TAILORING A PRE-PROSTHETIC TRAINING COURSE FOR COMMUNITY HEALTH WORKERS IN A RURAL SETTING WITHIN SOUTH AFRICA

By

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ABSTRACT

Background: More than a third of South Africa's population resides in rural areas. The attraction and retention of suitably trained medical professionals is a problem faced almost universally by those living in rural areas. Access to qualified health professionals by people in rural areas is a pressing matter, especially when faced with mobility barriers imposed by lower-limb amputation. The World Health Organisation has strongly advocated for the implementation of a community-based approach to rehabilitation in developing countries. A community-based approach to rehabilitation aims to improve access to health services by utilising local resources in resource-poor settings and training community members to provide basic rehabilitation. The study supervisor designed a pre-prosthetic training course for community health workers (CHWs) in rural areas; however, it needs to be refined and tailored before implementation.

The study aimed to tailor the content and format for a pre-prosthetic rehabilitation training course for community health workers in a rural setting in South Africa. The aim and objectives were to be achieved by identifying the ideal training course content and format, mapping and interpreting available literature, and receiving expert opinions and consensus from rehabilitation professionals.

Study approach and design: A multi-method approach consisting of two different phases was employed in this study. In phase one, a scoping review was conducted to assess what information was available on pre-prosthetic training courses for CHWs in rural settings in South Africa. Phase two used a Delphi method to reach a consensus on the ideal content and format of a CHW training course from international experts in the field.

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Study setting: The study was conducted online in two phases. Phase one involved a scoping review of online journals. Phase two involved a Delphi study where global experts in the field of rehabilitation were asked to participate by completing an online form.

Population and sampling for Delphi study: In total, 170 experts in rehabilitation were approached via email and invited to participate in the Delphi study. The final sample size depended on the number of experts that agreed to participate in the study. Seventeen (N=17) participants participated in the first round of the Delphi study.

Materials and methods for data collection: A scoping review of available literature on the training of community health workers was conducted. The scoping review followed Arksey and O'Mally's (2005) guidelines. Five electronic databases, namely PubMed, Wiley Online, BioMed Central, SAGE Journals, and Cumulated Index to Nursing and Allied Health Literature (CINAHL) with full text (EbscoHost), were included in the review. Information was selected using predetermined inclusion criteria, and data were gathered through online sources. The findings were mapped in a narrative table.

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Analysis: In phase one, the scoping review of the current literature identified and mapped what information was available. All included studies were assessed and analysed against pre-requisite inclusion criteria. Evidence was reviewed against the preliminary course, and the course was refined before the Delphi study. In phase two, the Delphi study was introduced, and each round was analysed descriptively after completion.

Results: Four (N = 4) articles met the inclusion criteria in the scoping review. Limited information was available on the training of CHWs in rural areas, and no information was available from research studies regarding the most appropriate content. Interventions used in training were mostly

a combination of theory and practical courses, with multiple choice (MCQ) theory examinations and practical scenario/simulation examinations performed to assess competency post-intervention. Follow-up and refresher training were also implemented and suggested for successful CHW training.

Expert opinions suggested that training course duration be dependent on resources availability; however, most recommended six months and 10-15 trainees per training course would be most effective. The majority of participants were in favour of mock scenarios for trainees, and a consensus was reached on training course content, where most were in favour of 'prosthetics, including basic maintenance', and the minority opted for 'wound hygiene and dressing'.

Conclusion: Expert consensus was reached on theory and practical components being most ideal for a CHW training programme, with a training duration of six months with small groups of 10-15 participants. Similarly, the initial course consisted of 15 participants and included practical and theoretical components, but the initial one day course duration could be extended if necessary resources are made available. Trainees should perform written and practical assessments, and follow-up training should be conducted post-intervention to assess trainee performance and course effectiveness. Follow-up courses were not provided initially, but should be considered. Experts suggested the training course should be evaluated using a survey, while a quiz and feedback form were used to assess the trainee's competence and their satisfaction during the initial course.

Consensus was reached among experts that prosthetics and basic maintenance training, range of motion (ROM) exercises and the use of splints, and being taught how to incorporate physical activity into daily life, especially if a wheelchair is being used, was the ideal content to form part

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of a training course for CHWs in rural settings. Initial content was similar to the consensus, without the use of splints.

Ethics statement: Ethics clearance to conduct the study was obtained from the university's Human and Social Science Research Ethics Committee (HS18/9/15). Informed consent was obtained in writing from all voluntary participants. All information gathered was strictly confidential. Only the researcher and the researcher's supervisor had access to the information. Participants in the study were informed of the study results.

Keywords: community health workers, training, rehabilitation, rural

DECLARATION

I hereby declare that “Tailoring a pre-prosthetic training course for community health workers in a rural setting within South Africa” is my own work, and that I have not submitted it or any part of it for a degree at any university. All the sources that I have used or quoted have been indicated by means of complete references.

Signature:  Date: 8 December 2022

Jarryd Erich Pagel

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DEDICATION

I dedicate this work to those who have supported me in many ways through all I aim to achieve:

- the lecturers who motivated me to pursue further academic studies;
- Prof. Liezel Ennion, thank you for your endless time and effort in helping me reach my goals and supporting me through a very tough few years;
- Prof. Michael Rowe for unknowingly igniting my interest in scientific literature;
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- Stephen Hartley, who encouraged and inspired my passion for science and showed me the value of knowledge and academia - I know you would be proud.

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"At the going down of the sun, and in the morning, we will remember them". Gone but never forgotten.

Palma Virtuti.

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Finally, I would like to thank all those professionals who kindly gave up their time to participate in this study and share their expert knowledge that has allowed this study to be possible.

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LIST OF ABBREVIATIONS

ART	antiretroviral treatment
CBC	community-based care
CBR	community-based approach to rehabilitation
CCM	community care management
CCW	community care workers
CHF	community health facilitators
CHW	community health worker
CINAHL	Cumulated Index to Nursing and Allied Health Literature
CQI	continuous quality improvement
CREDES	Conducting and Reporting Delphi Studies
HCT	HIV counselling and testing
HEMLEM	Healthcare Education Micro Learning Environment Measure
HH	household
ISPO	International Society for Prosthetics and Orthopaedics
KZN	KwaZulu-Natal
MCQ	multiple choice questions
MDT	multidisciplinary team
MSS	modular socket system
OPD	outpatient department
PHC	primary health care
PMTCT	prevention of mother-to-child transmission

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PNG	Papua New Guinea
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RDT	rapid diagnostic test
ROM	range of movement
STATA	statistical software for data science
STI	sexually-transmitted infection
TB	tuberculosis
WHO	World Health Organisation

CHAPTER 1: BACKGROUND

1.1 INTRODUCTION

This chapter will present the background of the study and discuss the aims and objectives it intends to achieve. The limited availability of appropriate literature and lack of professional consensus on tailored training course content and format for rural-based CHWs in South Africa, led to a two-part study. First, a scoping review of available literature will be provided, followed by expert opinion, suggestions, and consensus, presented in a Delphi study. The main concepts related to this study involve ideal training course content and format, mapping and interpreting available literature, and receiving expert opinions and consensus from rehabilitation professionals. This will be discussed and elaborated on in relevant chapters.

1.2 BACKGROUND

More than a third (38%) of South Africa's population reside in rural areas (The World Bank, 2014). Generally, an area is referred to as being 'rural' when it has poor infrastructure, is underdeveloped and underserviced, or necessary services are difficult to access (Gray, Vawda & Jack, 2013). Rural settings frequently have some difficulty with maintaining or gaining access to service delivery