites of muscle tenderness with a 1.5 cm^2 transducer. A single intervention lasted 5 min. An intensity of	Cervical spine pain (VAS), Cervical spine disability (German version McGill pain questionnaire)	Subcutaneous carbon dioxide insufflation (SCI) is not superior to Sham ultrasound for treating patients with acute non-specific neck pain. Pain intensity for SCI from (68.7 mm) at baseline to (33.0 mm) vs pain intensity for SUS from (69.4 mm) at baseline to

						0.2 watt per cm^2 was displayed at the Sham device 3 times weekly for 3 weeks. Both groups received local infrared light power 100watt with a distance of 25-30 cm. A single session lasted 10 min.		(30.9 mm) on 100 mm VAS.
8. Naik et al. (2016)	30 participants, male & female	18-45	Effect of total motion release on acute neck pain: A pilot study.	Dr Prabhakar Kore hospital, Dr BMK Ayuve rdic Hospital Belgaum India	Quasi-experi-mental study	Total motion release treatment techniques were used with patient in sitting position. The patient was asked to do movement on unaffected side to increase cervical ROM on the affected side. After 3 times repetition, the patient was asked to do the same movement on the affected side. 25	Cervical spine pain (VAS) Cervical spine disability (NDI) Cervical spine ROM (Goniometer)	paired t-test for the pre-& post comparisons revealed a significant decrease in pain, disability & increase in cervical spine ROM. Pain intensity decreased from (6.98±111) to a mean of (5±1.35) on a 10cm VAS after 7 sessions of treatment.

						minutes of therapy per day for 7 days.		
9. Javaid et al. (2016)	24 males/ 24 females	Mean age 26.9 ± 4.65 years	Effects of conventional physical therapy with or without strain counter-strain in patients with trigger points of upper trapezius; a randomised controlled clinical trial.	University of Lahore, Pakistan	RCT	Group A received conventional physical therapy (cervical spine ROM exercise) & strain counter-strain therapy the trigger point with the tolerable pressure held for 90 seconds) daily 1week duration. Group B received conventional physical therapy (cervical spine ROM exercise & advice was administered) daily for 1week.	Cervical spine pain (VAS) Cervical spine (NDI)	Patients in group A have shown moderate reduction in pain, functional disability & improved cervical spine ROM than patients in group B. Mean reduction in pain in group A 32.13 (26.99, 37. 27) in group B 12.62 (8.28, 16.96).
10. Hussain et al. (2016)	50 participants,	18-45	Effectiveness of natural	Shalamar Hospital	RCT	Group A received conventional therapy	Cervical spine (NPRS)	Improved cervical spine

	gender not reported.		apophyseal glides versus grade I and II Maitland mobilisation in non-specific neck pain.	Lahore, Pakistan		(ultrasound in continuous mode for 5 min. Shortwave diathermy continuous mode for 15 min. Natural apophyseal glides (NAGs) with 3 sets of 6 repetitions 4 times a week for 4 weeks. Group B also received conventional physical therapy plus oscillatory movements of Maitland grade I, II that was given for total of 60 seconds. 4 time a week for 4 weeks.	& Cervical spine disability (NDI)	pain, disability decreased & increased cervical ROM in group A (before mean scores = 4.8 SD 2.4, after mean scores 76 SD 1.09). Group B (before mean scores = 4.6 SD 2.3, after = 2.08 SD 2.3).
11. Nagrale et al. (2010)	25 males/ 35 females	18-55	The efficacy of an integrated neuromuscular inhibition technique on upper trapezius trigger points in subjects with non-specific neck pain: a randomised	Dhamtari India	RCT	Group A received muscle energy technique (MET) for 7-10 seconds followed by stretch held for 30 seconds & 3-5 reps per treatment sessions. Group B received ischaemic compression (pressure applied on trigger point for 90 seconds), strain counter-strain held for 20-30	cervical spine (NPRS) cervical spine disability (NDI)	Both groups demonstrated significant levels of improvement in pain intensity ($p < 0.01$), lateral cervical flexion ($p < 0.01$) & neck disability at

			controlled trial.			seconds & 3-5 reps. MET contraction held for 7-10 seconds & stretch held for 30 seconds & 3-5 per sessions. Both groups were treated 3 times per week for 4 consecutive weeks.		the 2 & 4 weeks follow up points ($p < 0.01$). However, comparison between group analysis revealed that group B (INIT) has shown more reduction in cervical spine pain & improvement in cervical spine ROM when compared to group A (MET).
12. Puentedura et al. (2011)	24 participants, gender not reported.	18-60	Thoracic spine thrust manipulation versus cervical spine thrust manipulation in patients with acute neck pain: a	University of Nevada Las Vegas USA	RCT	Thoracic group received thrust joint manipulation (TJM) in spine & an exercise in sitting position. Cervical group received thrust joint manipulation in supine & an exercise in sitting position.	Cervical spine pain (NPRS) Cervical spine disability (NDI) Fear avoidance (FABQ)	Patients in cervical group compared to the thoracic group showed significantly greater improvement in pain &

			randomised clinical trial.			The exercise program was standardised for both groups & is described as follow: Three-finger exercise for cervical spine rotation, Bilateral shoulder shrugs & scapular retractions, Bilateral shoulder horizontal abduction & abduction upper cervical spine flexion & extension, lower cervical spine flexion & extension, Thera-Band rows, with moderate resistance. 3 sets of 10 reps to 3-4 times per day in sitting position. Both groups attended physical therapy sessions 3 times during the 1st week, & 2 times during the 2nd week for a total of 5 sessions over a 2-wks period.		disability compared to those treated with thoracic spine TJM & exercises. Patients who received cervical TJM demonstrated greater improvement in NDI ($p \leq .001$) & NPR ($p \leq .003$) scores at all follow-up times.
13. Leaver et al. (2010)	64 males/ 118 females	18-70	A randomised controlled trial comparing	University of Sydney Australia	RCT	Category 1 patients received neck manipulation with manual high-velocity,	Cervical spine (NPRS) Cervical spine	Patients received neck manipulation did not

			manipulation with mobilisation for recent onset neck pain.			low- amplitude thrust techniques applied to the cervical spine Category 2 received neck mobilisation with low-velocity oscillating passive movement applied to the cervical spine. Both groups received 4 treatments over 2 weeks.	disability (NDI)	experience more rapid recovery from an episode of neck pain or better outcomes in terms of pain, disability, function, or global effect than mobilisation.
14. González-Iglesias et al. (2009)	24 males/ 21 females	18-45	Thoracic spine manipulation for the management of patients with neck pain: a randomised clinical trial.	Escela Osteopata Madrid Spain	RCT	Control group which received a standard electro/thermo therapy for 5 treatment sessions and the experimental group which received the same electro/thermal therapy program in addition to a thoracic spine thrust manipulation once a week for 3 consecutive weeks.	Cervical spine pain (VAS), Cervical spine disability (NPQ) Cervical spine ROM (Goniometer)	The finding showed that thoracic spine thrust manipulation was statistically significant improvement ($p < .001$) in reduction pain, improving cervical ROM & disability.
15. Gemmell et al. (2008)	45 participants, gender not	18-55	Immediate effect of ischaemic	Anglo-European college of	RCT	Group A treated with ischaemic compression (IC)	Cervical spine pain (VAS)	There was no statistically significant

	reported		compression and trigger point pressure release on neck pain and upper trapezius trigger points: a randomised controlled trial.	chiro-practice, UK		(consisted of sustained deep pressure with the thumb to the upper trapezius trigger point (TrP) for 30 seconds to 1 min). Group B received a TrP pressure release was applied & repeated pressure until there was no TrP tenderness or 90 seconds had elapsed. Group C received Sham Ultrasound (SUS); lotion was applied on trapezius muscle in the region of the TrP for 2 min. All patients attended one treatment session & outcome measures were repeated within 5 min. after treatment. This was a single treatment.	Pressure pain threshold (PPT) (Algometer) Cervical ROM (Goniometer)	difference ($p = 0.5721$) between the groups in any of secondary outcome measures. However, there was clinically significant difference between IC & SUS.
16. Bronfort et al. (2012)	272 participants gender not reported	18-65	Spinal manipulation, medication, or home exercise with advice for acute and	Minneapolis Minnesota USA	RCT	Spinal manipulation therapy (SMT) group were treated using diversified techniques (low-amplitude spinal adjustments, high-	Cervical spine pain (NPRS) Cervical spine disability	SMT had a statistically significant advantage over medication

			subacute neck pain.			velocity joint thrust manipulation & mobilisation, a low-velocity type joint oscillation lasted for 15-20 min). Medication (MED) group treated with (nonsteroidal anti-inflammatory drugs, acetaminophen) lasted 15-20 min. Home exercise with advice (HEA) group focused on simple self-mobilisation exercise gentle controlled movement of the neck & shoulder joints, including neck retraction, extension, flexion, rotation, lateral bending & scapular retraction, with no resistance 5-10 reps of each exercise 6-8 times daily for 12 weeks.	(NDI) Cervical spine ROM, CA6000 spine (motion analyser)	after 8, 12, 26 & 52 weeks ($p \leq 0.010$) & HEA was superior to medication at 26 weeks ($p \leq 0.02$). SMT & HEA led to similar short & long-term outcome but patients who received medication seemed to fare worse.
17. Masaracchio et al. (2013)	13 males/ 51 females	18-60	Short-term combined effects of thoracic spine thrust	Long Island University & Nova south eastern	RCT	Control group received posterior-to-anterior cervical spine non-thrust manipulations (grade	Cervical spine pain (NPRS) Cervical spine	Patients who received both thoracic spine thrust manipulation

			manipulation and cervical spine non-thrust manipulation in individuals with mechanical neck pain: a randomised clinical trial.	University USA		3) to spinous process of C2-C7. Each segment was oscillated for 10 reps followed by a 10 second rest. If patients reported an NPRS score of greater than 4/10 during the treatment, the treating therapist switched to a grade 2 non-thrust manipulation. There was an approximately 30 seconds rest between the cervical spine non- thrust manipulations & the thoracic spine thrust manipulations. Experimental group received the same interventions that the control group received, plus 2 thoracic spine thrust manipulations on upper thoracic spine (T1-T3) in supine lying & 2 thoracic spine thrust manipulations targeted to the middle	disability (NDI) GRCO	& cervical spine non-thrust manipulation plus exercise demon started better overall short-term outcomes ($p < .001$) on NPRS, NDI & GRCO compared to patients receiving only cervical spine non-thrust plus exercise.

						thoracic spine (T4-T7). 10 seconds rest between the thrust manipulations. Following an approximately 30-second rest, the middle thoracic spine thrust manipulation was performed in a similar way. Following the manipulations all patients in both groups were instructed to do cervical spine active ROM exercises. For a week.		
18. Ganesh et al. (2015)	38 males/ 22 females	21-45	Effectiveness of mobilisation therapy and exercises in mechanical neck pain.	Orissa India	RCT	Group I received Maitland mobilisation to the cervical spine for a period of two weeks (five days a week, 1 session per day) along with experiences prescribed for the group III patients. Group II received Mulligan SNAGs for a period of five sessions per week for	Cervical spine pain (VAS) Cervical spine Disability (NDI) Cervical spine ROM (Goniometer)	The overall results of the study showed that all of the groups improved over time compared to baseline ($p < 0.05$). It suggested that supervised exercises are

						two weeks & the exercises prescribed to group III. Group III received supervised exercises were stretching exercises to cervical & scapular muscles, deep neck flexor strengthening, isometric exercises for extensors, side flexors (both sides) & rotators (both sides), anti-gravity strengthening to rhomboids, middle & lower trapezius & cervical spine ROM exercises. All exercises were done with a dosage of one set of 10 reps with 6 seconds hold & 10 seconds rest between the repetitions. Duration 2 weeks.		as effective as mobilisation & exercises compared in reducing neck pain, improving cervical spine ROM & related disability among patients with acute neck pain.

19. Leininger et al. (2014)	261 participants gender not reported.	18-65	Exploring patient satisfaction: a secondary analysis of a randomised clinical trial of spinal manipulation, home exercise, and medication for acute and subacute neck pain.	Minnea-polis Minnesota USA	RCT	Group I spinal manipulation therapy (SMT) received high-velocity; low-amplitude joint manipulation lasted 15-20 min. other light soft tissue massage & assisted stretching & heat or cold packs were used as necessary to facilitate the SMT, over a 12-week treatment phase. Advice to stay active was provided. Group II Medication (MED) was provided by a medical doctor at a pain management clinic and consisted of nonsteroidal anti-inflammatory drugs, acetaminophen, as a first line of therapy. Narcotic medication & muscle relaxants were prescribed to patients who failed to respond to initial treatment over the 12-week treatment period.	Cervical spine pain (NPRS), Cervical spine disability (Self-reported question-naire)	SMT patients experienced significantly greater pain reduction than medication patients, SMT patients also reported greater global satisfaction than HEA & both groups were globally satisfied than the medication groups.

						Group III Home exercise and advice (HEA) was provided by exercise therapists. Patients attended two 1-hour visits focusing on self- mobilisation exercises for the neck & shoulders over a 2-week period. Participants were instructed toperform5 to10 repetitions of the exercises at home 6 to 8 times per day.		

5.6 Discussion of the findings

This section will thoroughly discuss the outcome of the reviewed articles. The purpose of this systematic literature review was to identify, critically evaluate and synthesise the most effective physiotherapy treatment for managing patients with acute NSNP. Utilising the electronic databases and other library literature resources, findings from the 19 articles are discussed. In this systematic review, all types of studies, which assessed effectiveness (shows better clinical effects, such as pain reduction, increased range of motion for short and long terms) of any physiotherapy treatment for acute NSNP were included. The majority of these studies were largely from Western and developed nations such as New Zealand, Spain, Australia, Germany, the UK, and the US. Although Africa is not represented due to a scarcity of data for the treatment of acute NSNP in these articles, other developing countries with a similar socioeconomic status such as India and Pakistan were included in this analysis.

Each different study measured its effectiveness as a single treatment or in combination with other specific interventions, for example the grade III downslope mobilisations technique together with a sustained natural apophyseal glide (SNAG) technique (mulligan) mobilisations, conventional physical therapy (cervical spine ROM exercise) alongside strain counter-strain therapy techniques. Whereas total motion release treatment technique was used as a sole treatment. A scrutiny of the 19 studies shows a wide array of objectives on the part of the researchers, involving comparisons of the efficacy of the treatment methods, among other things. RCTs are the most popular research method or design, with others being observational or case studies.[8] The efficacy of the following methods and/or interventions in the alleviation of NSNP is featured:

- Scapular repositioning
- Muscle energy technique
- Ischemic compression
- Diclofenac diethymine
- Subcutaneous carbon-dioxide insufflations

[8] A randomised clinical trial (RCT), also referred to in this thesis as a randomised controlled trial, is a clinical trial in which "a predefined study sample is built out of the target population (eg, patients with the respective diagnosis) and randomly assigned to different groups (eg, standard treatment or placebo vs new treatment)" (Spieth et al., 2016, p. 1342).

- Total motions release
- Conventional physical therapy (exercise, electrotherapy and advice)
- Strain-counter-strain
- Natural apophyseal glides
- Grade I and grade II Maitland
- Thoracic thrust spine manipulation
- Cervical spine thrust
- Trigger point pressure release; and
- Home exercise.

5.6.1 Manual therapy alone in the treatment of patients with acute NSNP

The applications of manual therapy in the treatment of patients with acute NSNP are presented (McNair et al., 2007, Nagrale et al., 2010; Leaver et al., 2010; and Masaracchio et al., 2013) in Table 5.4 above. The results revealed that there is a decrease in cervical spine pain, increased cervical ROM, and an improvement in pressure pain threshold (PPT), as summarised below.

a) Grade III downslope mobilisation technique, when followed with sustained natural apophyseal glide (SNAG) technique (Mulligan) leads to immediate decrease in cervical spine pain and increased cervical ROM.
b) Both muscle energy technique (MET) and ischaemic compression (IC) are effective at decreasing pain, improving cervical ROM and PPT. However, MET is more effective than the IC technique in improving cervical ROM. Also, IC is more effective than MET in improving PPT. There is no significant difference in the VAS (pain) score of patients treated using either intervention.
c) The use of either MET in supine lying position or the integrated neuromuscular inhibition technique (INIT) (that is, ischaemic compression and strain counter-strain) yields significant levels of improvement in pain intensity, lateral cervical flexion, and neck disability. However, INIT is more effective than MET in reducing cervical spine pain and improving cervical spine ROM.
d) Mobilisation (with low-velocity oscillating passive movement applied to the cervical spine) is more effective for acute neck pain treatment, in terms of pain, disability, and function outcomes, compared to neck manipulation (with manual high-velocity, low-amplitude thrust techniques applied to the cervical spine).

5.6.2 Manual therapy combined with other therapies

In addition, the other articles in support of manual therapy (González-Iglesias et al., 2009; Leaver et al., 2013; Shah & Shah, 2015; Javaid et al., 2016; Hussain et al., 2016; Puentedura et al., 2011; González-Iglesias et al., 2009; Gemmell et al., 2008; Bronfort et al., 2012; Ganesh et al., 2015 and Leininger et al., 2014) integrate one or two techniques with manual therapy. The combination of these techniques, such as manual plus electrotherapy, manual plus electrotherapy and medication, and manual therapy plus exercise therapy also demonstrated the effectiveness of manual therapy in the treatment of patients with acute NSNP. These integration interventions with an element of manual therapy are of significant benefit to the effective treatment of acute NSNP as highlighted in the results below.

a) Electro/thermal therapy (infrared lamp and TENS) combined with thoracic thrust manipulation yields better results, that is, improvements in both neck pain and ROM, as opposed to the exclusive application of electro/thermal therapy (infrared lamp & TENS).
b) Neck manipulation or neck mobilisation and multimodal physical agents (exercise, advice and electro physical agents) when applied pragmatically, according to the judgment of the treating practitioner, results in improvements in pain and disability.
c) Conventional physical therapy (cervical spine ROM exercise, advice) combined with strain counter-strain therapy yields better results than the exclusive use of conventional physical therapy. The combination results in greater reduction in pain and functional disability, and greater improvement in cervical spine ROM.
d) Conventional therapy (involving ultrasound and shortwave diathermy), combined with manual therapy (NAGs) yields better results, including improved cervical spine pain, decreased disability, and increased cervical ROM, than conventional physical therapy used in conjunction with oscillatory movements of Maitland, grades I and II.
e) The application of thrust joint manipulation (TJM) in supine position combined with an exercise in sitting position, yields significantly greater improvement in pain and disability reduction compared to the application of TJM in the spine, combined with exercise in the sitting position.
f) The application of electro/thermal therapy in addition to a thoracic spine thrust manipulation is more effective in the reduction of pain and disability and improving cervical ROM than the exclusive use of electro/thermo therapy.

The remaining four (4) studies employ other intervention techniques for the treatment of acute NSNP. These techniques include two (2) articles for medication (Predel et al., 2013; Brockow et al., 2008), one article for exercise therapy alone (Naik et al., 2016) and Desai et al. (2013) with the article on conventional therapy (exercise therapy, electrotherapy, and advice). The major findings of these articles emphasise the effectiveness of the intervention in the relief of acute neck pain, and also result in the improvement of cervical spine ROM. All the interventions in the reviewed articles used manual therapy treatment as one approach in combination with others. This review is in line with the literature review in Chapter 2 where combination therapy is more effective in the treatment of acute NSNP.

5.7 Comparing common Ethiopian physiotherapy practice (survey findings) with current evidence of effectiveness (SR findings)

This section shows a cross cutting review of commonly used physiotherapy treatments for acute NSNP in Ethiopia and juxtaposes it with the findings of the systematic review. Table 5.5 below summarises the items selected for cross referencing with systematic review findings.

Table 5.5: Summary of items partly selected for cross referencing with systematic review findings

Description	Most commonly used approach and frequency of treatment
Number of treatment sessions for acute NSNP patients	3 sessions per week
Joint mobilisation approaches for treatment of acute NSNP	Mckenzie approach
Type of exercise most prioritised for treatment of acute NSNP	Stretching of the neck and scapula-thoracic muscles, strengthening exercise
Type of soft tissue approach prioritised for treatment of acute NSNP	Passive stretching of the neck muscles
Type of electro-physical modality prioritised for treatment of acute NSNP	Hot-pack, TENS
Most important approach to relieving pain and promoting healing in acute NSNP patients	Ergonomic and ADL positioning advice AND advice on gentle neck movements
Peripheral neural mobilisation approach prioritised in the treatment of acute NSNP	Butler approach
Effectiveness of cervical manipulation approaches combined with supervised exercises in treating acute NSNP	Cervical manipulation approaches combined with supervised exercises

The survey conducted with 203 physiotherapists in Ethiopia in Chapter Four, has shown that both cervical manipulation approaches combined with supervised exercises and passive stretching of the neck muscles are the most popular treatments used in the treatment of acute non-specific neck pain. These techniques are consistent with an experimental study done by Ganesh et al. (2015) in which patients were divided into three groups. Group I received Maitland mobilisation to the cervical spine for a period of two weeks (five days a week, 1 session per day) along with exercises prescribed for the group III patients. Group II received Mulligan sustained natural apophyseal glides (NAGs) for a period of five sessions per week for two weeks and the exercises prescribed to group III. Group III received supervised exercises including stretching exercises to cervical and scapular muscles, deep neck flexor strengthening, isometric exercises for extensors, side flexors (both sides) and rotators (both sides), anti-gravity strengthening to rhomboids, middle and lower trapezius and cervical spine ROM exercises. All exercises were done with a dosage of one set of 10 reps with 6 seconds hold and 10 seconds rest between the repetitions for 2 week-durations. The study revealed that all the groups improved over time compared to the baseline. This suggests that supervised exercises are as effective as mobilisation and exercises in reducing neck pain, improving cervical spine ROM and related disability among patients with acute neck pain.

Ergonomic and home advice on early gentle neck movements (exercises) obtained from the survey results are some of the more common neck pain treatments used by physiotherapists in Ethiopia. Related to this is an experimental study conducted by Bronfort et al. (2012) in which spinal manipulation therapy (SMT) group were treated using diversified techniques (low-amplitude spinal adjustments, high-velocity joint thrust manipulation and mobilisation, a low-velocity type joint oscillation which lasted for 15-20 minutes). In addition, this study also used medication (MED) (the nonsteroidal anti-inflammatory drug, acetaminophen) which lasted for 15-20 minutes for a group treatment. Furthermore, a home exercise with advice (HEA) group focused on simple self-mobilisation exercises of gentle controlled movement of the neck and shoulder joints, including neck retraction, extension, flexion, rotation, lateral bending and scapular retraction, with no resistance (5-10 reps of each exercise 6-8 times daily for 12 weeks). The results showed that the SMT and HEA yield a similar outcome where the two groups

performed better in short- and long-term in pain reducing pain and improving neck disability compared to the MED group treatment.

The field survey observed that heat and electrotherapy (TENS) are commonly used treatments for acute neck pain in Ethiopia. This is consistent with a study conducted by González-Iglesias et al. (2009) in Madrid, Spain. The authors compared two groups; an experimental group and control group where the former received 6 sessions of a standard electro/thermal programme (infrared lamp and transcutaneous electric nerve stimulation (TENS)) and thoracic thrust manipulation once per week for 3 weeks and the latter group received the same sessions of electrotherapy/thermal programme an infrared for 15 minutes. Moreover, TENS was applied for 20 minutes to the spinous process of C7 vertebra for 3 weeks. The authors found that the experimental group showed significant improvement in both neck pain with differences between of 5.6 to 2.3 on the numeric pain rating scale (NPRS) and disability with between group differences of 27.8 to 15.2 on the neck disability index (NDI) questionnaire.

Despite other neck treatment methods, the commonly used treatments from the survey results conducted in Ethiopia as discussed in Chapter 4 were mainly manual therapy. Similarly, the intervention techniques used in this systematic review were mainly dominated by manual therapy in combination with other specific techniques such as exercise therapy. The “state of the art” in Ethiopian physiotherapy shows that therapists are still very much focused on manual therapy and so an evidence-based treatment protocol that is practical should also focus on those approaches. The combined findings from the field study in Ethiopia and the systematic review provide evidence that manual therapy is preferred, which might be a result of its simplicity and the cost-effectiveness of this treatment. In the light of this, perhaps the constant use of manual therapy by experts can be traced to the high cost of devices or stress involved in the application of other techniques along with the expertise of the users. Therefore, going by the way this treatment (manual therapy) is used in the reviewed articles and field survey and with the combination of other techniques (exercise therapy), one can conclude the justification for manual therapy as an appropriate technique in the treatment of acute NSPN for patients in Ethiopia.

5.8 Gaps and improvement possibilities

Various approaches to treating acute NSNP, which are neither widely known nor hardly in use in the Ethiopian context emerged from this systematic review. They are presented in juxtaposition with common treatments in Ethiopia in Table 5.6 Below.

Table 5.6: Treatment methods from Survey and Systematic Review

Approaches to treatment of acute NSNP largely unknown and unutilised in the Ethiopian context (SR)	**Common treatments for acute NSNP in Ethiopia (Survey)**
• Muscle energy technique • Ischemic compression • Total motions release • Strain-counter-strain • Natural apophyseal glides • Sustained natural apophyseal glides • Thoracic thrust spine manipulation • Cervical spine thrust • Myofascial trigger point therapy	• Mckenzie techniques • Stretching of neck and scapula-thoracic muscle • Strengthening exercises • Hot packs • TENS • Ergonomic and ADL posture advice • Gentle active neck exercises • Butler approach (a neural mobilisation technique) • Cervical manipulation approaches with supervised exercise

The addition of the above-mentioned newly researched interventions to the existing common treatments menu would create more varieties of treatment options for clinicians in the management of acute NSNP in Ethiopia. This fact informed the treatment protocol development process in this research, which combined elements from both sides of the divide presented in Table 5.6 above, in the subsequent e-Delphi study phase.

5.9 Limitation of the review

The systematic review in this study gives an extensive explanation concerning the intervention techniques used in the treatment of acute NSNP. From the reviewed articles, most articles rely mainly on manual therapy as an effective technique to treat patients. The limitation of this study within the systematic review of articles under investigation is that attention was not given to other interventions by looking at other related pains associated with acute cervical pain,

including the psychological components that influence the experience of pain. Another limitation associated with the review is that it focused mainly on manual techniques which are relatively passive in nature. In addition, the review literature is mainly limited to the western world. Also, the included study results were not sufficiently methodologically homogeneous to combine in a meta-analysis in this systematic review. Pooling was not possible as the included study results varied. Pooled analyses can only be conducted if studies use the same study design and statistical models, and if their respective populations are homogeneous (Price, Rushton, Tyros, Tyros, & Heneghan, 2020, p. 14; von Hippel, 2015, pp. 1-2). Finally, this systematic review was not designed to consider minimum clinical important difference (MCID), an important aspect when assessing treatment outcomes. MCID refers to "The smallest difference that patients perceive as beneficial and that would mandate, in the absence of troublesome side effects and excessive cost, a change in the patient's management" (Jaeschke et al., 1989, as quoted in King, 2011, p. 172). It is only used in studies that report on patient reported outcome measures (PROM), and provide MCID scores. However, none of the studies included in the systematic review in this chapter report on MCIDs of PROMs, making this kind of statistical analysis impossible. That said, whereas PROMs are increasingly seen as important indicators of efficacy, they are not required indicators of efficacy. Therefore, while the use of MCIDs of PROMs would add value to how the researcher answered the SR question, its omission does not necessarily hamper the process of looking for evidence of effectiveness, which may or may not include MCIDs of PROM scores.

5.10 Summary of the chapter

This chapter has explained the manner in which the systematic review component of this research was conducted. More specifically, it has provided details on the following research guidelines and procedures: data search strategy; search terms; selection criteria; assessment of study quality and reporting; data extraction; and, data analysis. Moreover, it has presented the results of that systematic review providing details of the final 19 studies that were selected for inclusion to inform the development of an initial draft set of protocols aimed at treating patients with acute NSNP. The 19 studies, whose finer details appear in Table 5.3 and 5.4 above, were critically appraised – vis-à-vis the abstract and title, introduction and aims, method and data, sampling, data analysis, ethics and bias, findings or results, transferability and implications and usefulness. From this critical appraisal, a summary of the 19 articles on the current state of

evidence for effectiveness of physiotherapy treatment for acute NSNP emerged. Together with the evidence common practice obtained from the quantitative survey (see Chapter 4), and those of the e-Delphi study (discussed in Chapter 6) they informed the evidence-based treatment protocol (see Figure 3.1 in Chapter 3) that was tested during the feasibility stage of this study.

Chapter 6

Phase 3: e-Delphi Study

6.1 Introduction

This chapter presents the further procedural details and results of the e-Delphi study that was conducted to capture the collective opinion of physiotherapy experts in Africa on the formulation of an evidence-based treatment protocol (EBTP) for patients with acute NSNP in Ethiopia. Following brief summaries of the processes employed, and their concomitant outcomes, the treatment protocol, informed by the survey, the systematic literature review, and the e-Delphi study, is presented, ready to be tested for feasibility in a subset of the Ethiopian population.

6.2 First-round of the e-Delphi study

In the first round, a panel of ten experts was presented with a questionnaire that included the findings from the nineteen articles identified in the systematic review. The questionnaire presented the following details from each of the nineteen studies: population tested, parameter of interventions, main outcomes measured, and the results (see Appendix C2). The panel was asked to provide their opinions on the findings of the nineteen studies and whether the findings might be useful for inclusion in an EBTP for patients presenting with acute NSNP in the Ethiopian context. They were asked to rank the interventions and outcomes in the order of their usefulness (practicability) in the management of patients suffering from the ailment. The options provided to them were the following: 1 = not at all useful; 2 = slightly useful; 3 = useful; 4 = fairly useful; and 5 = very useful. Respondents were asked to write comments and express their ideas freely (see Table in the Appendix C3 for the instructions that accompanied the questionnaire).

The questionnaire was e-mailed to the respondents during the second week of January 2019 and reminders were sent to the participants in each round to facilitate their responses. Of the ten experts who were approached, eight agreed to participate, making the response rate for this first round 80% (see Akins, Tolson, & Cole, 2005; Santaguida et al., 2018; Vergouw, Heymans, De Vet, Van der Windt, & Van der Horst, 2011). Sufficient for the purposes of the study, as guided by recommendations in the aforementioned literature, the individual opinions of the eight experts on each of the nineteen articles were analysed and their similarities and differences summarised collectively as presented in Table 6.1 below.

Table 6.1: Summary of findings from e-Delphi round 1

Authors	Interventions	Combined Expert Responses and Comments
1 McNair et al. (2007)	Grade III down-slope mobilisations on the left side at C5–6 and C6–7 in supine lying.	All eight respondents opined that this treatment is appropriate for the following reasons: it is simple and effective, inexpensive and does not require sophisticated equipment, can be applied in poorly resourced settings.
2 Shah & Shah, (2015)	Muscle energy technique or ischemic compression + isometric neck exercises and upper trapezius stretching exercises.	In this study, all eight experts agreed that these interventions could be useful. They believed that these interventions would be easy to apply, either singly or in combination, are effective, can be applied in low resource contexts, and are supported with high levels of evidence.
3 Javaid et al. (2016)	Conventional Physical therapy and Strain counter-strain.	All eight exerts believed that this method could be useful. It is a randomised controlled trial (RCT) and so has good evidence for efficacy. It is a simple treatment protocol and can be implemented with minimal equipment in the clinical setting. The fact that the method is quite labour intensive did not deter their positive posture towards it; indeed, they overwhelmingly approved it nonetheless.
4 Nagrale et al. (2010)	Muscle energy techniques, ischemic compression, and strain counter-strain.	All eight experts reported that this intervention might be useful. It alleviates pain intensity, is easy to apply, and comprises high levels of evidence. In addition, combination therapy has more short- and long-term benefits than single therapy.
5 González-Iglesias et al. (2009)	thoracic spine thrust manipulation + 5 sessions electro/thermal therapy.	All eight experts reported that this intervention could be useful as the level of evidence is high. The combination of manual therapy and electrotherapy is commendable, notwithstanding the challenges of widespread availability of electrotherapy equipment at primary health care physiotherapy settings in low-resourced countries like Ethiopia.
6 Bronfort et al. (2012)	Spinal manipulation therapy/Medication /Home exercise & advice group.	All eight experts reported that this intervention could be useful: the sample size is large; the combination of spinal manipulation therapy (SMT) and home exercise and advice (HEA) is highly effective; and it can be used in poorly resourced settings. Also, contemporary physiotherapy elements, such as doctoral physiotherapy (DPT) training, include the prescription and administration of medication, which makes this particular intervention viable in the Ethiopian setting.

7 Masaracchio et al. (2013)	cervical spine non-thrust manipulation and a home exercise programme/+ Tx manipulation.	All eight experts approved of this intervention, stating that its methodology is explained well. In addition, the combination of manual techniques is useful in the treatment of patients with acute NSNP. They noted, though, these techniques would probably require extra training.
8 Ganesh et al. (2015)	Maitland mobilisation/Mulligan mobilisation and exercises/ exercises only.	Despite its labour-intensive nature, all experts stated that this intervention might be useful for the following reasons: it has high evidence levels, is a simple treatment protocol, and can be used in poorly resourced settings.
9 Puentedura et al. (2011)	Thoracic thrust joint manipulation in spine & an exercise in sitting position+ exercises. Cervical thrust joint manipulation in supine & an exercise in sitting position + exercises.	In this study, all eight experts responded positively as they thought the intervention was a simple, effective procedure. However, although the procedures were well described, practitioners would need postgraduate training due to the inherent risk in cervical spine manipulation.
10 Desai et al. (2013)	Conventional treatment & an additional intervention in forms of scapular repositioning/conventional treatment of microwave diathermy, submaximal isometrics & advice.	Seven respondents said that this intervention would be appropriate. Reasons given in support of these interventions were that scapula stabilisation and posture correction could reduce neck pain immediately, is easily applicable in any context, and do not need special equipment. One of the respondents responded negatively, suggesting that the pain in these participants was caused by poor positioning and, therefore, might not fall under acute NSNP.
11 Naik et al. (2016)	Total motion release treatment procedures.	While one panel member responded negatively to this intervention, seven believed that it would be useful for the following reasons: it decreases pain and increases cervical spine ROM, is cost effective, and can be used in any setting.
12 Gemmell et al. (2008)	Ischemic compression versus Trigger Point pressure release.	In this study, seven experts responded positively while one dissented. The positive respondents thought that Ischemic Compression (IC) and trigger point technique were both effective in the reduction of trigger points.
13 Hussain et al. (2016)	Mulligan mobilisation/Maitland mobilisations. Both + electrotherapy.	Seven responded that this intervention was useful, since it exhibits high levels of evidence, and is important in pain control; the dissenting

		expert reported that it requires postgraduate manual therapy training.
14 González-Iglesias et al. (2009)	6 sessions electro/thermo therapy + thoracic spine thrust manipulation.	Six participants ranked this study as useful, for they thought the levels of evidence were high. The two experts who responded negatively raised concerns about the use of electrotherapy in resource-constrained contexts.
15 Leaver et al. (2013)	Neck mobilisation & multimodal physical agents (exercise, advice & electro physical agents).	Six experts believed that these interventions were useful, while two said they were not. However, the six supporters were also concerned about the specifics of the intervention, saying that four sessions would be inadequate, three months woefully long, and that chronicity is best prevented through early management.
16 Leaver et al. (2010)	Manipulation versus mobilisation.	While six experts reported that this intervention would be useful, two disapproved of it. Its strengths lie in the fact that it is a randomised clinical trial (RCT) with a large sample size, that cervical spine mobilisation is as good as manipulation, and it requires less postgraduate training. However, it requires expertise and experience, making it difficult to implement on a large scale.
17 Leininger et al. (2014)	Manipulation, + home exercise, + medication.	Six experts reported that the intervention might be useful, while two responded negatively. The six experts who thought it useful, however noted that the study is more chiropractic in nature. And the two dissenters disapproved it for its dependence on secondary analysis and its exclusive exploration of patients' satisfaction.
Study 6: 18 Predel et al. (2013)	Patients treated with DDEA 1.16% gel.	While five panel members felt that this intervention would not be useful, three reported positively. Negative respondents contended that it was pharmacological management and therefore outside the scope of physiotherapy practice, and that the majority of Ethiopian physiotherapists would not be licensed to prescribe Diclofenac.
Study 7: 19 Brockow et al. (2008)	Carbon-dioxide gas insufflation.	Only one of the eight panel members believed that this intervention would be useful. The overwhelming disapproval was based on the following reasons: there is no such facility in Ethiopia; it is not a safe technique; and it may be difficult to implement in a low resource setting. One participant had never heard of it.

Following the collective summaries depicted in Table 6.1 above, two studies, Predel et al. (2013), and Brockow et al. (2008), were excluded from the second round of the e-Delphi study. The two studies were excluded because they failed to garner the requisite threshold of joint approval, which, based on the scholarly contributions of Giannarou and Zervas (2014), should be 70%, which translates to a minimum of 6 (70% of 8 = 5.6) experts in this particular e-Delphi study. Therefore, 17 studies were selected to formulate the second-round questionnaire, based on the amalgamated expert responses from e-Delphi round 1, summarised in table 6.1 above (See Appendix C4).

6.3 Second-round of the e-Delphi study

The second and final round of the e-Delphi sought individual expert opinions on the combined responses from round 1. In essence, round 2 would involve a peer-review scenario, since the individual experts would now be able to see the ideas fronted by their colleagues. In this second round the same panel of eight experts was presented with a second questionnaire consisting of the 17 articles that had been scrutinised, analysed, and summarised from the round 1 responses. The same instructions applied. During this round the experts were asked to comment on the feasibility of the interventions and to provide any additional information that they felt could be important in the development of a treatment protocol for acute NSNP in the context of an African setting such as Ethiopia. The responses from the experts during this final round, aimed at further identifying common ground concerning the usefulness of each of the 17 studies that had been scrutinised by the researcher. The opinions of the eight experts on each of the seventeen articles were summarised and are presented in Table 6.2 below.

Table 6.2: Summary of findings from e-Delphi round 2

Authors	Interventions	Combined Expert Responses and Comments from Round 1	"Peer Review" Results	
			Agree (n)	Disagree (n)
1 McNair et al. (2007)	Grade III down-slope mobilisations on the left side at C5–6 and C6–7 in supine lying.	All the respondents agreed that the mobilisation techniques (Grade III down-slope mobilisations) led to substantial improvements in the range of motion and the restitution of normal coupled motion. Their strong consensus on the usefulness of these techniques was informed by their cost-effective nature.	8	None
2 Shah & Shah, (2015)	Muscle energy technique or ischaemic compression + isometric neck exercises and upper trapezius stretching exercises.	Each of the eight experts agreed that these interventions were effective in reducing pain and improving PPT and cervical range of motion (CROM). They concur that these intervention techniques are easy to implement/apply in low resource countries for they are cost-effective. Their cost-effectiveness is mainly due to their manual nature, meaning they do not require expensive equipment or electro-physical agents.	8	None
3 Javaid et al. (2016)	Conventional Physical therapy and Strain counter-strain.	All the experts agreed that the combination of conventional therapy with strain-counter-strain is very effective in reducing cervical spinal pain, functional disability, and improving cervical range of motion. They assert that these interventions are good techniques with simple treatment protocols for muscular dysfunction and can be easily performed in a low resourced and minimally equipped clinical setting.	8	None
4 Nagrale et al. (2010)	Muscle energy techniques, ischemic compression, and	All experts agreed that Integrated Neuromuscular Inhibition Technique (INIT) has a potential benefit in deactivating upper trapezius trigger points. for it effectively alleviates pain and is easy to implement. Likewise, they contend, these techniques do not	8	None

	strain counter-strain.	require much capital; moreover, the techniques come with both short- and long-term benefits beyond improving patients' symptoms.		
5 González-Iglesias et al. (2009)	Thoracic spine thrust manipulation + 5 sessions electro/ thermal therapy.	All the respondents agreed that thoracic spine thrust manipulation when added to electrotherapy or thermal programme, for 6 treatment sessions, results in superior clinical benefits for patients with acute neck pain. They assert that this technique, in combination with a good manual procedure such as manipulation and/or mobilisation, can be beneficial in the alleviation of patients' cervical spinal pain. They also contend that this is an effective intervention because it reduces pain and the irritability experienced on the neck. Minor concerns were raised on the availability of electrotherapy (expensive) and the need for post-graduate training, in the case of thoracic spine thrust manipulation.	8	None
6 Bronfort et al. (2012)	Spinal manipulation therapy/Medica-tion /Home exercise & advice group.	All the eight experts consulted agreed that the combination of soft tissue manipulative therapy (SMT), and home exercise and advice (HEA) is effective in both short- and long-term treatment for acute and sub-acute neck pain. They opine that SMT and HEA interventions are easily applicable in low-resourced settings, and more effective than medication. Physiotherapy intervention, it was noted, involves a physical approach (manual and exercise), which is more effective than medication; therefore, medication is mainly useful in decreasing acute inflammation and is often carried out in collaboration with a physician.	8	None
7 Masaracchio et al. (2013)	Cervical spine non-thrust manipulation and a home exercise programme / + Tx manipulation.	All the respondents agree that the short-term combination of thoracic spine thrust, and cervical non-thrust manipulation, go hand in hand and are largely effective for the treatment of mechanical neck pain. They are all in agreement that these techniques, when combined, yield substantive overall short-term outcomes on the numeric pain rating scale. They also assert that this combined intervention is easily applicable, and very safe to perform on a patient with mechanical neck pain. However, one of the experts raised a concern regarding trust manipulation, contending that it	8	None

		might require extra training.		
8 Ganesh et al. (2015)	Maitland mobilisation/ Mulligan mobilisation and exercises/ exercises only.	All experts agree that mobilisation and exercises are effective and simple treatment protocols in reducing mechanic neck pain, and improving range of motion (ROM), and neck disability. They all contend that this technique is a low-cost intervention that requires minimal resources, making it easy to implement in a low-resourced setting. Notwithstanding the labour-intensive nature of mobilisation and exercises, the experts emphasise the effectiveness of the technique in reducing neck pain.	8	None
9 Puentedura et al. (2011)	Thoracic thrust joint manipulation in spine & an exercise in sitting position+ exercises, Cervical thrust joint manipulation in supine & an exercise in sitting position + exercises.	All experts agreed that thoracic spine thrust manipulation and cervical spine thrust manipulation are effective intervention techniques for the treatment of acute neck pain. They said that these techniques are very easy to implement, simple to administer on a patient, and cost-effective. It was however stated that post-graduate training, or extra training on spinal manipulation, might be required for physiotherapists to effectively administer the treatment.	8	None
10 Desai et al. (2013)	Conventional treatment & an additional intervention in forms of scapular repositioning/conventional treatment of microwave diathermy, submaximal isometrics & advice.	Seven of the experts agreed that scapular stabilisation and cervical posture correction is an effective intervention technique in reducing pain and improving pressure pain threshold (PPT) and cervical range of motion (CROM) in patients with spasmodic torticollis. They concur that this technique can be easily applied and implemented in a low-resourced setting. However, one of the experts discouraged the use of this technique, stating that poor positioning can cause acute non-specific neck pain (NSNP) and that it is difficult to conclusively establish the efficacy of the intervention reported in this article for it is simply a pilot study.	7	1

11 Naik et al. (2016)	Total motion release treatment procedures.	Seven of the experts agreed on the effectiveness of total motion release on acute neck pain. They assert that this technique is effective in alleviating acute neck pain in terms of decreasing pain and neck disability and increasing cervical range of motion. In addition, the seven experts also believed that this technique is less time consuming, cost-effective, and easy to apply and implement as a home programme. However, one of the experts disapproved this technique, opining that the article was based on a pilot study, meaning its findings may only be indicative, and may lack the impact associated with main studies as other unforeseen factors often end up affecting the outcomes of proper studies.	7	1
12 Gemmell et al. (2008)	Ischemic compression with the thumb to the upper trapezius trigger point for 30 seconds to 1 min VS Trigger Point pressure release applied until 90 seconds had elapsed. Sham Ultrasound lotion was applied on trapezius muscle in the region of the trigger point for 2 minutes.	Seven of the experts agreed on the effectiveness of ischaemic compression (IC) and the trigger point technique in reducing trigger points on neck pain. They believe that IC and trigger point technique have almost the same effect on neck pain. The seven experts also said these techniques are easy to implement in any setting and highly effective on a patient with neck pain. However, one of the experts had a different opinion on the effectiveness of these techniques. The expert stated that, despite their feasibility, the effectiveness of the interventions on a patient with neck pain has not been conclusively established.	7	1
13 Hussain et al. (2016)	Mulligan mobilisation/Maitland mobilisations. Both + electrotherapy.	Seven of the respondents agreed that both natural apophyseal glides and grades I and II Maitland mobilisation are effective techniques, simply applicable, and appropriate for the treatment of mechanical neck pain. The seven respondents agreed that these two techniques are emerging effective treatment techniques for NSNP, and that	7	1

		they are cost-effective, since they are implemented manually. They further state that these techniques have a high level of evidence for efficacy, are appropriate for managing pain, very simple, and painless. However, one of the respondents did not agree with the effectiveness of these techniques. The expert states that these techniques will require additional manual therapy training to be implemented on a patient, making them less feasible.		
14 González-Iglesias et al. (2009)	6 sessions electro/thermo therapy + thoracic spine thrust manipulation.	Six experts agreed that thoracic spine manipulation with electrotherapy, or thermal programme for 5 treatment sessions, results in superior clinical benefits for patients with mechanical neck pain. The six experts assert that thoracic spine manipulation with electrotherapy or thermal program reduces the pain and irritability produced at the neck by treating the neck itself. These techniques also assist in increasing active cervical mobility in patients with acute neck pain and have a high level of evidence. However, two of the experts disagreed with these techniques. They state that these techniques require post-graduate training for physiotherapists to implement them safely and on patients. It was also stated that electrotherapy and thermal therapy are not easily available and applicable in resource-constrained settings.	6	2
15 Leaver et al. (2013)	Neck mobilisation & multimodal physical agents (exercise, advice & electro physical agents).	Six of the respondents agreed that these interventions are effective for neck pain management and can be applied based on patient need. They also stated that a patient could expect improvement within 4 sessions of treatment, which makes the techniques cost-effective, and feasible in many settings; also, these techniques have been supported in literature. However, two of the remaining experts disagree for the following reasons: according to them, these techniques were not outlined clearly in the article, which, in turn, does not explain how only four sessions of this intervention would lead to the desired results. The dissenting experts further opine that four (4) sessions over the period of three (3) months are insufficient, and state that 3 months is a long duration. To them, if the patient's condition does not improve in a short period of time,	6	2

		then the intervention is not useful.		
16 Leaver et al. (2010)	Manipulation versus mobilisation.	Six experts agreed that both manipulation and mobilisation techniques are effective interventions for onset neck pain, and state that cervical spine manipulation is as effective as mobilisation. The six experts further assert that cervical spine mobilisation and manipulation techniques are feasible in all physiotherapy settings. However, two experts disagree on the implementation of cervical spine manipulation. They argue that cervical spine manipulation requires post-graduate training, making it difficult to recommend or implement at scale because the cervical spine is a delicate structure with vital structures in the body. They further state that cervical manipulation requires careful handling, hence adequate training, skills, and experience are pre-requisites for its implementation on a patient with mechanical neck pain.	6	2
17 Leininger et al. (2014)	Manipulation, + home exercise, + medication	Six of the respondents agreed with the contention that patients with acute or subacute neck pain report greater satisfaction with spinal manipulation therapy and home exercise intervention, compared to those exclusively receiving medication. However, two of the respondents do not highly value manipulation and home exercise. They state that these interventions are chiropractic in nature, and therefore require expert training before implementation on patients. The two experts additionally assert that this intervention as a whole is less valuable and the medication aspect of it is not feasible in a low-resourced setting.	6	2

Following this final round of the e-Delphi, further analysis was done by the researcher, in the quest to obtain the evidence-based treatment protocol, as discussed in section 6.5 below.

6.4 Towards the evidence-based treatment protocol

The results of the second round of the e-Delphi survey did not yield substantial additional explanations or divergent opinions on the stances taken by the experts. Thus, having reached this "saturation point" the researcher saw no need for another round of the e-Delphi study. Accordingly, based on Table 6.2, above, the researcher employed a simple frequency count in the analysis of the e-Delphi study results. In doing this, all 17 studies were arranged in order of their perceived usefulness in the eyes of the experts, from the studies that garnered the greatest consensus to the ones that received the least. As depicted in Table 6.3 below, out of seventeen (17) articles, nine (tier 1) were fully acknowledged and unanimously accepted by all experts as appropriate interventions for the treatment of acute NSNP. On the other hand, a further four articles received the approval of seven experts (tier 2) and the remaining four studies were considered to contain effective treatment mechanisms in the Ethiopian context by only six experts (tier 3).

Table 6.3: Expert consensus frequencies

Consensus level (Tier)	**Frequency (n)**
Tier 1 (Support of 8 experts)	9 studies
Tier 2 (Support of 7 experts)	4 studies
Tier 3 (Support of 6 experts)	4 studies

From the three distinct tiers presented in Table 6.3 above, the researcher opted to emphasise the first two categories (tiers 1 and 2) in this evidence-based treatment formulation exercise. The criterion for inclusion (exclusion) was twofold: expert consensus and resource availability. Accordingly, the studies in tiers 1 and 2, and the treatment techniques contained therein, were selected for inclusion, because of superior scores in terms of expert consensus. To be able to operate meaningfully within the confines of the available limited resources, tier 3 was completely omitted. The detailed consensus, based on the opinions of the eight experts on each of the selected thirteen articles, is depicted in Table 6.4 below.

Table 6.4: Summary table of the thirteen selected articles for the EBTP

Authors	Intervention	Yes (n)	No (n)
1. McNair et al. (2007)	Grade III down-slope mobilisations on the left side at C5–6 and C6–7 in supine lying.	8	none
2 Shah & Shah (2015).	Muscle energy technique or ischemic compression + isometric neck exercises and upper trapezius stretching exercises.	8	none
3 Javaid et al. (2016)	Conventional Physical therapy and strain counter-strain.	8	none
4 Nagrale et al. (2010	Muscle energy techniques, ischemic compression, and strain counter-strain.	8	none
5 González-Iglesias et al. (2009)	Thoracic spine thrust manipulation + 5 sessions electro/thermal therapy.	8	none
6 Bronfort et al. (2012)	Spinal manipulation therapy/Medication/Home exercise & advice group.	8	none
7 Masaracchio et al. (2013)	Cervical spine non-thrust manipulation and a home exercise programme/ + thoracic manipulation.	8	none
8 Ganesh et al. (2015)	Maitland mobilisation / Mulligan mobilisation and exercises/exercises only.	8	none
9 Puentedura et al. (2011)	Thoracic thrust joint manipulation in spine & an exercise in sitting position + exercises, Cervical thrust joint manipulation in supine & an exercise in sitting position + exercises.	8	none
10 Desai et al. (2013)	Conventional treatment & an additional intervention in forms of scapular repositioning/conventional treatment of microwave diathermy, submaximal isometrics & advice.	7	1
11 Naik et al. (2016)	Total motion release treatment procedures.	7	1
12 Gemmell et al. (2008)	Ischemic compression with the thumb to the upper trapezius trigger point for 30 seconds to 1 min versus trigger point pressure release applied until 90 seconds.	7	1
13 Hussain et al. (2016)	Mulligan mobilisation/Maitland mobilisations. Both + electrotherapy.	7	1

It is from the above selected thirteen (13) best-ranked articles that the evidence-based protocol was devised by the researcher. Indeed, the research findings (through various stages of this study, that is, the systematic literature review, and the two e-Delphi study rounds), yielded the evidence-based protocol for the treatment of acute NSNP, presented as Table 6.5 below.

Table 6.5: Evidence-based treatment protocol for acute NSNP

INTERVENTIONS SELECTED (PROTOCOL)	SOME CONTEXTUAL INSIGHTS (FROM THE LITERATURE AND SYSTEMATIC REVIEWS)
A. Patient education and advice • Reassurance • Encouraging activities • Posture training • Advice	In addition to effective communication with patients, reassurance has been fronted by experts as being a crucial component of patient education. Reassurance of patients can help to address psychological factors, such as fear, anxiety, and depression, which are prominent in the early stages of acute neck pain. If left unaddressed, anxiety and depression may lead to chronic pain (Wirth, Humphreys and Peterson, 2016). Effective management of neck and other forms of musculoskeletal pain has also been attributed to the encouragement of patients, by therapists, in terms of resuming normal activity and posture correction (Spearing et al., 2005). Advice is also crucial in the treatment of acute NSNP. An improved understanding of the causes, nature, and type of neck pain experienced by patients can boost the treatment or recovery process (Sinatra, 2010; Gross et al., 2012; Fabrizio, 2009). The advice given to acute NSNP patients could centre on stress-coping skills, workplace ergonomics, and/or self-care strategies as appropriate (Gross et al., 2012; Fabrizio, 2009). Stress-coping skills, aimed at treating both the mind and the body, include deep breathing, meditation, yoga, listening to music, gentle massages and light stretching of neck muscles form part of the advice given to relieve stress in acute NSNP patients. On the other hand, workplace ergonomics include practice on good posture, the adjustment of monitor height and keyboard placement; the reduction of phone screen use and engaging in walks (Gross et al., 2012; Fabrizio, 2009). The aforementioned pieces of evidence, alongside expert opinion, informed the inclusion of this component of the evidence-based protocol.
B. Manual therapy • Passive cervical spine joint mobilisation • Myofascial trigger point therapy • Ischemic compression (IC) • Strain counter-strain • Natural apophyseal glides	From the literature and systematic reviews, this research has also established the following: firstly, IC is effective at decreasing pain, improving CROM and PPT. Secondly, conventional physical therapy (cervical spine ROM exercise) combined with strain counter-strain therapy yields better results than the exclusive use of conventional physical therapy; the combination results in greater reduction in pain and functional disability, and greater improvement in cervical spine ROM. Thirdly, the application of thrust joint manipulation (TJM) in supine position, combined with an exercise in sitting position, yields great improvement in pain and disability reduction. Moreover, thoracic spine thrust mobilisation/manipulation results in significantly greater short-term reductions in pain and disability, than thoracic non-thrust

(NAGs) • Sustained natural apophyseal glides (SNAGs) • Grades I and II Maitland mobilisation • Upper thoracic spine mobilisation and exercise therapy • Thoracic spine thrust joint manipulation	mobilisation/manipulation, in people with neck pain (Cleland et al., 2007). Fourthly, cervical spine joint mobilisation, combined with exercise and soft tissue mobilisation, has a clinically significant positive outcome in the treatment of acute NSNP (Breed, Van Rooijen, & Marais, 2014). Fifthly, non-thrust mobilisation techniques applied to the C7 segment are useful in reducing pain and improving active cervical rotation (Creighton et al., 2014). Sixth, muscle energy technique (MET) and Ischemic compression (IC) are both effective treatments insofar as pain reduction and the improvement of PPT and ROM are concerned (Shah & Shah, 2015; Gemmell et al., 2008). Seventh, Maitland thoracic mobilisation is more effective than deep neck flexor (DNF) endurance training; the combination of the two therapies achieves greater results with respect to pain reduction, and the improvement of cervical lateral flexion and rotation ROM (Deepa, Dabholkar, & Yardi, 2014). Eighth, sustained Natural Apophyseal Glides (NAGs) improve cervical joint ROM as well as skin condition (Bowler, Browning, & Lascurain-Aguirrebena, 2017). Hence the inclusion of these techniques in the protocol.
C. Exercise therapy • Supervised active exercises • Home exercise and advice • Scapular repositioning with active cervical rotation • Muscle energy techniques (MET) • Total motion release	Evidence from both the systematic and literature reviews also show the following: scapular repositioning used in conjunction with conventional therapy, yields greater results compared with the use of conventional therapy alone. The combination of the two therapies results in significant improvements in the intensity of pain, cervical rotation to the ipsilateral side, cervical spine side flexion to the contralateral side, and PPT. Furthermore, MET is effective at decreasing pain, improving CROM and PPT. The use of MET in supine position yields significant levels of improvement in pain intensity, lateral cervical flexion, and neck disability. Total motion release treatment techniques yield a significant reduction in pain and disability, and results in improved cervical spine ROM. Home exercise programmes (HEPs), whose focal point is strength, endurance and self-mobilisation, yield positive results when used exclusively or together with other conventional treatments. Also, HEPs effectively reduce neck pain and disability, thereby improving quality of life (Zronek et al., 2016). Neck pain resulting from computer use, which is associated with prolonged static or awkward work postures, can be alleviated by the application of exercise therapy (Ashwini, Karvannan, & Prem, 2018). The protocol's exercise therapies are based on this evidence.
D. Electrotherapy or Thermal therapy • Infrared therapy/hot packs • TENS • Ultrasound therapy	The evidence also shows that electro/thermal therapy (infrared lamp & TENS) combined with thoracic thrust manipulation yields better results, that is, great improvements in both neck pain and ROM, as opposed to the exclusive application of Electro/thermal therapy (infrared lamp & TENS). And ultrasound, combined with manual therapy (NAGs) decreases cervical spine pain and disability, and increases cervical ROM. Cervical traction combined with heat therapy is more effective than the exclusive application of either therapy (Kalra & Kalra, 2016). Simultaneous application of ultrasound therapy and static stretching is effective in increasing range of motion and lessening cervical pain and

	disability (Reda & Eman, 2016). The fusion of thoracic spine thrust manipulation with electrotherapy (thermal programme) effectively reduces neck pain and disability and increases active cervical mobility in patients with acute neck pain (González-Iglesias et al., 2009). This evidence informs the inclusion of the chosen electrotherapy or thermal therapy techniques.

Although the inclusion of all 17 studies would have provided a wider array of treatment techniques for the researcher to select from, stronger expert endorsement of the 13 selected articles nonetheless provides the requisite substantive confidence in the eventual EBTP devised in the researcher's view. Indeed, expert endorsement of the techniques in the chosen 13 studies was based on the latter's wealth of experience, which factored in elements such as the suitability and cost-effectiveness of these therapies. Therefore, the selected 13 articles should be considered sufficient to inform a treatment protocol for acute NSNP, especially in this unique scenario of limited resources. Figure 6.1 below represents the flowchart for the management of patients with acute NSNP (0-3 months) that resulted from this research. Treatment could proceed in the following manner: During the first consultation, the physiotherapist should make assessments, identify clinical findings in patients with acute NSNP, exclude the presence of serious pathology (red flags, e.g., infection, malignancy, upper cervical ligamentous insufficiency, cardiac problem, fracture, arterial insufficiency, unexplained cranial nerve dysfunction), and refer patients for consultation to the appropriate health department (Blanpied et al., 2017). The physiotherapists' assessments of musculoskeletal impairments of body functioning should be based on the International Classification of Functioning, Disability and Health (ICF), which categorises clinical findings on neck pain into the following three groups: neck pain with mobility deficits; neck pain with movement coordination impairments; and neck pain with headaches (cervicogenic headache).[9] Thereafter, a determination of the stage (acute or subacute) of the condition should be made to allow for appropriate treatment (Blanpied et al., 2017; Andelic et al., 2012). Acute neck pain with radiating pain was excluded here, as it is not categorised under NSNP.

[9] The International Classification of Functioning, Disability and Health (ICF), developed by the World Health Organization (WHO), provides a unified, standard language that classifies health and health-related domains of individuals and provides a framework to measure health and disability associated with any health condition (Rauch, Cieza & Stucki, 2008). "It includes a list of body structures and functions and a list of activities and participation, which can be influenced by contextual factors such as the environment and personal characteristics" (Rauch, Cieza & Stucki, 2008).

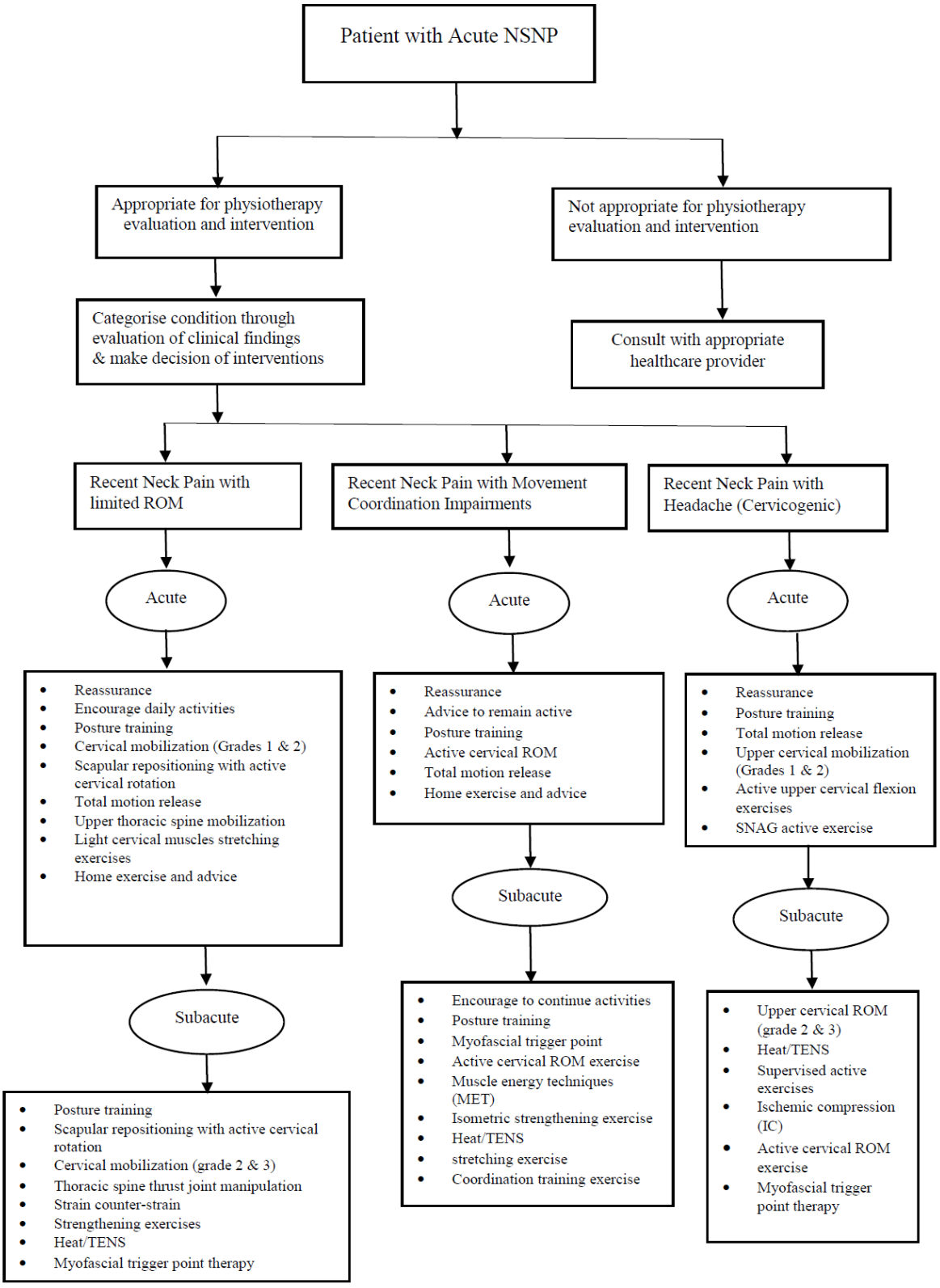


Figure 6.1: Flowchart for the management of patients with acute NSNP (0-3 months)

6.5 Discussion

6.5.1 Protocol structure

As evidenced in Table 6.6 above, the evidence-based treatment protocol comprises four categories of intervention. They are: i) patient education; ii) manual therapy; iii) exercise therapy; and iv) electrotherapy or thermal therapy. Two main reasons inform this segmentation of the devised protocol: firstly, the researcher views the patient as a key stakeholder in the treatment process. Accordingly, from the researcher's perspective the patient has to be educated on his or her condition, as a better understanding on the patient's part increases the chances of success. Secondly, and equally important, as described in the literature review in chapter 2, combination therapy works better than singular therapy in the treatment of acute NSNP. Consequently, the protocol has been arranged in such a manner as to guide the therapist who might employ it towards the selection of a combination of techniques in accordance with patient diagnosis and needs.

6.5.2 Comparison of evidence-based protocol and common Ethiopian practice

As was established in chapter 4, Ethiopian physiotherapy practice prioritises ergonomic and ADL positioning advice that is heavily centred on the adoption of gentle neck movements to alleviate pain in patients. The draft protocol considers the aforementioned traits of Ethiopian physiotherapy practice to be useful. Accordingly, in the "Patient Education" category, the protocol includes postural training (Bronfort et al., 2012). Alongside this, the protocol adds the following three methods under patient education: reassurance; encouragement of patients to engage in various activities; and ice massage. This provides greater variety and puts more intervention techniques at the disposal of physiotherapists in this African setting.

Regarding Manual Therapy, the McKenzie Approach was established to be the most popular joint mobilisation technique amongst Ethiopian physiotherapists. Also, the Butler Approach emerged as the most commonly used peripheral neural mobilisation approach in the treatment of acute NSNP. And cervical manipulation approaches, in the Ethiopian setting, are mostly combined with supervised exercises for effectiveness in the treatment of the ailment. Cognizant of these facts, the researcher acknowledged Ethiopian practice by retaining some of its elements in the manual therapy segment of the protocol by including the following two similar or related

techniques: passive cervical spine joint mobilisation, and upper thoracic spine mobilisation combined with exercise. Thereafter, in keeping with the trend of availing a wider range of choice for physiotherapists to select from, depending on their assessment of the patients' presentations, the researcher included the following six additional treatment options under the manual therapy category of the evidence-based treatment protocol: myofascial trigger point therapy; ischemic compression (IC); strain counter-strain; natural apophyseal glides (NAGs); grades I and II Maitland mobilisation; and thoracic spine thrust joint manipulation.

Concerning exercise therapy, the type of exercise mostly prioritised for the treatment of acute NSNP by Ethiopian physiotherapists was found to be the stretching of the neck and scapulo-thoracic muscles. And the passive stretching of the neck muscles was found to be the type of soft tissue approach most preferred for treatment of acute NSNP in this African setting. In its exercise therapy segment, the evidence-based protocol maintains the first of the two aforementioned Ethiopian trends, by including scapular repositioning with active cervical rotation as a treatment option. It thereafter expands the treatment options available to physiotherapists by including the following four additional techniques: supervised active exercises; home exercise and advice; muscle energy techniques (MET); and total motion release.

With regard to electrotherapy or thermal therapy, the types of modality prioritised for the treatment of acute NSNP in Ethiopia were found to be TENS, ultrasound, and heat (e.g., hot pack), respectively. These three treatment techniques were the ones included by the researcher in the electrotherapy or thermal therapy component of the evidence-based protocol. In this particular segment of the protocol, therefore, the treatment options mirrored Ethiopian physiotherapy practice in its exact form.

6.6 Summary and conclusion of the chapter

This chapter has presented the details of the e-Delphi study that was conducted, to capture the collective opinion of physiotherapy experts in Africa on the formulation of an EBTP for patients with acute NSNP in Ethiopia. It has given the details of the 2-round e-Delphi study that was used to achieve consensus on the treatment of acute NSNP, which resulted in an evidence-based treatment protocol, which was presented in the final phases of the chapter.

The chapter finds the following: when juxtaposed to chapter 4's findings on common Ethiopian physiotherapy practice on neck pain: some of the common Ethiopian physiotherapy practices are similar to what is considered to be best practice by African experts. Ultimately, when the four categories of the evidence-based protocol discussed above are collectively taken into consideration, it is discernible that the protocol pays heed to these realities. However, the protocol also provides additional treatment methods, some of which may not be well known in this African setting, such as grades I and II Maitland mobilisation and natural apophyseal glides (NAGs), thereby increasing the likelihood of success in the treatment of this ailment in this particular setting. To assess the feasibility of the evidence-based treatment protocol unveiled through this research as presented in this chapter, the researcher tested the protocol for feasibility in a subset of the Ethiopian population. The final phase of this research, the feasibility study, which was based on the therapies contained in the protocol presented above, is discussed in Chapter 7.

Chapter 7

Feasibility study of an Evidence-based Treatment Protocol for the Treatment of Patients with Acute NSNP in Ethiopia

7.1 Introduction

This chapter presents the details of the feasibility study (evaluation phase of the research) that was conducted to test and establish the feasibility of the formulated evidence-based treatment protocol for patients with acute NSNP in Ethiopia. It describes both the evidence-based intervention and the common treatment components of this evaluation phase of the research. It then undertakes a side-by-side account of the treatment procedures and performances of the two groups, with the view to assess the feasibility of the final evidence-based treatment protocol that resulted from this research. The common treatment group was included in the study to yield outcome information that would assist the researcher to assess whether the treatment protocol interventions had similar outcomes to the standard methods used to address acute NSNP in Ethiopia.

This chapter is inspired by the fact that there is limited evidence of an appropriate treatment protocol for managing patients with acute NSNP in Ethiopia and existing evidence may not always be applicable in a low resource setting such as Ethiopia. Indeed, as outlined in the introductory chapter, acute NSNP management in Ethiopia is largely dependent on the discretion or skill level of the physiotherapist, mainly because there is no contextually appropriate treatment protocol for the condition (Food, Medicine and Healthcare Administration and Control Authority [FMHACA], 2014). It is therefore hoped that the evidence-based treatment protocol for acute NSNP developed in this study will assist Ethiopian physiotherapists to achieve uniformity and reduce the current variations in clinical care and treatment interventions for patients with acute NSNP. The chapter includes the following components: the methodology; the treatment outcomes; a comparative discussion of the treatment outcomes; and the summary and conclusions.

7.2 Methodology

During this feasibility phase of the study, patients were purposively selected based on certain predetermined criteria that are discussed below, and recruited for participation in either the

evidence-based intervention group or the common treatment group (treated using standard methods employed by Ethiopian physiotherapists without interference from the researcher). The two hospitals selected for the evidence-based intervention were similar to the two chosen for common treatment in the sense that they offer the same services and facilities. Their operational capacities (bed space and the daily number of patients attended to) and stature (reputation) are also of a corresponding nature. This was done in order to make sure that the patient and institutional profiles were comparable.

7.2.1 Research Setting

At the moment, there are 12 state-run hospitals in Ethiopia's capital, Addis Ababa. Most of the city's close to five million inhabitants depend on these public hospitals for health services. These public institutions are complemented by an additional 40 hospitals, which are privately run (Ejigu, 2014). A combination of the aforementioned public and private hospitals served as the sample frame at the onset of the feasibility study. Owing to convenience and financial constraints, the following four tertiary hospitals in Addis Ababa – both public and private – were purposively selected for this feasibility study: Yekatit 12 Hospital (public), Zewuditu Hospital (public), Myungsung Christian Medical Centre (private), and Alert Hospital (public). More comprehensive profiles of these institutions have been provided in the Table 7.1 below.

Table 7.1: Detailed descriptions of the research settings

EVIDENCE-BASED TREATMENT INSTITUTIONS			
Hospital	**Characteristics**	**Hospital**	**Characteristics**
Yekatit 12 hospital	Public tertiary hospital	Myungsung Christian Medical Center (Korean hospital)	Private Tertiary hospital
	260 bed capacity		200 bed capacity
	Estimated 600 patients attend daily		Estimated 500 patients attend daily
	Has all specialised services including physiotherapy		Has all specialised services including physiotherapy
	Has 8 Physiotherapists		Has 5 Physiotherapists
	Service charges are subsidised by government		Fee paying hospital
COMMON TREATMENT INSTITUTIONS			
Zewuditu hospital	Public Tertiary hospital	Alert Centre	Public tertiary hospital
	bed capacity not sure		240 beds
	Estimated 550		Estimated 400

	patients attend daily		patients attend daily
	Has all specialised services including physiotherapy		Has all specialised services including physiotherapy
	Has 6 Physiotherapists		Has 8 Physiotherapists
	Service charges are subsidised by government		Fee paying hospital

7.2.2 Inclusion and exclusion criteria

The criteria for patient inclusion and exclusion were as captured in Table 7.2 below.

Table 7.2: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Patients with acute NSNP, of less than 3 months' duration, aged 18 years and above, able to speak the local or English languages, both male and female, willing to participate in the feasibility study, oriented to people, time, and present place, were included in this feasibility study.	Patients with fractures or dislocations of cervical spine osteoporosis, myelopathy, acute prolapsed disc and neural entrapment, spondylolisthesis and spinal stenosis, recent trauma or surgery in the neck area, tumours as these are causes of specific neck pain, rheumatoid arthritis and other inflammatory systemic diseases and infections, mental disorders, and pregnancy, were excluded from this feasibility study.

7.2.3 Sample Size Calculation

The G*Power Software application was used to generate the sample size for this feasibility study with 80% statistical power. One hundred and twenty-two (122) patients (sixty-one participants in the evidence-based intervention group and a further sixty-one participants in the common treatment group) were involved in the feasibility study.

7.2.4 Procedure

The research activities in this feasibility study were coordinated by the researcher. Permission was sought from the hospital authorities before the data collection and this permission was granted by all the hospitals that were used to test the feasibility of the evidence-based treatment

protocol. The researcher held meetings, as appropriate, with the physiotherapists in each of the two evidence-based intervention hospitals to lobby and inspire them to get involved in the feasibility study.

Various challenges faced the researcher during the recruitment phase. For instance, to get access to physiotherapists, the researcher had to obtain permission from hospital authorities. This entailed the booking of appointments, to get the audience of hospital authorities, some of which had to be rescheduled owing to the uncertainties of the work environment. It took considerable negotiation efforts to convince the hospital authorities that the feasibility study was worthwhile. The reluctance may be informed by the belief, as outlined in the introductory chapter, that physiotherapists in Ethiopia rely on individual discretion in their choice of treatment modality for acute NSNP, since physiotherapy is a relatively new field in the country (see Footer et al. 2017). Negotiations with the hospital authorities largely centred on the availability of physiotherapists, considering their busy work schedules, among other issues. In one of the participating hospitals, it was a bit challenging to find a convenient meeting venue following the approval by hospital authorities.

Eventually, two physiotherapists were selected on the evidence-based treatment side (one per hospital) and another two for the common treatment side (one for each hospital) making a total of four physiotherapists for this feasibility study. Their colleagues stood in for them during the training session, which lasted for a week. Each of the four physiotherapists who assisted in this feasibility study had five or more years of work experience in musculoskeletal practice. They recruited and treated the patients in this feasibility study. Recruitment was done through liaison with the medical doctors assigned to patients at each hospital's outpatient department (OPD), which referred the patients presenting with neck pain to the respective physiotherapy departments.

The two physiotherapists in the evidence-based group were given the developed evidence-based treatment protocol menu, a patient assessment pro forma (see Appendix D), and a Neck Disability Index (NDI) questionnaire (see Appendix E), to treat and record patient outcomes in the evidence-based intervention institutions. Moreover, the researcher conducted a week-long

training for these two physiotherapists in the evidence-based intervention group, on how they were to make use of the treatment protocol menu and the other aforementioned assessment instruments to manage the treatment process (see the details of this training in section 7.2.5 below).

However, the other two physiotherapists in the common treatment institutions did not receive any training on the proposed protocol as they were to provide their usual treatment for patients with acute NSNP. As mentioned in the introduction of this chapter, the common treatment group was included in the study to yield outcome information that would assist the researcher to assess whether the guideline interventions had similar outcomes to the standard methods used to address acute NSNP in Ethiopia. Nonetheless, the two physiotherapists in the common treatment group were also given the patient assessment instruments (pro forma) outlined above to record their usual treatment techniques in order to ensure similar treatment frequency and duration vis-à-vis the evidence-based intervention group.

7.2.5 Description of the training given to physiotherapists

The physiotherapists on the evidence-based intervention side were presented with the evidence-based treatment protocol from whence they were to choose a suitable holistic treatment package from the four categories contained in the treatment protocol (patient education, manual therapy, exercise therapy, electro/thermal therapy); choices were to be informed by expert assessment of the patients' needs following diagnosis. In addition to being familiarised with the contents of the protocol, they were informed that it was the product of an empirical process. Thereafter, during a week-long training process, the two intervention therapists were given mannequin demonstrations by the researcher, on those techniques that were new to them, such as grades I and II Maitland mobilisation. Through the training, the therapists became familiar with and competent to perform all the treatment techniques in the protocol. Furthermore, during the training the therapists were instructed to make use of combination therapy, for the researcher had established that it was more effective than single therapy during the empirical process that was used to obtain the evidence-based protocol. In addition to this, during the training process, they were familiarised with the criteria for patient inclusion and exclusion as described above. Following this, instructions on how to use an assessment pro forma developed by the researcher were given to the therapists. They were also provided with the customised NDI assessment

questionnaire, which they were to use in the assessment of outcomes during and at the end of the treatment process, respectively. They were also reminded to put emphasis on patients' reassurance – both cognitive and perceived. Cognitive reassurance aims to increase a patient's awareness by giving concrete information about the patient's non-specific condition (cause, diagnosis, prognosis and discussing the management) and aims to decrease the patient's concerns about illness (Holt, Mansell, Hill, & Pincus, 2018, Traeger, O'Hagan, Cashin, & McAuley, 2017). Perceived reassurance, on the other hand, can be measured by the Consultation-based Reassurance Questionnaire (CRQ) following primary healthcare consultations (Traeger, O'Hagan, Cashin, & McAuley, 2017, Holt & Pincus, 2016).

Since the physiotherapists in the common treatment institutions were to provide their usual treatment for patients with acute NSNP without any intervention whatsoever from the researcher, they were not included in the full training sessions given to the therapists on the evidence-based side. Nonetheless, they were also asked to record their usual treatment techniques and associated patient outcomes, including demographic information, using the same assessment instruments that were used for patients in the evidence-based institutions (patient assessment pro forma, and NDI questionnaires) in order to enable comparisons. Some short explanations on how to utilise these instruments were given to them in one session that took place over a period of one day. During the training sessions, the researcher and his assistants encountered a little pessimism from the physiotherapists who thought that the research instruments were over-elaborate and unusually lengthy. However, they were notified that the intricacy and approach was informed by the objective of establishing and using substantial evidence-informed physiotherapy practice to guide treatment decisions and practices and gradually became less doubtful about the process. The researcher managed the negativity further through follow-up telephone calls aimed at encouraging and inspiring the physiotherapists. In this manner, the researcher was able to establish rapport and build sustainable relationships with the former. In order to ensure that the therapists implemented the protocol, the researcher paid regular visits to the four hospitals to check in with the physiotherapists to see if they were having any challenges in their treatment and pro forma filling endeavours. The researcher collected, examined and evaluated the assessment pro formas at the end of the feasibility study to assess adherence to the protocol and treatment procedure instructions by the physiotherapists who participated in the study.

Regarding the duration and frequency of the evidence-based intervention side, the details were as follows: the patients were treated twice weekly over a period of six weeks; this translated to a total of 12 sessions per patient. Each of the treatment sessions lasted approximately 30–45 minutes as supported by studies conducted by Alfawaz et al. (2017) and Korthals-de Bos et al. (2003), respectively. This arrangement, originally proposed at the beginning of the intervention, proceeded smoothly. No challenges were either experienced or reported by the physiotherapists on the evidence-based treatment side in this regard. The structure and schedule of the training programme are presented in Table 7.3 below (see Appendix N for more details on the training and its content).

Table 7.3: Structure and schedule of training programme

ITEM	SCHEDULE
Explanation on patient inclusion and exclusion criteria	DAY 1
Explanation and demonstrations on treatment methods on devised evidence-based treatment protocol for acute NSNP	DAY 2
Demonstration on how to fill the patient assessment pro forma	DAY 3
Instructions on treatment plan and procedure	DAY 4
Recap	DAY 5

7.2.6 Diagnostic Phase: Patient Assessment Guidelines and Treatment Process Indicators

The patient assessments, which were conducted along the guidelines delineated in the assessment pro forma annexed in Appendix D, proceeded as follows: to begin with, the patients' vital signs, such as the temperature, blood pressure, pulse, and respiration rate, were taken by outpatient department personnel. The patient prevalent health condition — that is, the chief complaint, details on the onset of symptoms, the duration of the neck pain — was assessed in order to determine the intensity of the the pain. Pain intensity was recorded under a numeric pain rating scale with the following four distinct categories: no pain as (0); mild pain (1–3 captured broadly

as 1); moderate (4–6 captured broadly as 2); and severe (7–10 captured broadly as 3) in the analysis that follows.[10]

After that information was sought and recorded on all the medication the patients were taking prior to the onset of the study, including particulars of the names of tablets, tablet-strength, the number of times medication was taken in a day, the start-date of the medication and the details of the physician(s) who had prescribed the medication. Details on the patients' previous medical histories were also taken, with specific reference to the following parameters: allergy histories; lifestyles (e.g., exercise or lack thereof); personal habits (e.g., alcohol, tobacco, drug use); and diagnostic tests (x-rays, MRIs, etc.). Afterwards, the following general posture observations were conducted on the patients: the forward head posture, the thoracic kyphosis and the lumbar lordosis.

After that, baseline physical examinations of the cervical spine, whereby the cervical spine muscular strength, the cervical spine range of motion, and the state of the neurological condition of the cervical spine were assessed, were carried out. However, the focus areas in this feasibility study phase were pain intensity and the cervical spine range of motion (ROM)[11] and neck disability. These focus areas generated six key measurements for both groups in the study—i) onset and end pain intensities; ii) flexion; iii) extension; iv) rotation (right and left); v) side bending (right and left); and, vi) the NDI outcomes — which have been compared in the analysis that follows to test the feasibility of the evidence-based treatment protocol that this research produced. Measurements for the first five of the above-mentioned categories were taken during each visit. To enable the therapists to assess the progression of patient recovery and the impact of the treatments given, the NDI measurements were taken twice as follows: at baseline, and at the end of the treatment on the last week.

[10] The numeric rating scale (NPRS) is one of common instruments widely used scales to assess self-reported pain intensity in patients with acute or chronic neck pain. The NPRS scale consists of 11-points, that is, numbers between 0 and 10, where 0 indicates no pain, and 10 indicates the worst pain (Castarlenas, Jensen, von Baeyer, & Miró, 2017; Pathak, Sharma, & Jensen, 2018).

[11] To evaluate ROM, a universal goniometry was used in both sides. A universal goniometry is a reliable tool frequently used for assessing cervical spine joint range of motion in a physiotherapy clinical setting (Farooq, Bandpei, Ali, & Khan, 2016).

7.2.7 Neck Disability Index (NDI)

Originally developed by Howard Vernon in 1989 as an adaptation of Fairbank's 1980 Oswestry Low Back Pain Disability Index, the Neck Disability Index (NDI) is the contemporary standard instrument for measuring self-reported neck disability and is used by both researchers and clinicians (MacDermid et al., 2009). The NDI measures and scores neck disability on a scale ranging from 0 (no disability) to 50 (complete disability), and is calibrated in a more detailed way as follows: 0 to 4 (no disability); 5 to 14 (mild disability); 15 to 24 (moderate disability); 25 to 34 (severe disability) and over 34 (completely disabled) (MacDermid et al., 2009). It concerns itself with ten areas including pain, personal care, lifting, reading, headaches, concentration, work, driving, sleeping, and recreation (Howell, 2011). The NDI enjoys wide acclaim and its current status as the most frequently used self-report measure for neck pain attests to its usefulness (MacDermid et al., 2009). In order to conduct a comparative NDI outcome analysis, a survey questionnaire was employed in this research to collect information on how the patients' neck pain had reacted to treatment (see Appendix E). The questionnaire assessed the ability of patients to manage their post-treatment everyday life.

7.2.8 Interventions used by the physiotherapists on both sides

Table 7.4 below shows the types of interventions used by the physiotherapists.

Table 7.4: Types of interventions used by the physiotherapists

Evidence-based intervention group	Common treatment group
1. Manual therapy (Maitland cervical spine mobilisation, strain counter strain, natural apophyseal glides, sustained natural apophyeal glides, trigger point release, and muscle energy techniques). 2. Exercise therapy (active supervised chin tuck, stretching of upper trapezius, scalene and levator scapulae, and home exercise programmes).	1. Electrotherapy (TENS, infrared, ultrasound and shortwave diathermy). 2. Exercise therapy (stretching, strengthening, active exercises). 3. Manual therapy (neck mobilisation, thoracic thrust manipulation, neck massage, myofascial release). 4. Mechanical neck traction. 5. Patient education (reassurance, encourage early activities, posture

3. Electrotherapy (transcutaneous nerve stimulation (TENS)). 4. Patient education (reassurance, encourage early activities, posture training).	training).

Regarding the duration and frequency of the interventions, the details of both sides were the following: the patients were treated twice weekly over a period of six weeks which translated to a total of 12 sessions per patient. Each of the treatment sessions lasted approximately 30–45 minutes as supported and guided by studies conducted by Alfawaz et al. (2018) and Korthals-de Bos et al. (2003), respectively.

7.2.9 Descriptive summary characteristics of patients

A total of 122 patients took part in this feasibility study. Table 7.5 provides the descriptive characteristics of the patients.

Table 7.5: Descriptive summary characteristics of patients

	Evidence-based intervention group	**(%)**	**Common treatment Group**	**(%)**
Gender				
Male	29	47.5	29	47.5
Female	32	52.5	32	52.5
Age (Years)				
18-24	5	8.2	3	4.9
25-31	12	19.7	15	24.6
32-38	13	21.3	13	21.3
39-45	13	21.3	10	16.4
46 and above	18	29.5	20	32.8
Marital status				
Single	16	26.2	23	37.7
Married	46	73.8	37	60.7
Divorced	-	-	1	1.6
Level of education				
Uneducated	3	4.9	6	9.8
Primary school	5	8.2	3	4.9

High school	18	29.5	13	21.3
College	10	16.4	11	18.0
University	25	41.0	28	45.9
Occupation				
Employed	35	57.4	35	55.7
Unemployed	14	23.0	10	16.4
Student	5	8.2	3	4.9
Self-employed	7	11.5	14	23.0

A comparative analysis, of the treatment outcomes of the two sides of this feasibility study, follows.

7.3 Results (Treatment Outcomes)

7.3.1 Pain intensity and cervical spine ROM

To compare the treatment outcomes, the researcher performed paired sample t-test of which the results are captured in Table 7.6, below.

Table 7.6: Comparative outcomes of pain intensity and cervical spine ROM

Measurement	**Common treatment**	**Evidence-based**	**P value**	**95% CI**	**Mean difference**
Pain Intensity (PI) in NPRS	1	0.9	0.426	-0.28, 0.12	-0.082
Flexion ROM in degree	60.16	64.46	< 0.001*	2.274, 6.32	4.295
Extension ROM	50.52	52.74	0.080	-265, 4.692	2.213
Right Rotation (RR) ROM	63.28	64.75	0.311	-1.397, 4.348	1.475
Left Rotation (LR) ROM	61.39	63.52	0.149	-777, 5.040	2.131
Right Side (RS) Bend ROM	42.00	40.33	0.003*	-2.754, -0.590	-1.672
Left Side (LS) Bend ROM	41.70	40.49	0.031*	-2.312, -0.114	-1.213

CI = confidence interval, * = statistically significant

Regarding the outcomes of cervical spine ROM following treatment, the results were mixed; notably, however, evidence-based intervention returned considerably better results in three of the six measurement categories as follows: flexion ROM in degree (p = < 0.001); right side bend ROM (p = 0.003); and left side bend ROM (p = 0.031).

7.3.2. Neck Disability Index (NDI)

Table 7.7 below provides a comparative summary of the NDI outcomes following the interventions.

Table 7.7: Comparative NDI outcomes

Measurement	Common treatment	Evidence-based	P value	95%CI	Mean difference
Neck Disability Index (NDI)	11.20	10.05	0.036*	-2.217, -.078	-1.148

CI=confidence interval, * = statistically significant

The results show that both interventions substantially addressed patients' neck disability. However, as shown by the results in Table 7.7 above (p = 0.036), the evidence-based intervention had an appreciably greater impact than common treatment.

7.4 Summary, Clinical Implications and Conclusions

This chapter has presented the details of the procedures and findings of the feasibility study (evaluation phase of the research) that was conducted to meet the objectives of this thesis. It has tested the viability of the formulated evidence-based treatment protocol that was presented in chapter six. In order to accomplish its objectives, it began with a comprehensive outline of the details of all the processes employed during the feasibility study phase. Thereafter it presented the treatment outcomes of both interventions. The following broad conclusions can be drawn from the treatment outcomes presented in this chapter.

Whereas the two interventions offer similar benefits in many aspects of pain and ROM, a strong case could be made for, either the exclusive application or the incorporation of the treatment protocol devised through this research, in cases where part of the major objective of treatment is to restore flexion ROM and side bending ROM. Similarly, the evidence-based treatment protocol substantially addresses patients' neck disability, offering better pain reduction benefits than the "normal" treatments, making it an arguably better option for the alleviation of pain in acute NSNP patients. Therefore, taken holistically, the comparative improvement indices vouch for the adoption of the evidence-based treatment protocol this research produced, in relation to the

individual discretion generally employed by Ethiopian physiotherapists in their choice of a treatment modality for acute NSNP.

The challenges experienced by the researcher and his assistants at the planning and training stages can, however, not be gainsaid. Perhaps the lack of adequate appreciation for the need for an appropriate treatment protocol for acute NSNP as it took considerable negotiation efforts to convince the hospital authorities that the feasibility study was worthwhile. Moreover, the researcher encountered some resistance at the training level. This was related to what appeared to be a display of displeasure at the rigour required in the process of advancing the reliability of acute NSNP treatment approaches and minimizing clinical inconsistency by streamlining the treatment choices available for this ailment. Nonetheless, it is hoped that the evidence-based treatment approach and protocol for acute NSNP developed in this study will assist Ethiopian physiotherapists to achieve uniformity and reduce the current variations in clinical care and treatment interventions for patients with acute NSNP. Chapter 8 presents the crucial take-away points of this research and concludes it.

Chapter 8

Discussion and Policy Recommendations

8.1 Introduction

This chapter integrates the findings of the previous chapters, following which it makes recommendations accordingly. It presents an in-depth and critical analysis of the results by discussing them in relation to other, similar research. After this introduction, it comprises two sections. They are: i) an integrated summary of the findings; and ii) policy recommendations. These fundamental take-away points of the study are now presented successively.

8.2 Discussion

The findings of this study show that the physiotherapy profession in Ethiopia is a male dominated domain. These findings are in congruence with the figures provided by World Physiotherapy, a global organization comprising physiotherapy associations from around the world. According to World Physiotherapy (2020), 33% of physiotherapists in Ethiopia are female; and 37% of physiotherapists in the Ethiopian Physiotherapists' Association are also female. The situation in Africa, as well as the world at large, is the exactly the opposite. While 60% of physiotherapists in the Africa region are female, 70% of physiotherapists in member organisations in the Africa region are female. Also, whereas 62% of the number of physiotherapists globally are female, 59% of physiotherapists that are a member of a World Physiotherapy member organisation are female (World Physiotherapy, 2020). To beget some semblance of balance, and perhaps level the playing field, the Ethiopian authorities could offer incentives such as scholarships and bursaries to women learners and other prospective female physiotherapy students.

This research also finds that most Ethiopian physiotherapists are young. Besides, many physiotherapists in the country are at the inceptive stages of this profession. This makes the idea of a new, more comprehensive, and improved physiotherapy curriculum appreciably ideal making the two components of Ethiopia's new physiotherapy curriculum (1) the Advanced Standing Doctor of Physiotherapy (DPT) programme curriculum (4-year-course for registered physiotherapists who hold a BSc Degree and wish to join faculty), and (2) the Generic DPT programmes curriculum (6-year-course for high school graduates interested in physiotherapy)

(see Footer et al., 2017) – largely relevant. Fresh students and aspiring professionals may offer comparatively little resistance to new ideas and course content than established professionals. Also, in such an environment, evidence-based treatment protocols, such as the one presented in this study, may be found to be acceptable and eventually thrive.

In their quest to remain apprised of clinical developments in the field of physiotherapy practice, the study finds, the majority of Ethiopian physiotherapists depend largely on physiotherapy journals; to a lesser extent, they also remain updated through informal contact with colleagues, meetings with peer groups and conference attendances. A smaller number uses online sources such as YouTube, Google and Physiopedia. These findings could be crucial if considered by the Ethiopian Physiotherapists' Association, a professional membership organisation devoted to promoting compassion, respect and careful practice in the field. Among the association's objectives the following should be included: provision of accredited Continuous Professional Development (CPD) courses to members; the sharing of information and trends that will affect members' practice and development; and the enforcement of professional codes of conduct **(**World Physiotherapy, 2020).

The adoption of the EBTP devised through this research could contribute towards achieving uniformity and reducing the current variations in clinical care and treatment interventions for patients with acute NSNP in Ethiopia. The possibility of adoption of such a protocol may not be without its hurdles. As discussed in the feasibility phase in Chapter 7, it took considerable negotiation efforts to convince the hospital authorities that the feasibility study was worthwhile. Moreover, the researcher encountered some resistance at the training level. However, with fast industrial movement, technologies advance, and current events shift, meaning practice change is now a conventional part of doing business. Changing practice to align it with the best available evidence-based research can improve patient care outcomes and organisational activities (Gesme & Wiseman, 2010).

The evidence-based treatment protocol emanating from this research yielded treatment packages of which the outcomes were appreciably better in some important aspects than the normal approaches employed by Ethiopian physiotherapists. If possible, such an empirically informed

standardised protocol should be adopted in the treatment of NSNP and other similar ailments in Ethiopia. Standard treatment protocols come with benefits to both patients, healthcare providers and health policy makers. Besides offering a concise source of treatment information, standard treatment protocols aid in the process of making decisions on management of conditions. Moreover, they help to ensure the uniformity of the quality of care at all levels and assist in limiting the wastage of resources that often accompanies unstandardised treatment modalities (Kendall & Frank, 2018; Rycroft-Malone, Fontenla, Seers, & Bick, 2009; World Health Organization [WHO], 2018; Hawk et al., 2017).

The evidence-based treatment protocol also introduces techniques hitherto either largely unknown to, or unutilised by the Ethiopian physiotherapy fraternity. Examples include Maitland Grades I & II; thoracic spine mobilisation; strain counter-train; ischemic compression; Mulligan techniques (natural apophyseal glides); muscle energy techniques; and myofascial trigger point therapy. Consideration and possible consequent adoption of these methods, following the uptake of the devised protocol, therefore, proffers a unique opportunity for self-development and growth amongst the country's physiotherapists. In particular, the curriculum content developers of the Advanced Standing Doctor of Physiotherapy (DPT) programme curriculum, which teaches Musculoskeletal Management, and the Generic DPT programmes curriculum, and proposes to teach Musculoskeletal and Integumentary Systems as one of its courses (see Footer et al., 2017), could integrate the aforementioned techniques in the course content.

At the feasibility stage, this study established that Ethiopian physiotherapists may not readily yield to the introduction of standardised treatment protocols in their practice. These findings are in congruence with those of Kutty, Gebremichael and Vargehese (2013), who found a substantive attitude of negativity amongst medical doctors in the Tigray region in Northern Ethiopia, with regard to physiotherapy as a practice. To remedy this anomaly, they called for the inclusion of topics on physiotherapy in the Medicine curriculum taught at institutions of higher learning. In similar fashion, this research urges the health authorities in the country to find ways to undertake more sensitisation measures on the importance of evidence-based treatment protocols to ensure well-organised and safe treatment practice, minimising clinical inconsistency, and advancing quality treatment choices.

8.3 Policy Recommendations on General physiotherapy practice in Ethiopia

The following eight broad policy recommendations, inspired by the findings of this study, could aid Ethiopia in its quest to effectively remedy the problem of acute NSNP:

i. Owing to the finding that physiotherapy in Ethiopia is a male dominated profession, the country's Ministries of Health and Education should make efforts to encourage female students to consider enrolling for physiotherapy courses by giving them some incentives, such as bursaries.

ii. Since the majority of the physiotherapists in Ethiopia are considerably well educated, as established by this study, the Ethiopian authorities should create more work opportunities to maximise the use of this crucial human resource as this will enhance rehabilitation services in the country.

iii. Many physiotherapists in the country are at the inceptive stages of this profession and will most certainly require mentorship, which Ethiopia as a country cannot provide on its own, because there are very few physiotherapists with 20 or more years of experience in the country. Therefore, the state's health authorities should strongly consider working in collaboration with other countries, where the profession is more advanced, to be able to ensure the provision of the requisite apprenticeship for emerging talent.

iv. Most Ethiopian physiotherapists work as general practitioners. This indicates that there may be a scarcity of specialty schools for physiotherapists in the country. There is, therefore, a need to either establish facilities for specialised training in physiotherapy sub-fields such as geriatrics, cardiopulmonary treatment, wellness, or health promotion, community development, and research. Additionally, training opportunities abroad for physiotherapists who desire to specialise in any of the aforementioned areas could be availed by Ethiopian authorities to enhance the field of physiotherapy in the country.

v. Since this study has established that Ethiopian physiotherapists do not utilise treatment protocols in their practice, the health authorities in the country should advocate for the adoption of evidence-based treatment protocols to ensure well-organised and safe treatment practice, minimise clinical inconsistency, and advance quality treatment choices. In circumstances where staff have low work experience, and supervision is not readily available, the treatment protocol could serve as the framework to be relied upon to ensure safe practice.

vi. Since the majority of Ethiopian physiotherapists depend largely on physiotherapy journals in their quest to remain apprised of developments in the field, Ethiopian authorities and educational institutions should subscribe to more international peer-reviewed journals. This will ensure that the practitioners remain competent and knowledgeable about current practice and, therefore, in a position to compete with their counterparts around the world.

vii. From the findings of this research, the prevalence of acute NSNP in Ethiopia is high; it is increasingly becoming a phenomenon that cannot be ignored. Accordingly, it is advisable for Ethiopian health authorities to have an overarching management plan concerning an appropriate regimen or therapy aimed at addressing this clinical condition. This would guide patient care as it would assist the practitioners in their clinical approach, thus enhancing the quality and outcome of the healthcare accorded to acute NSNP patients. This management plan should comprise of detailed information on how more specialised physiotherapists will be trained in the quest to efficiently manage patients.

Chapter 9

Conclusion

9.1 Broad overview of this thesis

This research has been inspired by the scarcity of local evidence about acute NSNP treatment in Ethiopia, which is in turn the result of the fact that physiotherapy is a relatively underdeveloped field in the country. Indeed, while evidence-based treatment protocols (EBTPs) for acute NSNP exist elsewhere (Diab, Hamed, & Mustafa, 2016; Williams, Srikantaiah, & Mani, 2013), it is difficult to adopt them effectively for the Ethiopian context, given that treatment protocols should be informed by locally generated evidence, because culture, populations and settings often vary. With the aforementioned realities in mind, the study set out to meet the following objectives: i) To determine the current modalities used in the treatment of patients with acute NSNP in Ethiopia to establish the local management context; ii) To identify the best evidence on the effectiveness of treatment modalities for acute NSNP from the literature and from experts; iii) To develop a draft EBTP for patients with acute NSNP in Ethiopia; and iv) To determine the feasibility of this protocol for the treatment of patients with acute NSNP in Ethiopia. The aim of this study was to develop an EBTP for Ethiopian physiotherapists to follow regarding patients who present with acute non-specific neck pain. This final chapter briefly assesses the research itself, outlining how the aforementioned aim and objectives were met, and concludes with a short statement on what it considers its contribution to knowledge.

9.2 Towards an assessment of the aim and objectives of the research

With regard to the study's aim, an EBTP for acute NSNP was successfully developed and tested for feasibility in a subset of the Ethiopian population. Moreover, this research presents a contextually relevant decision-making system (regarding when to use a technique or a combination of techniques) on the treatment and management of acute NSNP, as part of its contribution to knowledge. In terms of the research objectives, the study, in its fourth chapter, unveiled the results of a quantitative survey that was carried out among the country's physiotherapists to ascertain the current modalities used in the treatment of patients with acute NSNP. To identify the best evidence on the effectiveness of treatment modalities for acute NSNP from the literature and from experts, the research, following a systematic review, outlined the findings obtained from the e-Delphi study carried out to obtain expert opinion and consensus. In

summary, therefore, the aims and objectives set out at the beginning of the study have largely been met.

9.3 Contribution to knowledge

Contribution to knowledge in the context of this research lies partly in its methodological approach, which fuses four distinct components – a survey, a systematic review, a Delph study and a feasibility study – to yield an evidence-based treatment protocol for acute NSNP. Moreover, the evidence-based treatment protocol yielded by this research constitutes knowledge in the sense that, while in Ethiopia neck pain is increasingly being considered as an important public health problem, there is no treatment protocol guiding practice for acute NSNP in the country. This means that, in this setting, every therapist treats patients based on their own knowledge of what constitutes best practice. Since physiotherapy is a relatively new field in Ethiopia, there is scanty evidence on the effectiveness of treatment protocols for NSNP. Furthermore, existing evidence, mostly from high income countries, cannot always be applied in low resource settings (BOLDER, 2016; Lahariya, 2013).

Noteworthy, the abundant research discussed in this literature review, has occurred in a western or developed world context (see, for examples, Brockhusen et al., 2017; González-Iglesias et al., 2009; Leaver et al., 2007; Leaver et al., 2013a; Leaver et al., 2013b; Spearing et al., 2005). Indeed, insights from emerging economy settings are profoundly lacking. It is this disturbing reality that constituted an apparent glaring gap that this research has attempted to fill. Undoubtedly, for the important findings emanating from developed (industrialised countries') contexts to be considered more meaningful, and for them to attain the threshold for generalisation, they must be juxtaposed with knowledge obtained from similar research carried out in countries whose resource bases are relatively challenged, such as Ethiopia. It is hoped that the outcome of this research presents a platform for comparisons to be made, thereby increasing the chances of credibility and validity as concerns prior, largely western-sourced knowledge. Moreover, as interest in acute NSNP widens, a plethora of calls for "further large-scale clinical trials to confirm the effect[s] [of treatment methods] and to determine … [the extent to which they] reduce pain and neck disability" (Schabrun, et al., 2012, p. 946) accompanies it; this study has made a contribution by heeding this noble invite.

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APPENDICES

APPENDIX A: SURVEY QUESTIONNAIRE

This survey questionnaire consists of the following three parts: Respondents' demographic and educational background (4 items); a list of basic profiles (7 items); and a list of treatment modalities or techniques (16 items). **Please mark (X) or (print)** your answer in the space provided.

Non-specific neck pain (NSNP) is neck pain without any specific systemic disease being detected as the underlying cause of the complaints.

I consent to participate in this study

Yes ☐ No ☐

A. Demographic information

Male ☐ Female ☐

Age

18-24 ☐

25-31 ☐

32-38 ☐

39-45 ☐

46 and above ☐

1. What is your primary workplace?

   A. Always inpatients ☐ C. Most of the time outpatients ☐

   B. Most of the time inpatients ☐ D. Always outpatients ☐

2. Highest educational level achieved.

   A. Bachelor's degree ☐ C. DPT degree ☐

   B. Master's degree ☐ D. PhD degree ☐

   E. DPT and PHD ☐ F Diploma ☐

   G. Other please, specify……

B. Basic practice profile (work experience, current area of practice)

3. How many years have you been working since your graduation as a Physiotherapist?

A. 0-5 years ☐ C. 11-15 years ☐
B. 6-10 years ☐ D. 16-20 years ☐
E More than 20 years ☐

4. What is your current area of practice? (You can mark more than one answer)

A. General practice ☐ C. Neurological ☐
B. Geriatric ☐ D. Musculoskeletal ☐
E. Paediatric therapy ☐ F. Cardiopulmonary rehabilitation ☐
G. Wellness or health promotion ☐ H. Community development ☐
I. Research ☐ J. Other, please specify

5. Do you have a treatment protocol in your practice or department, for the management of patients who present with acute non-specific neck pain (NSNP)?

A. Yes ☐ B. No ☐ C. Not sure ☐

6. Would you say that having a protocol in your workplace for the treatment of acute NSNP is

A. Not important ☐ C. Important ☐
B. A little important ☐ D. Very important ☐
E. Extremely important ☐

7. How do you keep up to date with clinical development in your professional field of practice? (You can mark more than one answer)

A. Reading professional journals ☐ C. Scheduled meeting with peer groups ☐

B. Attending Congresses or conferences ☐

D. Informal contact with colleagues ☐

E. Attending Journal club ☐

F. Other……

8. Are you involved in any activities related to the development of protocols/guidelines in your field of physiotherapy care?

A. No: ☐ B. Yes ☐

C. Treatment preferences

9. Approximately how many patients presented with acute non-specific neck pain have you personally seen in the last two weeks?

A. 1-5 ☐ C.11-15 ☐

B. 6-10 ☐ D. 16-20 ☐

E. over 21 ☐ F. None ☐

10. On average, over how many sessions do you treat patients with acute non-specific neck pain?

A. 1- 2 sessions per week ☐ C. 4 sessions per week ☐

B. 3 sessions per week ☐ D. 5 sessions per week ☐

E. Others, please specify…….

11. Which of the following joint mobilisation approaches do you use the most in the treatment of acute NSNP? (You can mark more than one answer)

A. Maitland approach ☐ C. McKenzie approach ☐

B. Mulligan approach ☐ D. Cyriax approach ☐

E. Not sure ☐

12. Which type of exercises do you use the most in the treatment of acute NSNP? (You can mark more than one answer)

A. Strengthening of the neck C. Self-mobilisation of cervical

muscles ☐ range of motion ☐

B. Stretching of the neck and scapula-thoracic muscles ☐

D. Posture rehabilitation of the neck and head positions ☐

E. Others please specify……

13. Which type of soft tissue approaches will you use mainly in the treatment of patients with acute NSNP?

A. Massage of the shoulder girdle muscles ☐

C. Myofascial release of the shoulder girdle muscles ☐

B. Myofascial trigger point therapy ☐

D. Passive stretching of the neck muscles ☐

E. Others please specify……

14. Which of the following electro-physical modalities do you use the most when treating patients with acute NSNP? (You can mark more than one answer)

A. Ultrasound ☐
B. Interferential therapy ☐
E. Heat e.g., Hot-pack ☐
G. Dry needling ☐
C. Shortwave diathermy ☐
D. Ice ☐
F. Acupuncture ☐
H. Others, please specify……

15. Which of the following do you think is the most appropriate to do with patients with acute NSNP, in order to relieve pain and/ or promote healing? (You can mark more than one answer)

A. Advice to wear a brace or collar ☐
B. Neck care education ☐
C. Pain Neuroscience Education ☐
D. Ergonomic and ADL positioning advice ☐
E. Advice on gentle neck movements ☐
F. Advice client to staying active ☐
G. Others please specify……..

16. Which of the following peripheral neural mobilisation approaches will you use the most when treating patient with acute NSNP? (You can mark more than one answer)

A. Butler ☐
B. Shacklock ☐
C. Coppieters ☐
D. Others, please specify……

E. Not sure ☐

17. Name three modalities or techniques in your preferred package of care for the patients with acute non-specific neck pain:

A. …….

B. ……

C. ……

Attitudes

19. In your opinion how would you rate the use of evidence-based management of acute non-specific neck pain physiotherapy treatments in Ethiopia?

A. very poor ☐ C. Good ☐

B. poor ☐ D. very good ☐

E. Not sure ☐

19. How would you rate the effectiveness of cervical manipulation/mobilisation approaches combined with supervised exercise when treating acute NSNP?

A. Not effective ☐ C. Effective ☐

B. Less effective ☐ D. Most effective ☐

E. Not sure ☐

20. In order to effectively work with patients with acute non-specific neck pain a physiotherapist requires special education in the field

A. Strongly agree ☐ C. Neutral ☐

B. Agree ☐ D. Disagree ☐

E. Strongly Disagree ☐

21. Patients at risk of developing new neck pain need counselling or lifestyle education from physiotherapists

A. Strongly Agree ☐ C. Neutral ☐

B. Agree ☐ D. Disagree ☐

E. Strongly Disagree ☐

22. Patients at risk of developing chronic neck pain need counselling or education from physiotherapists

A. Strongly Agree ☐ C. Neutral ☐

B. Agree ☐ D. Disagree ☐

E. Strongly Disagree ☐

23. When do you think it is appropriate to refer a patient with acute NSNP to relevant health care practitioner? (You can mark more than one answer)

A. When condition (neck pain) is outside their scope of practice ☐

C. When consultation with a medical specialist is indicated ☐

B. When expected outcomes have not reached in appropriate treatment timeframes ☐

D. When limitations of skills or job role prevent the client's needs being adequately addressed ☐

E. Other……

Thank you very much for completing this survey. If you have any questions or concerns about any of the questions asked, please do not hesitate to contact the researcher at email address: 2110621@myuwc.ac.za

APPENDIX B: QUANTITATIVE SURVEY RESULTS

Table A1: Years of practice as physiotherapist since graduation.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
0 – 5 years	85	41.87	41.87
6 – 10 years	60	29.56	71.43
11 – 15 years	43	21.18	92.61
16 – 20 years	4	1.97	94.58
More than 20 years	11	5.42	100.0
Total	**203**	**100.0**	

Table A2: Current area of practice.

Response	**Frequency**	**Percentage (%) n =203)**
General practice	125	61.58%
Geriatric	10	4.93%
Neurological	64	31.53%
Musculoskeletal	89	43.84%
Paediatric therapy	52	25.62%
Cardiopulmonary rehabilitation	19	9.36%
Wellness or health promotion	11	5.42%
Community development	7	3.45%
Research	10	4.93%
Others, please specify	5	2.46%

Table A3: Availability of treatment protocol for acute NSNP.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
Yes	32	15.76	15.76
No	97	47.78	63.54
Not sure	74	36.45	100.0
Total	**(N=203)**	100.0	

Table A4: Importance of treatment protocol for management of patients with NSNP.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
Not important	0	0	0
A little important	7	3.45	3.45
Important	98	48.28	51.73
Very Important	71	34.97	86.7
Extremely Important	27	13.3	100.0
Total	**203**	**100.0**	

Table A5: Enlightenment on developments in physiotherapy practice.

Response	**Frequency**	**Percentage (%) n = 203)**
Reading professional journals	159	78.33%
Attending Congresses or conferences	42	20.69%
Scheduled meeting with peer groups	47	23.15%
Informal contact with colleagues	98	48.28%
Attending Journal club	24	11.82%
Others, please specify	19	9.36%

Table A6: Involvement in the development of physiotherapy protocols.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
Yes	75	36.95	36.95
No	128	63.05	100.0
Total	203	100.0	

Table A7: Patients presenting with acute NSNP during the last two weeks.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
1-5	111	54.68	54.68
6-10	23	11.33	66.01
11-15	12	5.91	71.92
16-20	9	4.43	76.35
Over 21	2	0.99	77.34
None	46	22.66	**100.0**
Total	**203**	**100.0**	

Table A8: Number of treatment sessions for acute NSNP patients.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
1- 2 sessions per week	47	23.15	23.15
3 sessions per week	94	46.31	69.46
4 sessions per week	20	9.85	79.31
5 sessions per week	26	12.81	92.12
Others, please specify	16	7.88	100.0
Total	**203**	**100.0**	

Table A9: Joint mobilisation approaches for treatment of acute NSNP.

Response	Frequency	Percentage (%) n=203)
Maitland approach	49	24.14%
Mulligan approach	43	21.18%
McKenzie approach	85	41.87%
Cyriax approach	15	7.39%
Not sure	59	29.06%

Table A10: Type of exercise most prioritised for treatment of acute NSNP.

Response	Frequency	Percentage (%) N=203)
Strengthening of the neck muscles	122	60.1%
Stretching of the neck and scapula-thoracic muscles	142	69.95%
Self-mobilisation of cervical range of motion	125	61.58%
Posture rehabilitation of the neck and head positions	116	57.14%
Others, please specify	9	4.43%

Table A11: Type of soft tissue app**roach prioritised for treatment of acute NSNP.**

Response	Frequency	Percentage (N=203)
Massage of the shoulder girdle muscles	64	31.53%
Myofascial trigger point therapy	21	10.34%
Myofascial release of the shoulder girdle muscles	48	23.65%
Passive stretching of the neck muscles	65	32.02%
Others, please specify	5	2.46%

Table A12: Type of electro-physical modality prioritised for treatment of acute NSNP.

Response	**Frequency**	**Percentage (%) n=203)**
Ultrasound	85	41.87%
Interferential therapy	85	41.87%
Shortwave diathermy	34	16.75%
Ice	45	22.17%
Heat e.g., Hot-pack	101	49.75%
Acupuncture	21	10.34%
Dry needling	15	7.39%
Others, please specify	30	14.78%

Table A13: Most important approach to relieving pain and promoting healing in acute NSNP patients.

Response	**Frequency**	**Percentage (%) n=203)**
Advice to wear a brace or collar	64	31.53%
Neck care education	121	59.61%
Pain Neuroscience Education	30	14.78%
Ergonomic and ADL positioning advice	128	63.05%
Advice on gentle neck movements	128	63.05%
Advice client to staying active	29	14.29%
Others, please specify	2	0.98%

Table A14: Peripheral neural mobilisation approach prioritised in the treatment of acute NSNP.

Response	**Frequency**	**Percentage (%) n=203)**
Butler	29	14.29%
Shacklock	24	11.82%
Coppieters	13	6.40%
Others, please specify	11	5.42%
Not sure	134	66.01%

Table A15: Name three modalities or techniques in your preferred package of care for the patients with acute non-specific neck pain.

Response	**Frequency**	**Percentage (%) n=203)**
TENS	79	38.92%
Exercise	73	35.96%
Ultrasound	62	30.54%
Manual therapy	61	30.05%
Hot pack/heat	48	23.65%
Infrared	32	15.76%
Massage	21	10.34%
Shortwave diathermy	19	9.36%
Interferential	18	8.87%
Cold pack	17	8.37%
Advice	14	6.9%
Others, please specify	14	6.9%
Traction	8	3.94%
Acupuncture	4	1.97%

Table A16: Opinion on evidence-based management of acute NSNP physiotherapy treatment.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
Very poor	30	14.78%	14.78%
Poor	56	27.57%	42.35%
Good	65	32.02%	74.37%
Very good	26	12.81%	87.18%
Not sure	26	12.81%	100.0%
Total	**203**	**100.0%**	

Table A17: Effectiveness of cervical manipulation approaches combined with supervised exercises in treating acute NSNP.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
Not effective	5	2.46%	2.46%
Less effective	9	4.43%	6.89%
Effective	125	61.58%	68.47%
Most effective	52	25.62%	94.09%
Not sure	12	5.91%	100.0%
Total	**203**	**100.0%**	

Table A18: Correlation between acute NSNP and special education in the field.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
Strongly agree	123	60.59%	60.59%
Agree	64	31.53%	92.12%
Neutral	11	5.42%	97.54%
Disagree	1	0.49%	98.03%
Strongly Disagree	4	1.97%	100.0%
Total	**203**	**100.0%**	

Table A19: Correlation between development of new neck pain and counselling or lifestyle education from physiotherapists.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
Strongly agree	141	69.46%	69.46%
Agree	56	27.59%	97.05%
Neutral	2	0.98%	98.03%
Disagree	0	0%	98.03%
Strongly Disagree	4	1.97%	100.0%
Total	**203**	**100.0%**	

Table A20: Need for counselling or education from physiotherapists for patients at risk of developing chronic neck pain.

Response	**Frequency**	**Percentage**	**Cumulative Percentage**
Strongly agree	147	71.41%	72.41%
Agree	50	24.63%	97.04%
Neutral	3	1.48%	98.52%
Disagree	2	0.98%	99.5%
Strongly Disagree	1	0.49%	100.0%
Total	**203**	**100.0%**	

Table A21: Types of modalities or techniques used in the treatment of acute NSNP.

Response	**Frequency**	**Percentage (%) n=203)**
When condition (neck pain) is outside their scope of practice	130	64.04%
When expected outcomes have not reached in appropriate treatment timeframes	119	58.62%
When consultation with a medical specialist is indicated	140	68.97%
When limitations of skills or job role prevent the client's needs being adequately addressed	51	25.12%
Others, please specify	6	2.96%

APPENDIX C: e-DELPHI STUDY MATERIAL

Appendix C1: Instructions at e-Delphi round 1.

Instructions

In this study the focus is particularly on the acute non-specific neck pain (i.e., neck pain with no clear cause, that has been experienced for fewer than 3 months) and the physiotherapy interventions that may be most effective. Therefore, a systematic review was conducted in order to determine interventions and outcome that would inform the development of this protocol.

The following list of **interventions and outcomes** were obtained from this **systematic** review. You are requested to rank the interventions and outcomes in the order of their usefulness (practicability) in the management of patients with acute non-specific neck pain. The ranking ranges from **1 = not at all useful to very useful.**

(1 = not at all useful 2 = slightly useful 3 =useful 4 = fairly useful 5 = very useful)

There will be 2 rounds in this e-Delphi study and is estimated that it will take approximately 30 minutes to complete the questionnaire in each round. Please take a few minutes to read through all of the interventions so that you can familiarise yourself with them. Note that these interventions have been selected for the quality of the evidence in support of their efficacy, so the intention is not to make a judgement on whether or not they are effective. I would like you to review them in terms of their feasibility. In other words, given your working environment and what you know about general working environment in Ethiopia, which of these interventions do you think are possible to be implemented, given your physical, financial, logistical and experience constraints?

Appendix C2: Questionnaire for round 1 Delphi study.

Population Tested	Parameter of interventions	Main outcomes measured	Results
1.Acute neck pain: Cervical spine range of motion and position sense prior to and after joint mobilisation (McNair et al., 2007).			
Male = 1 Female = 0 Age 44 Total = 1	Grade III downslope mobilisations on the left side C5-6 and C6-7 undertaken in supine lying. 3 sets of 20 mobilisations. This technique was then progressed by placing the patients in an upright sitting position, and a sustained natural apophyseal glide (SNAG) technique (mulligan tech) was utilised. This involved application of an anterior and superior Glide, 10 repetitions (reps) to the C6 articular pillar on the left with the patient in slight left side bending. The progression from lying to sitting was chosen because the latter was deemed a more functional posture. Duration not specified.	Cervical spine pain (VAS) & Cervical spine ROM (Zebris CMs 70p system	Immediate decrease in cervical spine pain (6/10 to 2/10), increased cervical spine ROM (flexion 55%, extension 35%, left rotation 56% left lateral flexion 22%).
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
2. Inclusion of thoracic spine thrust manipulation into an electrotherapy or thermal program for the management of patients with acute mechanical neck pain: A randomised clinical trial (González-Iglesias et al., 2009).			

Male = 20 Female = 25 Age 23-44 Total = 45	Patients were randomly assigned in to two groups. **Experimental** groups received 6 sessions of a standard electrotherapy/thermal program (infrared lamp &TENS) during 3 consecutive weeks & thoracic thrust manipulation once per week for the 3 consecutive weeks. **Comparison** groups received 6 sessions of a standard electrotherapy or thermal program (an infrared lamp (250 W), located 50 cm distant from the patient's neck was applied for 15 min. TENS with a frequency of 100 Hz and 250 ms applied for 20 min. to the spinous process of C7 vertebra for 3 consecutive weeks.	Cervical spine pain (NPRS), Cervical spine disability (NPQ) & Cervical spine ROM (Goniometer)	Patients receiving thoracic spine manipulation experienced greater reductions in both neck pain with between group differences of 5.6 to 2.3 points on the NPRS & disability with between-group differences of 27.8 to 15.2 in the NPQ.
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)……** **Rationale:**			
3. Immediate effect of scapular repositioning with active cervical rotation in acute spasmodic torticollis (Desai et al., 2013).			
Male = 17 Female = 9 Age 20-40 Total = 26	Patients were randomly assigned into two groups. The conventional treatment groups received physiotherapy treatment in the form of microwave diathermy, submaximal isometrics & advice. The study groups received conventional treatment & an additional intervention in forms of scapular repositioning with patient in upright sitting position. 3 sets of 10 rep with 30 seconds, rest interval between each application. This study only measured the immediate effect of scapular repositioning & did not measure long-	Cervical spine Pain (VAS) Pressure pain threshold (PPT) (Algometer) & Cervical spine ROM	Significant improvements in intensity of pain ($p<.01$), cervical spine rotation to the ipsilateral side ($p<.01$). cervical spine side flexion to the contralateral side ($P<.01$), & PPT ($P < .01$) immediately after the treatment of the scapular repositioning & conventional

	term outcomes.	(Goniometer)	therapy compared with the conventional therapy alone.
(1 = not at all useful 2 = slightly useful 3 =useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
4. People seeking treatment for a new episode of neck pain typically have rapid improvement in symptoms: an observational study (Leaver et al., 2013)			
Male = NR Female = NR Age 18-70 Total = 181	Neck manipulation or neck mobilisation &multimodal physical agents (exercise, advice & electro-physical agents) were applied pragmatically according to the judgement of the treating practitioner. All patients received 4 treatment sessions over 3-month period.	Cervical spine pain (NPRS), Cervical spine disability (NDI)	On NPR scale from 0 (none) to10 (worst), pain improved from 6.1 (SD 2.0) at baseline to 2.5 (SD 2.1) at 2 weeks and to 1.5 (SD 1.8) at 3 months. On NDI scale from 0 (none) to 50 (worst), disability improved from 15.5 (SD 7.4) at baseline to 5.4 (SD 6.4) at 3 months.
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
5. Comparison of two treatment techniques: Muscle energy technique and Ischemic compression on upper trapezius trigger point in subjects with non-specific neck pain (Shah & Shah, 2015).			

Male = 11 Female = 19 Age 30-50 Total = 20	Comparison of two treatments techniques. Patients randomly divided into two groups. **Gr A**: patients received post isometric relaxation (PIR) technique of muscle energy technique (MET) light resisted effort for 7-10seconds 3-4 per sessions, in supine lying position. **Gr B**: patients received ischemic compression (IC) on the trigger point for 90 second tolerably painful (7- 8 on a client pain scale of 10), 3 rep per sessions plus Isometric neck exe & upper trapezius stretching exercise in sitting position on a chair. Duration 1 week.	Cervical spine pain (NPRS) PPT (Algometer) & Cervical spine ROM (NDI)	Both MET & IC were found to be effective on decreasing pain, improving CROM & PPT. MET was more effective than ischemic compression technique in improving CROM. ischemic compression appeared to be more effective than MET in improving PPT. Difference in VAS (pain) score between groups was not significant.
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
6. Efficacy and safety of diclofenac diethylamine 1.16% gel in acute neck pain: a randomised, double-blind, placebo-controlled study (Predel et al., 2013).			
Male = 36 Female = 36 Age > 18	Patients treated with DDEA 1.16% gel, (2g, 4x/day, for 5 days) or placebo. Day 1 (baseline and 1 h after first application of study drug) Day 2 (24h ± 4h after firs application of study drug). Day 3 (48 h ± 4 h after firs application of study drug) Day 5 (study end, 96h + 24h after first application of study drug) in	Cervical spine pain (VAS), Cervical spine disability	A topical DDEA 1.16% gel with diclofenac was fast-acting, effective & well tolerated for the relief of acute cervical spine pain (75.5 mm) at baseline to (19.5 mm)

Tota l= 72	gr A. Topical treatment with gel DDEA 1.16% gel without diclofenac was applied to gr B, a dose of 2 g gel was applied topically with the fingertips on the affected area & massaged into the skin for about 1 min. The gel was applied 4 times a day for 5 days & paracetamol, up to 2000 mg daily.	(NDI) & Vital signs	vs placebo (77.2 mm) to (73.8 mm) on 100mm VAS & improved cervical spine ROM.
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
7. Evaluation of the efficacy of subcutaneous carbon dioxide insufflations for treating acute non-specific neck pain in general practice: A sham controlled randomised trial (Brockow et al., 2008).			
Male = 28 Female = 98 Age > 65 Total = 126	Patients randomised into 2 groups. Two treatments were compared Carbon dioxide gas was insufflated subcutaneously at the sites of muscle tenderness. 25 ml carbon dioxide gas was administered per tender site. The maximum dose was limited to 100 ml 3 times per week for 3 weeks in gr A. Sham ultrasound with a common transmission gel applied at the sites of muscle tenderness with a 1.5 cm^2 transducer. A single intervention lasted 5 min. An intensity of 0.2 watt per cm^2 was displayed at the sham device 3 times for 3 weeks in gr B. Both groups received local infrared light power 100 Watt with a distance of 25-30 cm. A single treatment session lasted 10 min.	Cervical spine pain (VAS) Cervical spine Disability (German version McGill pain questionnaire)	Subcutaneous carbon dioxide insufflation (SCI) is not superior to sham ultrasound for treating patients with acute non-specific neck pain. Pain intensity for SCI from (68. 7 mm) at baseline to (33.0 mm) vs pain intensity for SUS from (69.4 mm) at baseline to (30.9 mm) on 100 mm VAS.

(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
8. Effect of Total Motion Release on Acute Neck Pain: A Pilot Study (Naik et al., 2016).			
Male = NR Female = NR Age 18-45 Total = 30	Total motion release treatment procedures as follow: Patients seated comfortably on the chair with Therapist sitting in front. To increase the affected side ROM, the patient is asked to do the movement on the unaffected side. The movement has to be done throughout the range; the patient is asked to sustain the range for 15 seconds for 3 times in 3 different ranges. Then the patient is asked to do the movement on the affected side for 3 times holding it for 15 seconds. 25 min of therapy per day for 7 days.	Cervical spine pain (VAS), Cervical spine disability (NDI) & Cervical spine ROM (Goniometer)	Paired t-test for the pre- and post-comparisons revealed a significant decrease in pain, disability & increase in cervical spine ROM. Pain intensity decreased from (6.98 ± 1.11) to a mean of (5 ± 1.35) on a 10 cm VAS after 7 sessions of treatment
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
9. Effects of conventional physical therapy with or without Strain Counter-strain in Patients with Trigger Points of Upper Trapezius; a Randomised Controlled Clinical Trial (Javaid et al 2016).			
Male = 25 Female = 23	Patients were randomised into two groups. **Gr A** received conventional physical therapy (cervical ROM exercises & advice) & strain counter-strain therapy (the technique was applied to the	Cervical spine pain (VAS) &	Patients in gr A have shown moderate reduction in pain, functional disability &

Age > 26 Total=48	trigger point with the tolerable pressure held for 90 seconds). Daily for 1-week duration. **Gr B** received conventional physical therapy (cervical ROM exercises & advice was administered) daily for 1-week duration.	Cervical spine disability (NDI)	improvement in cervical spine ROM than patients in gr B, mean reduction in pain in gr A 32.13 (26.99, 37.27) in gr B 12.62 (8.28, 16.96).
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
10. Effectiveness of Natural Apophyseal Glides Versus Grade I and II Maitland Mobilisation in Non- Specific Neck Pain (Hussain et al., 2016).			
Male = NR Female = NR Age 18-45 Total = 50	Fifty patients randomised into two groups. **Gr A** received conventional therapy (ultrasound therapy in continues mode frequency 1 MHz, intensity 1.0 W/cm^2, for 5 min. Shortwave diathermy continuous mode, frequency 27.12 MHZ, wavelength 11 meters for 15 min. Natural apophyseal glides (NAGs) with 2-3 herzt (for less than 6 rep) in 3 sets 4 times a week for 4 weeks. **Gr B** also received conventional therapy plus oscillatory movements of Maitland grade I, II that was given with 2 – 3 hertz for total of 60 seconds. 4 times a week for 4 weeks.	Cervical spine pain (NPRS) & Cervical spine disability (NDI)	Improved cervical spine pain, disability decreased & increased cervical spine ROM in gr A (before means scores = 4.8 SD 2.4, after means score = .76 SD1.09). Gr B (before mean scores = 4.6 SD 2.3 after = 2.08 SD 2.3)
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….**			

Rationale:			
11. The efficacy of an integrated neuromuscular inhibition technique on upper trapezius trigger points in subjects with non-specific neck pain: a randomised controlled trial (Nagrale et al., 2010).			
Male = 25 Female = 35 Age 18-55 Total = 60	Patients were randomised into gr A & gr B. **Gr A** received muscle energy technique (MET) in supine lying position. Each isometric contraction was held for 7–10 seconds & was followed by each stretch held for 30 seconds & 3-5 reps per treatment sessions. **Gr B** received Integrated neuromuscular inhibition technique (INIT) ischemic compression (pressure applied on trigger point for 90 seconds), strain counter-strain held for 20-30 seconds & 3-5 reps, MET contraction held for 7-10 seconds & stretch held for 30 seconds & 3-5 reps per sessions. Both groups were treated 3 times per week for 4 consecutive weeks.	Cervical spine pain (NPRS), Cervical spine disability (NDI) & Cervical spine ROM (Goniometer)	Both groups demonstrated significant levels of improvement in pain intensity ($P < 0.01$), lateral cervical flexion ($P< 0.01$), and cervical spine disability at the 2- & 4-weeks follow-up points ($P < 0.01$). However, comparison between gr analysis revealed that gr B (INIT) has shown more reduction in pain & improvement in cervical spine ROM when compared to gr A (MET).
(1= not at all useful 2= slightly useful 3=useful 4= fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
12.Thoracic Spine Thrust Manipulation Versus Cervical Spine Thrust Manipulation in Patients with Acute Neck Pain: A Randomised Clinical Trial (Puentedura et al., 2011).			
Male = NR	Patients were randomly allocated to 1 of the 2 treatment groups	Cervical spine	Patients in the cervical group,

Female = NR Age 18-60 Total = 20	(thoracic gr & cervical gr). **Thoracic gr** received thrust joint manipulation (TJM) in supine & an exercise in sitting position. **Cervical gr** received thrust joint manipulation supine & an exercise in sitting position. The exercise program was standardised for both groups and is describe as follow: Three-finger exercise for cervical spine rotation, Bilateral shoulder shrugs and scapular retractions, Bilateral shoulder horizontal adduction & abduction, upper cervical flexion and extension, lower cervical flexion and extension, Thera-Band rows, with moderate-resistance. 3 sets of 10 reps 3 to 4 times per day in sitting position. Both groups attended physical therapy sessions 3 times during the 1st week & 2 times during the 2nd week for a total of 5 sessions over a 2 week period.	pain (NPRS), Cervical spine disability (NDI) & Fear avoidance (FABQ)	compared to the thoracic gr, showed significantly greater improvement in pain & disability compared to those treated with thoracic spine TJM & exercises. Patients who received cervical spine TJM demonstrated greater improvements in NDI ($P \leq .001$) & NPRS ($p \leq .003$) scores at all follow-up times.
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
13. A Randomised Controlled Trial Comparing Manipulation with Mobilisation for Recent Onset Neck Pain (Leaver et al., 2010).			
Male = 64 Female = 118 Age 18-70	Patients randomised into two categories to determine whether neck manipulation is more effective for neck pain than mobilisation **Category 1** patients received neck manipulation with manual high-velocity low-amplitude thrust techniques applied to the cervical spine.	Cervical spine pain (NPRS), Cervical spine disability	Patients received neck manipulation did not experience more rapid recovery from an episode of neck pain or better outcomes in terms of pain,

Total = 182	**Category 2** received neck mobilisation with low-velocity oscillating passive movement applied to the cervical spine. Both groups received 4 treatments over 2 weeks.	(NDI)	disability, function, or global effect than mobilisation.
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
14. Thoracic Spine Manipulation for the Management of Patients with Neck Pain: A Randomised Clinical Trial (González-Iglesias et al., 2009).			
Male = 24 Female = 21 Age 18-45 Total = 45	Patients divided into a control group &experimental group. Control group received a standard electro/thermal therapy for 5 treatment sessions, and the experimental group received the same standard electro/thermal therapy program & a thoracic spine thrust manipulation in addition once a week for 3 consecutive weeks.	Cervical spine pain (VAS), Cervical spine disability (NPQ) & Cervical spine ROM (Goniometer)	The finding showed that standard electro/thermo therapy plus thoracic spine thrust manipulation was statistically significant improvement P < .001) in reducing pain, cervical spine ROM & disability.
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
15. Immediate effect of ischemic compression and trigger point pressure release on neck pain and upper trapezius trigger points: A randomised controlled trial (Gemmell et al., 2008).			
Male = NR	Patients randomised into three groups (Gr A, Gr B, & Gr C).	Cervical spine	There was no statistically

Female = NR Age 18-55 Total = 45	**Gr A** treated with ischemic compression (IC) (consisted of sustained deep pressure with the thumb to the upper trapezius trigger point (TrP) for 30 seconds 1 min). **Gr B** received a trigger point pressure release was applied & repeated pressure until there was no TrP tenderness or 90 seconds had elapsed. **Gr C** received Sham Ultrasound (SUS) lotion was applied on trapezius muscle in the region of the TrP for 2 min. All patients attended one treatment session & outcome measures were repeated within 5 min after treatment. (This was single treatment).	pain (VAS) PPT (Algometer) Cervical spine ROM (Goniometer)	significant difference (P = 0.5721) between the groups in any of the secondary outcome measures. However, there was a clinically significant difference between IC and SUS.
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
16. Spinal manipulation, medication, or home exercise with advice for acute and subacute neck pain (Gert Bronfort et al., 2012).			
Male = NR Female = NR Age 18-65 Total = 272	Patients were randomised into Spinal manipulation therapy (SMT) gr, Medication (MED) gr & Home exercise with advice (HEA) gr. **SMT gr** were treated using diversified techniques (low-amplitude spinal adjustments, high-velocity joint thrust manipulation & mobilisation a low-velocity type joint oscillation lasted for 15-20 min. **Medication gr** (nonsteroidal anti-inflammatory drugs, acetaminophen). The choice of medications and number of visits was made by the physician on the basis of the participant's history and response to treatment. **HEA gr** focused on simple self-mobilisation exercise gentle controlled movement of the neck & shoulder joints, including neck	Cervical spine Disability (NDI) & Cervical spine ROM (6000 spine motion	HEA was superior to medication at 26 weeks (P ≤ 0.02). SMT & HEA led to similar short and long-term outcomes but patients who received medication seemed to fare worse.

	retraction, extension, flexion, rotation, lateral bending & scapular retraction, with no resistance 5-10 rep of each exercise 6-8 times daily. Duration of the treatment 12weeks.	analyser)	
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
17. Short-Term Combined Effects of Thoracic Spine Thrust Manipulation and Cervical Spine Non-thrust Manipulation in Individuals with Mechanical Neck Pain: A Randomised Clinical Trial (Masaracchio et al., 2013)			
Male =13 Female = 51 Age 18-60 Total = 64	Patients divided into comparison & experimental. Patients in the comparison gr received posterior-to-anterior cervical spine non-thrust manipulations (grade 3) to the spinous process of C2-C7. Each segment was oscillated for 10 reps followed by a 10second rest between segments. If patients reported an NPRS score of greater than 4/10 during the treatment, the treating therapist switched to a grade 2 non-thrust manipulation. There was an approximately 30-second rest between the cervical spine non-thrust manipulations & the thoracic spine thrust manipulations. Patients in the experimental gr received the same interventions that the comparison gr received, plus 2 thoracic spine thrust manipulations targeted to the upper thoracic spine (T1-T3) in supine lying & 2 thoracic spine thrust manipulations targeted to the	Cervical spine pain (NPRS) & Cervical spine Disability (NDI)	Patients who received both thoracic spine thrust manipulation & cervical spine non-thrust manipulation plus exercise demonstrated better overall short-term outcomes ($P < .001$) on the NPRS & NDI compared to patients receiving only cervical spine non-thrust plus exercise.

	middle thoracic spine (T4-T7). Approximately 10 second rest between the thrust manipulations. Following an approximately 30-second rest, the middle thoracic spine thrust manipulation was performed in a similar way. Following the manipulations all patients in both groups were instructed to do cervical spine active ROM exercises. For a week duration.		
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
18. Effectiveness of mobilisation therapy and exercises in mechanical neck pain (Ganesh et al., 2015).			
Male = 38 Female = 22 Age 21-45 Total = 60	Patients were randomised into 3 groups. **Gr I** received Maitland mobilisation to the cervical spine for a period of two weeks (five days a week, one session per day) along with exercises prescribed for the gr III patients. **Gr II** received Mulligan SNAGs for a period of five sessions per week for two weeks & the exercises prescribed to gr III. **Gr III** received supervised exercises were stretching exercises to cervical & scapular muscles, deep neck flexor strengthening, isometric exercises for extensors, side flexors (both sides) and rotators (both sides), anti-gravity strengthening to rhomboids, middle and lower trapezi & cervical ROM exercises.	Cervical spine pain (VAS), Cervical spine Disability (NDI) & Cervical spine ROM (Goniometer)	The overall results of the study showed that all of the groups improved over time compared to baseline ($p < 0.05$) It suggested that supervised exercises are as effective as mobilisation & exercises combined in reducing cervical spine pain, improving ROM & related disability among patients with acute neck pain.

	All exercises were done with a dosage of one set of 10 rep with 6 second hold and 10 second rest between the repetitions. Duration 2 weeks.		
(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful) **Your response (score)…….** **Rationale:**			
19. Exploring patient satisfaction: a secondary analysis of a randomised clinical trial of spinal manipulation, home exercise, and medication for acute and subacute neck pain (Leininger et al., 2014).			
Male = NR Female = NR Age 18-65 Total = 261	Patients were divided into 3 groups. **Gr I** Spinal manipulation therapy (SMT) was provided by Dr of Chiropractic. The treatment consisted of high-velocity low amplitude joint manipulation lasted 15-20 min. Other light soft tissue massage and assisted stretching and heat or cold packs were used as necessary to facilitate the SMT. The specific areas of treatment & number of visits were determined by the treating chiropractic over a 12-week treatment phase. Advice to stay active was provided as needed. **Gr II** Medication (MED) was provided by a medical doctor at a pain management clinic and consisted of nonsteroidal anti-inflammatory drugs, acetaminophen, or both as a first line of therapy. Narcotic medication & muscle relaxants were prescribed to patients who failed to respond to initial treatment. The number of visits & choice of medication were at the physician's discretion over the 12-week	Cervical spine pain (NRS) & Cervical spine disability (Self-report questions)	SMT patients experienced significantly greater pain reduction than Medication patients; SMT patients also reported greater global satisfaction than HEA & both groups were globally satisfied than the Medication groups.

	treatment period. Advice to stay active was provided. **Gr III** Home exercise and advice (HEA) was provided by exercise therapists at a research clinic. Patients attended two 1-hour visits focusing on self-mobilisation exercises for the neck & shoulders over a 2-week period. Participants were instructed toperform5 to10 repetitions of the exercises at home 6 to 8 times per day.		

(1 = not at all useful 2 = slightly useful 3 = useful 4 = fairly useful 5 = very useful)

Your response (score)…….

Rationale:

VAS (visual analogue scale), **Rom** (range of motion), **NPRS** (neck pain rating scale), **NPQ** (neck pain questionnaire), **NDI** (neck disability index), **SD** (standard deviation), **NR** (not reported), **Gr** (group), **CROM** (cervical range of motion), **DDEA (**diclofenac dimethylamine), **FABQ** (fear avoidance behaviour question).

Thank you very much for participating in this e-Delphi study. If you have any questions or concerns about any of the questions asked, please do not hesitate to contact the researcher at email address:

2110621@myuwc.ac.za

Appendix C3: Instructions at e-Delphi round 2.

Dear ……

I hope this email will find you well.

You are invited to provide your expert opinion for a second time on the treatment methods identified in the first round of the study. A total of eight experts took part in the first round and the summary of each study in the table below represents a combination of the previous responses. While I appreciate that you would naturally have an opinion on the quality of the studies presented herein, and their usefulness thereof, I am particularly interested in your view on their feasibility. In other words, given your working environment and what you know about the general working environment in Africa, which of these interventions do you think are possible to be implemented, given your physical, financial, logistical and experience constraints? In this second round of the e-Delphi study, please indicate whether you agree or disagree with the summarised responses, from round 1, and provide a short explanation for your response.

Sincerely,

Roba Banata.

Appendix C4: Questionnaire for round 2 e-Delphi study.

Study 1: McNair P J, Portero P, Chiquet C, Mawston G, & Lavaste F. (2007). Acute neck pain: cervical spine range of motion and position sense prior to and after joint mobilisation. Manual therapy, 12(4), 390-394.

Conclusions: The findings showed that the application of standardised specific mobilisation techniques led to substantial improvements in the range of motion and the restitution of normal coupled motion.

Combined expert responses e-Delphi 1: All eight respondents opined that this treatment is useful for the following reasons: it is simple and effective; inexpensive and does not require sophisticated equipment; can be applied in poorly resourced settings. However, they also reported that because it is a case study, it does not provide high-levels of evidence.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree …… Explanation:……..

Study 2: González-Iglesias J, Fernández-de-las-Peñas C, Cleland J A, Alburquerque-Sendín F, Palomeque-del-Cerro L, & Méndez-Sánchez R. (2009). Inclusion of thoracic spine thrust manipulation into an electro-therapy/thermal program for the management of patients with acute mechanical neck pain: a randomised clinical trial. *Manual therapy*, *14*(3), 306-313.

Conclusions: We found that the inclusion of a thoracic manipulation into an electrotherapy/thermal program was effective in reducing neck pain and disability, and in increasing active cervical mobility in patients with acute neck pain.

Combined expert responses e-Delphi 1: Six participants ranked this study as useful, while two suggested that it was not useful. ~~Of~~ The six people who agreed that it was useful, ~~they~~ also raised concerns about the use of electrotherapy in resource-constrained contexts.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree …….. Explanation: ……..

Study 3: Desai N A, Khatri S M, & Agarwal A B. (2013). Immediate effect of scapular repositioning with active cervical rotation in acute spasmodic torticollis. *Journal of Manipulative and Physiological Therapeutics*, *36*(7), 412-417.

Conclusions: This pilot study demonstrated that scapular repositioning may have an immediate hypoalgesic effect on individuals with spasmodic torticollis in terms of pain severity, pressure pain threshold (PPT), and cervical range of motion. Further controlled trials are warranted.

Combined expert responses e-Delphi 1: Seven respondents said that this intervention would be useful, while one responded negatively, the pain was caused by poor positioning and, therefore, might not fall under acute non-specific neck pain (NSNP). Reasons given in support of the intervention were that scapula stabilisation and posture correction could reduce neck pain immediately, is easily applicable anywhere, and does not need special equipment.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree ……. Explanation:……

Study 4: Leaver A M, Maher C G, McAuley J H, Jull G, Latimer J, & Refshauge K. M. (2013). People seeking treatment for a new episode of neck pain typically have rapid improvement in symptoms: an observational study. *Journal of physiotherapy*, *59*(1), 31-37.

Conclusions: Although almost half of those who seek treatment do not recover completely within three months, residual pain and disability in this group is relatively low. Physiotherapists should reassure people with a new episode of neck pain that rapid improvement in symptoms is common, modifying this advice where applicable based on risk factors.

Combined expert responses e-Delphi 1: Six experts believed that this intervention (multimodal physical therapies, comprising either high velocity thrust manipulation or mobilisation, and multimodal physical interventions such as exercise, advice about activity, and electrophysical agents) was useful, while two said that it was not. However, the six supporters were also concerned about the specifics of the intervention, saying that four sessions would be inadequate, three months is woefully long, and that chronicity is best prevented through early management.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree……. Explanation:……

Study 5: Shah N, & Shah N. (2015). Comparison of two treatment techniques: Muscle energy technique and Ischemic compression on upper trapezius trigger point in subjects with non-specific neck pain. *International Journal of Therapies and Rehabilitation Research*, *4*(5), 260.

Conclusions: Both the treatments were effective in reducing pain and improving PPT and cervical range of motion (CROM). Ischemic compression appeared to be more effective than muscle energy technique (MET) in improving PPT. Difference in visual analogue scale (VAS) score between the groups was not significant. MET was more effective than Ischemic compression (IC) technique in improving CROM.

Combined expert responses e-Delphi 1: In this study, all eight experts agreed that these interventions could be useful. They believed that these interventions would be easy to apply, either singly or in combination, are effective, can be applied in low resource contexts, and are supported with high levels of evidence.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree……. Explanation:……

Study 6: Predel H G, Giannetti B, Pabst H, Schaefer A, Hug A M, & Burnett I. (2013). Efficacy and safety of diclofenac diethylamine 1.16% gel in acute neck pain: a randomised, double-blind, placebo-controlled study. *BMC musculoskeletal disorders*, *14*(1), 250.

Conclusions: diclofenac dimethylamine (DDEA) 1.16% gel, which is available over-the-counter, was effective and well tolerated in the treatment of acute neck pain. The tools used to assess efficacy suggest that it quickly reduced neck pain and improved neck function. However,

questions remain regarding the comparability and validity of such tools.

Combined expert responses e-Delphi 1: While five panel members felt that this intervention would not be useful, three did find it useful. Those who thought it was not useful considered that it was pharmacological management and therefore outside the scope of physiotherapy practice, and that the majority of Ethiopian physiotherapists would not be licensed to prescribe Diclofenac.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree ……
Explanation:…….

Study 7: Brockow T, Heißner T, Franke A, & Resch K L. (2008). Evaluation of the efficacy of subcutaneous carbon dioxide insufflations for treating acute non-specific neck pain in general practice: A sham controlled randomised trial. *European Journal of Pain*, *12*(1), 9-16.
Conclusions: The study indicates that subcutaneous carbon dioxide insufflations are not superior to sham ultrasound for treating patients with acute non-specific neck pain. Because course of pain did not differ from the one expected from self-limitation, it is likely that non-specific effects played only a minor role, if any, in both interventions

Combined expert responses e-Delphi 1: Only one of the eight panel members believed that this intervention would be useful. Reasons given were that there is no such facility in Ethiopia; that it is not a safe technique; and it may be difficult to implement in a low resource setting; one participant had never heard of it.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree ……..

Explanation:……

Study 8: Naik V, Naik P, Tavares A, More D, & Souza G D. (2016). Effect of Total Motion Release on Acute Neck Pain: A Pilot Study. *Indian Journal of Physiotherapy and Occupational Therapy-An International Journal*, *10*(1), 93-97.

Conclusions: The study concluded that total motion release was effective in alleviating acute neck pain in terms of decreasing pain and disability and increasing range of motion.

Combined expert responses e-Delphi 1: While one panel member responded negatively to this intervention, seven believed that it would be useful for the following reasons: it decreases pain and increases cervical spine ROM, is cost effective, and can be used in any setting. However, there was a concern that it was a small, pilot study.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree …….
Explanation:…….

Study 9: Javaid H M W, Ahmad A, Ajmad F, Liaqat S, & Tahir S. (2016). Effects of Conventional Physical Therapy with or without Strain Counterstrain in Patients with Trigger Points of Upper Trapezius; a Randomised Controlled Clinical Trial. *Annals of King Edward Medical University*, *22*(3).

Conclusions: Conventional physical therapy with strain counter-strain was found to be effective in reducing pain, functional disability and improving range of motion in the cervical region.

Combined expert responses e-Delphi 1: All eight exerts believed that this method could be useful. It is a randomised controlled trial (RCT) and so has good evidence for efficacy, is a simple treatment protocol, and can be implemented with minimal equipment in the clinical setting. However, there were also comments that it is quite labour intensive.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree …….

Explanation:……..

Study 10: Hussain S I, Ahmad A, Amjad F, Shafi T, & Shahid H A. (2016). Effectiveness of Natural Apophyseal Glides Versus Grade I and II Maitland Mobilisation in Non-Neck Pain. *Annals of King Edward Medical University*, *22*(1), 23-23.

Conclusions: It was concluded that mobilisation of Mulligan i.e., natural apophyseal glide (NAGS) was more effective compared with mobilisation of Maitland in Grade 1 and II in progressing neck pain rating scale (NPRS) and neck disability index (NDI) scores in sufferers with nonspecific neck pain.

Combined expert responses e-Delphi 1: Seven responded that this intervention was useful, while one reported that it would not be useful at all. Although it exhibits high levels of evidence, and is important in pain control, it nonetheless requires electrotherapy and postgrad manual therapy training.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree

Explanation:…….

Study 11: Nagrale A V, Glynn P, Joshi A, & Ramteke G. (2010). The efficacy of an integrated neuromuscular inhibition technique on upper trapezius trigger points in subjects with non-specific neck pain: a randomised controlled trial. *Journal of Manual & Manipulative Therapy*, *18*(1), 37-43.

Conclusions: The findings of this study suggest the potential benefit of an integrated approach in deactivating upper trapezius trigger points. Further research should be performed to investigate the long-term benefits of the current treatment approach.

Combined expert responses e-Delphi 1: All eight experts reported that this intervention might be useful. It alleviates pain intensity, is easy to apply, and comprises high levels of evidence. In addition, combination therapy has more short- and long-term benefits than single therapy.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree ……

Explanation:……

Study 12: Puentedura E J, Landers M R, Cleland J A, Mintken P, Huijbregts P, & Fernandez-De-Las-Peñas C. (2011). Thoracic spine thrust manipulation versus cervical spine thrust manipulation in patients with acute neck pain: a randomised clinical trial. *journal of orthopaedic & sports physical therapy*, *41*(4), 208-220.

Conclusions: Patients with neck pain who met the criteria for successful treatment of neck pain with a thoracic spine manipulation (TJM) demonstrated a more favourable response when the TJM was directed to the cervical spine rather than the thoracic spine. Patients receiving cervical TJM also demonstrated fewer transient side-effects.

Combined expert responses e-Delphi 1: In this study, all eight experts responded positively as the intervention is a simple, effective procedure. However, although the procedures were well described, this is a small study and practitioners would need postgraduate training due to the inherent risk in cervical spine manipulation.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagre…….
Explanation:……

Study 13: Leaver A M, Maher C G, Herbert R D, Latimer J, McAuley J H, Jull G, & Refshauge K M. (2010). A randomised controlled trial comparing manipulation with mobilisation for recent onset neck pain. *Archives of physical medicine and rehabilitation*, *91*(9), 1313-1318.

Conclusions: Neck manipulation is not appreciably more effective than mobilisation. The use of neck manipulation therefore cannot be justified on the basis of superior effectiveness.

Combined expert responses e-Delphi 1: While six experts reported that this intervention would be useful, two disapproved of it. Its strengths lie in the fact that it is an RCT with a large sample size, that cervical spine mobilisation is as good as manipulation, and it requires less postgraduate training. However, it nonetheless requires expertise and experience, making it difficult to recommend at scale.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree……..
Explanation: ……

Study 14: González-Iglesias J, Fernandez-De-Las-Penas C, Cleland J A, & del Rosario Gutiérrez-Vega M. (2009). Thoracic spine manipulation for the management of patients with neck pain: a randomised clinical trial. *journal of orthopaedic & sports physical therapy*, *39*(1), 20-27.

Conclusions: The results of this study suggest that thoracic spine thrust manipulation results in superior clinical benefits that persist beyond the 1-month follow-up period for patients with acute neck pain.

Combined expert responses e-Delphi 1: All eight experts reported that this intervention could be useful as the level of evidence is high. The combination of manual therapy and electrotherapy is commendable, but the availability of electrotherapy equipment at primary health care

physiotherapy settings may not be practical in low-resourced countries like Ethiopia.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree …….

Explanation:…….

Study 15: Gemmell H, Miller P, & Nordstrom H. (2008). Immediate effect of ischaemic compression and trigger point pressure release on neck pain and upper trapezius trigger points: a randomised controlled trial. *Clinical Chiropractic*, *11*(1), 30-36.

Conclusions: Ischemic compression is superior to sham ultrasound in immediately reducing pain in patients with non-specific neck pain and upper trapezius trigger points.

Combined expert responses e-Delphi 1: In this study, six experts responded positively while two suggested that the method would not be useful. The study found that IC is effective in the reduction of trigger points. Also, IC and trigger point technique have almost the same effects.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree ……..
Explanation:……

Study 16: Bronfort G, Evans R, Anderson A V, Svendsen K H, Bracha Y, & Grimm R H. (2012). Spinal manipulation, medication, or home exercise with advice for acute and subacute neck pain: a randomised trial. *Annals of internal medicine*, *156*(1_Part_1), 1-10.

Conclusions: For participants with acute and subacute neck pain, soft tissue manipulative therapy (SMT) was more effective than medication in both the short and long term. However, a few instructional sessions of HEA resulted in similar outcomes at most time points.

Combined expert responses e-Delphi 1: All eight experts reported that this intervention could be useful: the sample size is large; the combination of SMT and home exercise and advice (HEA) is superior; and it can be used in poorly resourced settings. However, although medication can be used during acute stages of the condition, it may not be practical in the physiotherapy clinics of Ethiopia.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree ……..
Explanation: ……..

Study 17: Masaracchio M, Cleland J, Hellman M, & Hagins M. (2013). Short-term combined effects of thoracic spine thrust manipulation and cervical spine nonthrust manipulation in individuals with mechanical neck pain: a randomised clinical trial. *journal of orthopaedic & sports physical therapy*, *43*(3), 118-127.

Conclusions: Individuals with neck pain who received a combination of thoracic spine thrust manipulation and cervical spine non-thrust manipulation plus exercise demonstrated better overall short-term outcomes on the numeric pain rating scale, the Neck Disability Index, and the global rating of change.

Combined expert responses e-Delphi 1: All eight experts approved of this intervention, stating that its methodology is explained well. In addition, the combination of manual techniques is

useful in the treatment of patients with acute NSNP. However, concerns were raised that these techniques would probably require extra training.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree……. Explanation:…….

Study 18: Ganesh G S, Mohanty P, Pattnaik M, & Mishra C. (2015). Effectiveness of mobilisation therapy and exercises in mechanical neck pain. *Physiotherapy theory and practice*, *31*(2), 99-106.

Conclusions: The results of this showed that manual therapy interventions were no better than supervised exercises in reducing pain, improving range of motion (ROM) and neck disability.

Combined expert responses e-Delphi 1: All experts stated that this intervention might be useful for the following reasons: it has high evidence levels, is a simple treatment protocol, and can be used in poorly resourced settings. However, it is very labour intensive as it involves five sessions per week for a period of two weeks.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree ……. Explanation:……

Study 19: Leininger B D, Evans R, & Bronfort G. (2014). Exploring patient satisfaction: a secondary analysis of a randomised clinical trial of spinal manipulation, home exercise, and medication for acute and subacute neck pain. *Journal of manipulative and physiological therapeutics*, *37*(8), 593-601.

Conclusions: Individuals with acute/subacute neck pain were more satisfied with specific aspects of care received during spinal manipulation therapy or home exercise interventions compared with receiving medication. The relationship between neck pain and satisfaction with care was weak.

Combined expert responses e-Delphi 1: Six experts reported that the intervention might be useful, while two responded negatively. Although six experts thought it useful, the study is more chiropractic in nature. In addition, it is secondary analysis and only explores patients' satisfaction.

Your opinion on combined expert responses e-Delphi 1: Agree or Disagree ……

Explanation: ……..

Thank you very much for participating in this e-Delphi study. If you have any questions or concerns about any of the questions asked, please do not hesitate to contact the researcher at email address:

2110621@myuwc.ac.za

APPENDIX D: ASSESSMENT PROFORMA

Assessment pro-forma for patients with acute non-specific neck pain (feasibility study)

This form will be used to assist physical therapist (treatment provider) in assessing, treating and discharging each patient with acute non-specific neck pain.

Date…….

Section I: Socio-demographic characteristics of patients

Personal information

Patient's full name ……

Age

- ☐ 18-24
- ☐ 25-31
- ☐ 32-38
- ☐ 39-45
- ☐ 46 and above

Gender……..

- ☐ Male
- ☐ Female

Height ……. weight ……

Marital status…….

- ☐ Single
- ☐ Married
- ☐ Divorced

Educational qualification……

- ☐ Uneducated
- ☐ Primary School
- ☐ High School

☐ College

☐ University

Occupation…….

☐ Employed

☐ Unemployed

☐ Student

☐ Self-employed

Address…… Phone number…….

Section II: Vital signs

Temperature……

BP……

Pulse……

Respiration rate……

Section III: Neck pain-specific (related) information

Present history

- Chief complaint…….
- Onset of Symptoms……
- Duration of the neck pain……
- Pain intensity (0-10)

0	1 2 3	4 5 6	7 8 9 10
No	Mild pain	Moderate pain	Severe pain

- Medication

List all medications you are currently taking for your neck pain if any including the name of pill, strength, how many times per day, name of doctor who prescribe, date started

- Previous medical history

  Any allergy history

  Lifestyle (Exercise/sedentary)

Personal Habits (alcohol, tobacco, drug use) Diagnostics tests (x-ray MRI etc) if any

Section IV: Baseline physical examination of cervical spine

Physical examination/ general observation	**Yes/No**	**Cervical spine muscular strength**	**Grade**	**Cervical spine range of motion**	**Degree**	**Cervical spine neurological test**	**Remark**
Forward head posture		Flexion		Flexion		Upper limb tension tests	
Thoracic kyphosis		Extension		Extension		Deep tendon reflex tests	
Lumbar lordosis		Rotation R…… L…….		Rotation R…… L…….			
		Side bending R…… L…….		Side bending R…… L…….			

V: Physiotherapy intervention plan for patient with acute non-specific neck pain

Part to be treated	Types of treatments (items)	Route of interventions or methods used	Dosages (in min)	1st day treatment and outcomes	Treatment adverse effects if any
				NPRS…..	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L……	
				Side bending R…… L…….	
Part to be	types of	Route of	Dosages	2nd day treatment	Treatment

treated	treatments (items)	interventions or methods used	(in min)	outcomes	adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	3rd day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	4th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments	Route of interventions	Dosages (in min)	5th day treatment outcomes	Treatment adverse

	(items)	or methods used			events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	6th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	7th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods	Dosages (in min)	8th day treatment outcomes	Treatment adverse events if any

		used			
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	9th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	10th day treatment outcomes	Treatment adverse events if any
				NPRS……..	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	11th day treatment outcomes	Treatment adverse events if any

				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	12th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	

Section VI: outcome assessment instruments

The Numeric Pain Rating Scale Instructions
Numerical pain rating scale is Valid and reliable pain assessment for patients with acute and chronic non-specific neck pain (Pathak, Sharma, & Jensen 2018, Castarlenas, Jensen, von Baeyer, & Miró 2017).

The patient is verbally asked to tell the number which fits best to his or her present pain intensity

Numerical pain rating scale (0-10)

1st visit, date……. _____/10 5th visit date…… _____/10

2nd visit date…… _____/10 6th visit date…… _____/10

3rd visit date…… _____/10 7th visit date…….. _____/10

4th visit date…… _____/10 8th visit date……. _____/10

9th visit date…… _____/10 10 visit date…….. _____/10

11th visit date…. _____/10 12th visit date…… _____/10

Neck Disability Index (NDI). **NDI** is used to assess the patient's level of functional status (Vernon, 2008, Young et al., 2009). The following chart shows the progressive assessment of cervical spine functional disability (NDI questionnaire see Appendix E).

Items	Pre intervention day	Post int week 1				Week 6
Pain Intensity						
Personal Care						
Lifting						
Work						
Headache						
Concentration						
Sleeping						
Driving						
Reading						
Recreation						

- **Goniometry: used** to measure cervical spine range of motion (Farooq, Bandpei, Ali, & Khan, 2016)

- **Quality of life assessment** at the end of neck pain treatment (at the end of 6 weeks) (see Appendix F).

- **Full name of assessor and treating physiotherapist……**

APPENDIX E: NECK DISABILITY INDEX SURVEY

This questionnaire has been designed to give us information as to how your neck pain has reacted to treatment by gauging your ability to manage your everyday life. Please answer every section and **mark in each section only the one box that applies to you.** We realise you may

consider that two or more statements in any one section relate to you, but please just mark the box that most closely describes your problem.

A. Demographic information

Patient's full name …… Date……

Age

- ☐ 18-24
- ☐ 25-31
- ☐ 32-38
- ☐ 39-45
- ☐ 46 and above

Gender

- ☐ Male
- ☐ Female

Height ……. weight ……

Marital status…….

- ☐ Single
- ☐ Married
- ☐ Divorced

Educational qualification……

- ☐ Uneducated
- ☐ Primary School
- ☐ High School
- ☐ College
- ☐ University

Occupation…….

- ☐ Employed
- ☐ Unemployed
- ☐ Student
- ☐ Self-employed

1. **Questions**

Section 1: Pain Intensity

☐ I have no pain at the moment
☐ The pain is very mild at the moment
☐ The pain is moderate at the moment
☐ The pain is fairly severe at the moment
☐ The pain is very severe at the moment
☐ The pain is the worst imaginable at the moment

Section 2: Personal Care (Washing, Dressing, etc.)

- I can look after myself normally without causing extra pain
- I can look after myself normally but it causes extra pain
- It is painful to look after myself and I am slow and careful
- I need some help but can manage most of my personal care
- I need help every day in most aspects of self-care
- I do not get dressed, I wash with difficulty and stay in bed

Section 3: Lifting

☐ I can lift heavy weights without extra pain
☐ I can lift heavy weights but it gives extra pain
☐ Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed, for example on a table
☐ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned

☐ I can only lift very light weights
☐ I cannot lift or carry anything

Section 4: Reading

- I can read as much as I want to with no pain in my neck
- I can read as much as I want to with slight pain in my neck
- I can read as much as I want with moderate pain in my neck
- I can't read as much as I want because of moderate pain in my neck
- I can hardly read at all because of severe pain in my neck
- I cannot read at all

Section 5: Headaches

vi. I have no headaches at all
vii. I have slight headaches, which come infrequently
viii. I have moderate headaches, which come infrequently
ix. I have moderate headaches, which come frequently
x. I have severe headaches, which come frequently
xi. I have headaches almost all the time

Section 6: Concentration

☐ I can concentrate fully when I want to with no difficulty

☐ I can concentrate fully when I want to with slight difficulty
☐ I have a fair degree of difficulty in concentrating when I want to
☐ I have a lot of difficulty in concentrating when I want to
☐ I have a great deal of difficulty in concentrating when I want to
☐ I cannot concentrate at all

Section 7: Work

e) I can do as much work as I want to
f) I can only do my usual work, but no more
g) I can do most of my usual work, but no more
h) I cannot do my usual work
i) I can hardly do any work at all £ I can't do any work at all

Section 8: Driving

☐ I can drive my car without any neck pain
☐ I can drive my car as long as I want with slight pain in my neck
☐ I can drive my car as long as I want with moderate pain in my neck
☐ I can't drive my car as long as I want because of moderate pain in my neck
☐ I can hardly drive at all because of severe pain in my neck
☐ I can't drive my car at all

Section 9: Sleeping

☐ I have no trouble sleeping
☐ My sleep is slightly disturbed (less than 1 hr sleepless)
☐ My sleep is mildly disturbed (1-2 hrs sleepless)
☐ My sleep is moderately disturbed (2-3 hrs sleepless)
☐ My sleep is greatly disturbed (3-5 hrs sleepless)
☐ My sleep is completely disturbed (5-7 hrs sleepless)

Section 10: Recreation

☐ I am able to engage in all my recreation activities with no neck pain at all
☐ I am able to engage in all my recreation activities, with some pain in my neck
☐ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck
☐ I am able to engage in a few of my usual recreation activities because of pain in my neck
☐ I can hardly do any recreation activities because of pain in my neck
☐ I can't do any recreation activities at all

Source: NDI developed by: Vernon, H. & Mior, S. (1991). The Neck Disability Index: A study of reliability and validity. Journal of Manipulative and Physiological Therapeutics. 14, 409-415

APPENDIX F: SURVEY PARTICIPANT INFORMATION SHEET

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2542, Fax: 27 21-959 1217
E-mail: 2110621@myuwc.ac.za

Information sheet: For physiotherapists

Research Title: Development of an evidence-based physiotherapy treatment protocol for acute non-specific neck pain in Ethiopia

What is this study about?

This is a study being conducted by **Roba Banata**, a PhD student at physiotherapy Department, University of the Western Cape in South Africa. You are invited to participate in this research because we are carrying out a survey to determine the current modalities and techniques used by physiotherapists in the treatment of patients with acute non-specific neck pain in Ethiopia. The purpose of this research study is to develop an evidence-based physiotherapy treatment protocol for acute non-specific neck pain.

What will I be asked to do if I agree to participate?

You will be asked to sign up a consent form for your participation, and then you will be given questionnaires to complete. The questionnaires consist of three sections. The first section will gather demographic information, the second section some basic profiles (work experience, current working place) and the third section your treatment preferences for patients with acute non-specific neck pain. It will take approximately 45 minutes to complete the questionnaire.

Would my participation in this study be kept confidential?

The researchers will take all appropriate measures to protect your identity and your contribution to the study. Your confidentiality and anonymity will be protected by not writing your name on the questionnaires and instead specific codes will be used for data management.

What are the risks of this research?

There may be some risks from participating in this research study. All human interactions and talking about the self or others carry some level of risk. We will nevertheless minimize such risks and act promptly to assist you if you experience any discomfort, psychological or otherwise during the process of your participation in this study. All the detailed contact numbers of

appropriate authorities will be given to you in case you want to ask any question concerning the study.

What are the benefits of this research?

You may not benefit much from this study. However, your participation and contribution to this study will enhance the deployment of a physiotherapy treatment protocol for patients with acute non-specific neck pain. The results of this study may also help the researcher to get a clear picture on the current physiotherapy management of patients with acute non-specific neck pain in Ethiopia

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. If you decide not to participate in this study or if you stop participating at any time, you will not be penalised or lose any benefits to which you otherwise qualify.

What if I have questions?

This research is being conducted by **Roba Banata**, a PhD student department physiotherapy at the University of the Western Cape. If you have any questions about this research study, please contact **Roba Banata** at: University of the Western Cape, Physiotherapy Department on telephone number: +27 21-959 2542 or mobile number: 061 235 8623, or e-mail: 2110621@myuwc.ac.za

If 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:

Prof Michael Rowe
Head Department of
Physiotherapy
Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
mrowe@uwc.ac.za

Prof Anthea Rhoda
Dean of the Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
chs-deansoffice@uwc.ac.za

APPENDIX G: SURVEY CONSENT FORM

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959-2542, Fax: 27 21-959-1217

E-mail: **2110621@myuwc.ac.za**

SURVEY CONSENT FORM: PHYSIOTHERAPIST

Research Title: Development of an evidence-based physiotherapy treatment protocol for acute non-specific neck pain in Ethiopia

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…….

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:

Mr Roba Banata
University of the Western Cape
Private Bag X17, Belville 7535
Tel: +27 21-959-2542, Fax: 27 21-959-1217
Cell: 0612358623
Email: 2110621@myuwc.ac.za

APPENDIX H: e-DELPHI STUDY PARTICIPANT INFORMATION SHEET

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2542, Fax: 27 21-959 1217

E-mail: 2110621@myuwc.ac.za

Information sheet: e-Delphi study

Research Title: Development of an evidence-based physiotherapy treatment protocol for acute non-specific neck pain in Ethiopia

What is this study about?

This is a research study being conducted by **Roba Banata**, a PhD student under Physiotherapy Department, at the University of the Western Cape in South Africa. You are invited to participate as an expert panellist in an e-Delphi study as part of the development of an evidence-based physiotherapy treatment protocol for patients with acute non-specific neck pain in Ethiopia.

Why have I been chosen to partake in this study?

You are invited to participate in this study because you have been identified as an expert in the field of musculoskeletal physiotherapy. The e-Delphi study is to seek expert opinion and consensus on the proposed physiotherapy treatment protocol for patients with acute non-specific neck pain.

What will I be asked to do if I agree to participate?

You will be asked to sign up an agreement form for your participation and return it through email address. The questionnaire will be sent to you. The questionnaire will be sent in three different rounds in order to achieve consensus with respect to developing a protocol for the treatment of patients with acute non-specific neck pain. You will be asked to present your opinion on a draft physiotherapy treatment protocol. Please take a few minutes to read through all of the interventions so that you can familiarize yourself with them. The questionnaire will take approximately **30 minutes** to complete.

Would my participation in this study be kept confidential?

To help protect your confidentiality and anonymity, your name will not be written on the questionnaire and information obtained from you will not be communicated to the other experts. You will remain anonymous through the study. Your questionnaire will be accessible only to the researcher.

What are the risks of this research?

There may be some risks from participating in this research study. All human interactions and talking about the self or others carry some level of risk. However, such risks will be minimised

or acted on promptly during the study process. All relevant information will be provided to you in case you would like to raise any concern with regards to the study.

What are the benefits of this research?

This research may not be personally helpful to you, but the results may help the investigator learn more about the processes and components of an effective physiotherapy treatment protocol in an Ethiopian context

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 refuse not to participate anytime. If you decide not to participate in this study or if you stop participating at any time, you will not face any consequences or lose any benefits that you are entitled to.

What if I have questions?

This research is being conducted by Roba Banata, a PhD student in the Department of Physiotherapy at the University of the Western Cape in Cape Town, South Africa. If you have any questions about the research study, please contact **Roba Banata** at the University of the Western Cape, Physiotherapy Department on telephone number: +27 21 959 2542 or mobile number: 061 235 8623, or Email: 2110621@myuwc.ac.za

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:

Prof Michael Rowe: Head of Department
Department of Physiotherapy
Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
mrowe@uwc.ac.za

Prof Anthea Rhoda
Dean of the Faculty of Community and Health Sciences
University of the Western Cape
Private Bag X17
Bellville 7535
chs-deansoffice@uwc.ac.za

APPENDIX I: e-DELPHI STUDY CONSENT FORM

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2542, Fax: 27 21-959 1217
E-mail: 2110621@myuwc.ac.za

Consent form: e-**Delphi study**

Dear Sirs,

Hello, my name is Roba, I am a PhD student at University of the Western Cape in South Africa. I am conducting research on development of an evidence-based physiotherapy treatment protocol for acute non-specific neck pain in Ethiopia. Part of this research requires your participation as expert panelist that should not take more than 30 minutes. I understand that this is a substantial investment of your time. However, your response is valuable as it will contribute towards a development of an evidence-based physiotherapy treatment protocol for patients with acute non-specific neck pain. I would therefore, like to invite you to participate in the study.

Informed consent form (participant)

I, _____ hereby agree to participate in e-Delphi study to develop an evidence-based physiotherapy treatment protocol for acute non-specific neck pain in Ethiopia. I have read and understood what participation entails as set out in the information sheet. I understand that:

I confirm that I have read and understood the information regarding the above study. I have had the opportunity to consider the information, ask questions and have been answered to my satisfaction.

I understand the study will have many rounds, and I am expected to willingly participate in all rounds

I also understand that, my participation is voluntary, and I may withdrawal from the study at any time, without giving reasons. I however, understand that the success of this study is dependent on the participants to complete all rounds.

I understand that my identity will remain anonymous throughout the study and no communication regarding my answers will be made to the other experts in this study except the researcher.

I understand that, all information and data collected will be kept in a secure place by the researcher.

Participant's name…….signature…….. date……

Researcher’s mane ……signature…….date…3/16/2019……

APPENDIX J: ETHICS CLEARANCE (SOUTH AFRICA)

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DIRECTOR: RESEARCH
RESEARCH AND INNOVATION DIVISION

Private Bag X17, Bellville 7535
South Africa
T: +27 21 959 4111/2948
F: +27 21 959 3170
E: research-ethics@uwc.ac.za
www.uwc.ac.za

23 May 2019

Mr RB Banata
Physiotherapy
Faculty of Community and Health Science

Ethics Reference Number: BM19/3/16

Project Title: Development of an evidence-based physiotherapy treatment protocol for acute non-specific neck pain in Ethiopia.

Approval Period: 15 May 2019 – 15 May 2020

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report in good time for annual renewal.

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

BMREC REGISTRATION NUMBER -130416-050

ROM HOPE TO ACTION THROUGH KNOWLEDGE.

APPENDIX K: ETHICS CLEARANCE (ETHIOPIA)

Appendix O

የኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ
የጤና ጥበቃ ሚኒስቴር

Federal Democratic Republic of Ethiopia
Ministry of Health

ቀን Date: 02 SEP 2019

ቁጥር Ref. No: AT30/27/45 ኮ80

ALERT HOSPITAL
Addis Ababa

Emv
27/12/11

Subject:-Request to access Health Facilities to conduct approved research

The letter is to support **Roba Banata** to conduct research,Which is entitled as **"Development of an evidence- based Physiotherapy treatment Protocol for acute nonspecific neck pain in Ethiopia."** The study proposal was duly reviewed and approved by Addis Ababa Health Bureau IRB, and the principal investigator is informed with a copy of this letter to report any changes in the study procedures and submit an activity progress report to the Ethical Committee as required.

Therefore We request the Health facility and staffs to Provide support to the Principal investigator.

With Regards.

Yakob Seman Ahmed
Medical Service General Directorate
Director General

Federal Democratic Republic of Ethiopia Ministry of Health

Cc//

- Roba Banata
  Addis Ababa
- Medical Service General Directorate
  FMoH

251-(0) 11-5517011
251-(0) 11-5515425
Fax 251-(0) 11-5519366
251-(0) 11-5159657
E-mail:moh@ethionet.et
Web site: www.moh.gov.et
1234
Addis Ababa
Ethiopia

14 NOV 2017

MT/6/5718

To Zewditu Memorial Hospital
To Yekatit 12 Memorial Hospital

To Myungsung christian medical center (Korea Hospital)
Addis Ababa

Subject: Collaboration

Mr. Roba Banata, an Ethiopian, is pursuing his PHD education in Physiotherapy in the University of Western Cape, South Africa. As part of his education he will conduct research on ***"Development of an Evidence –based Physiotherapy Treatment Protocol for Acute Non-specific Neck pain in Ethiopia"*** in 3 hospitals in Addis Ababa, one which will be your hospital.

This is therefore, to request your collaboration on providing data and other relevant information for Mr. Roba Banata while conducting the above mentioned research work.

Regards,

Daniel G/Michael, (MD, MPH)
Head and Advisor of the
Office of State Minister

CC

- Mr. Roba Banata
  Addis Ababa
- State. Minister's Office /programs/
  FMOH

APPENDIX L: QUALITY APPRAISAL CRITERIA FOR SYSTEMATIC REVIEW

Appendix 1. QUALITY APPRAISAL CRITERIA CHECKLIST (Hawker et al., 2002)

Score	Abstract and Title	Introduction and Aims	Method and Data	Sampling	Data Analysis	Ethics and Bias	Results	Transferability or Generalizability	Implications and Usefulness
	Did they provide a clear description of the study?	Was there a good background and clear statement of the aims of the research?	Is the method appropriate and clearly explained?	Was the sampling strategy appropriate to address the aims?	Was the description of data analysis sufficiently rigorous?	Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?	Is there a clear statement of the findings?	Are the findings of this study transferable (generalizable) to a wider population?	How important are these findings to policy and Practice?
Good (4)	Structured abstract with full information and clear title.	Full but concise background to discussion/study containing up-to date literature review and highlighting gaps in knowledge. Clear statement of aim AND objectives including research questions	Method is appropriate and described clearly (e.g., questionnaires Included). Clear details of the data collection and recording	Details (age/gender/race/context) of who was studied and how they were recruited. Why this group was targeted. The sample size was justified for the study. Response rates shown and explained	Clear description of how analysis was done. Qualitative studies: Description of how themes derived/ Respondent validation or triangulation. Quantitative studies: Reasons for tests selected hypothesis driven/ numbers add up/statistical significance discussed	Ethics: Where necessary issues of confidentiality, sensitivity, and consent were addressed. Bias: Researcher was reflexive and/or aware of own bias.	Findings explicit, easy to understand, and in logical progression. Tables, if present, are explained in text. Results relate directly to aims Sufficient data are presented to support findings.	Context and setting of the study is described sufficiently to allow comparison with other contexts and settings, plus high score in Question 4 (Sampling)	Contributes something new and/or different in terms of understanding/ insight or perspective. Suggests ideas for further research. Suggests implications for policy and/or practice
Fair (3)	Abstract with most of the information	Some background and literature review. Research questions outlined	Fair Method appropriate, description could be better. Data described	Sample size justified. Most information given, but some missing.	Qualitative: Descriptive discussion of analysis. Quantitative	Lip service was paid to above (i.e., these issues were acknowledged.	Findings mentioned but more explanation could be given. Data presented relate directly to results	Some context and setting described, but more needed to replicate or compare the study with others, PLUS fair score or higher in Question 4.	Two of the above (state what is missing in comments)
Poor (2)	Inadequate abstract	Some background but no aim/objectives/questions, OR Aims/objectives but inadequate background	Questionable whether method is appropriate. Method described inadequately. Little description of data.	Sampling mentioned but few descriptive details	Minimal details about analysis.	Brief mention of issues	Findings presented haphazardly, not explained, and do not progress logically from results.	Minimal description of context/setting	Only one of the above.
Very poor (1)	No abstract	No mention of aims/ objectives. No background or Literature Review	No mention of method, AND/OR Method inappropriate, AND/OR No details of data.	No details of sample	No discussion of analysis.	No mention of issues	Findings not mentioned or do not relate to aims.	No description of context/setting	None of the above.

APPENDIX M: EDITORIAL PROOF

Cyril JM Clarke
Translator, Editor & Proofreader
Word for word the very best!
18 Kleinkaroo Street
OUDTSHOORN 6625
South Africa
Mobile: +27 (0)83 384 0766
E-mail: cyril@mweb.co.za
Member: ZaLang
Member: Polingua

To Whom It May Concern

I, Cyril JM Clarke, the undersigned, a qualified editor and translator, hereby declare that I have edited the following thesis:

Title:

DEVELOPMENT OF AN EVIDENCE-BASED PHYSIOTHERAPY TREATMENT PROTOCOL FOR ACUTE NON-SPECIFIC NECK PAIN IN ETHIOPIA

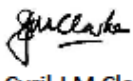
written by

Roba Banata Bali (Student number: 2110621)

submitted in partial fulfilment of the requirements for the degree of Doctor Philosophy in Physiotherapy, in the Faculty of Community and Health Science, University of the Western Cape

I have made certain suggestions regarding the use of the grammar and language. Furthermore, I have suggested changes regarding the consistency of lay-out and clear expression and checked all references, but I cannot guarantee that all my suggested changes and recommendations have been implemented.

Regards



Cyril J M Clarke
21 March 2022

APPENDIX N: TRAINING INSTRUMENT (TREATMENT PROTOCOL TRAINING PACKAGE FOR RESEARCH ASSISTANTS)

Treatment protocol training package for research assistants (physiotherapists) Date……

1. Introduction

The researcher will be responsible for coordinating all research activities in this controlled experiment. Prior to data collection, he will seek permission from hospitals authorities to test the evidence-based treatment protocol. He will also hold a meeting with the physiotherapists in each of the two intervention hospitals to lobby and motivate them to participate in this study. In addition, physiotherapists from the intervention institutions will receive a week-long training session on how to utilise the treatment protocol in practice.

These RAs will be physiotherapists with not less than five years' experience in musculoskeletal physiotherapy practice. The RA would be assigned to an intervention hospital where he/she will be responsible for the recruitment of participants and implementation of the intervention. The RAs will work together with physiotherapists in each of the two intervention hospitals to recruit participants for this study. The physiotherapists who are trained to use the proposed protocol will provide treatment to subjects in the intervention group. Physiotherapists in the control institutions will receive a day long training on the proposed protocol and will provide their usual treatment for patients with acute NSNP. These physiotherapists will be asked to record their usual treatment techniques and associated patient outcomes, including demographic information in order to compare with the intervention group. They will be asked to record patient outcomes using the same instruments that are used for patients in the intervention institutions.

2. Explanation on patient inclusion and exclusion criteria

Inclusion criteria	**Exclusion criteria**
All patients with acute NSNP (neck pain that	Fractures or dislocations of cervical spine

has been present for less than 3 months)	
Neck pain of less than 3 months' duration, including intermittent episodes of neck pain that are short in duration but over periods of time not longer than 3 months.	Osteoporosis, myelopathy
Sufficient pain intensity (greater than 2 out of 10 on a NPRS) to allow treatment	Acute prolapsed disc and neural entrapment
	Spondylolisthesis and spinal stenosis
Neck pain with cervicogenic headache	Recent trauma or surgery in the neck area
Age 18 years and above	Tumours as these are causes of specific neck pain
Able to understand or speak local language or English	Rheumatoid arthritis and other inflammatory systemic diseases
Must be willing to participate	Infections, mental disorders, pregnancy
Be oriented to person, time and place	Not enough understanding local language

3. **Explanation and demonstrations on each preliminary evidence-based treatment protocol for acute NSNP**

A. **Patient education**:

- Reassurance
- Encourage activities
- Posture correction

B. Manual therapy:

Cervical joint mobilisation and soft tissue mobilisation

- Maitland Grade I & II
- Thoracic spine mobilisation
- Strain counter-train
- Ischemic compression
- Mulligan techniques (Natural Apophyseal Glides)
- Muscle energy techniques
- myofascial trigger point therapy

C. Exercise therapy:

- Supervised chin-tuck exercise
- Total motion release techniques
- Specific cervical spine muscle stretching exercises
- scapular repositioning with active cervical rotation

4. Demonstration on the patient assessment proforma that includes (see Appendix D)

- History taking, baseline physical examination of cervical spine,
- Outcome assessment instruments
    - **Numerical pain rating scale (NPRS)**
    - **Neck Disability Index (NDI) questionnaire (see Appendix E)**
    - **Use of Goniometry** (to measure cervical spine range of motion)

Assessment pro-forma for patients with acute non-specific neck pain

This form will be used to assist physical therapist (treatment provider) in assessing, treating and discharging each patient with acute non-specific neck pain.

Section I: Socio-demographic characteristics of patients

Personal information

Patient's full name ……

Age ……

Sex……..

Height ……. weight ……

Marital status…….

Educational qualification……

Occupation…….

Address…… Phone number…….

II: Vital signs

Temperature……

BP……

Pulse……

Respiration rate……

Section III: Neck pain-specific (related) information

Present history

- Chief complaint…….
- Onset of Symptoms……
- Duration of the neck pain……
- Pain intensity (0-10)

0	1 2 3	4 5 6	7 8 9 10
No pain	Mild pain	Moderate pain	Severe pain

- Medication

List all medications you are currently taking for your neck pain if any including the name of pill, strength, how many times per day, name of doctor who prescribe, date started

- Previous medical history

Any allergy history

Lifestyle (Exercise/sedentary)

Personal Habits (alcohol, tobacco, drug use)

Diagnostics tests (x-ray MRI etc) if any

Section IV: Baseline physical examination of cervical spine

Physical examina-tion/ general observation	**Yes/No**	**Cervical spine muscular strength**	**Grade**	**Cervical spine range of motion**	**Degree**	**Cervical spine neurolo-gical test**	**Remark**
Forward head posture		Flexion		Flexion		Upper limb tension tests	
Thoracic kyphosis		Extension		Extension		Deep tendon reflex tests	
Lumbar		Rotation		Rotation			

lordosis		R…… L……		R…… L……			
		Side bending R…… L……		Side bending R…… L……			

V: Physiotherapy intervention plan for patient with acute non-specific neck pain

Part to be treated	Types of treatments (items)	Route of interventions or methods used	Dosages (in min)	1st day treatment and outcomes	Treatment adverse effects if any
				NPRS	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L……	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	2nd day treatment outcomes	Treatment adverse events if any
				NPRS……..	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	3rd day treatment outcomes	Treatment adverse events if any
				NPRS……..	

				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	4th day treatment outcomes	Treatment adverse events if any
				NPRS……..	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	5th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	6th day treatment outcomes	Treatment adverse events if any
				NPRS……..	

				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	7th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	8th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	9th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	

				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	10th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	11th day treatment outcomes	Treatment adverse events if any
				NPRS……	
				ROM	
				Flexion……	
				Extension…….	
				Rotation R…… L…….	
				Side bending R…… L…….	
Part to be treated	types of treatments (items)	Route of interventions or methods used	Dosages (in min)	12th day treatment outcomes	Treatment adverse events if any
				NPRS……..	
				ROM	
				Flexion……	
				Extension…….	

				Rotation R…… L…….	
				Side bending R…… L…….	

Section VI: outcome assessment instruments

- The Numeric Pain Rating Scale Instructions

Items	Pre intervention day	Post int week 1				Week 6
Pain Intensity						
Personal Care						
Lifting						
Work						
Headache						
Concentration						
Sleeping						
Driving						
Reading						
Recreation						

The patient is verbally asked to tell the number which fits best to his or her present pain intensity

Numerical pain rating scale (0-10)

1st visit, date……. _____/10 5th visit date…… _____/10

2nd visit date…… _____/10 6th visit date…… _____/10

3rd visit date…… _____/10 7th visit date…….. _____/10

4th visit date…… _____/10 8th visit date……. _____/10

9th visit date…… _____/10 10 visit date…….. _____/10

11th visit date…. _____/10 12th visit date…… _____/10

Numerical pain rating scale is valid and reliable pain assessment for patients with acute and chronic non-specific neck pain

- Neck Disability Index (NDI). **NDI** is used to assess the patient's level of functional status.

The following chart shows the progressive assessment of cervical spine functional disability (see the NDI questionnaire attached).

5. **Treatments (Interventions) plan**

Following the details of assessment, the treatment will begin. Regarding the duration and frequency of the intervention, the details will be as follows:

- **Frequency: patients will be treated twice weekly**
- **Duration: six weeks; this translated to a total of 12 sessions per patient**
- **Each treatment sessions lasted approximately 30–45 minutes**.

Full name of assessor and treating physiotherapist……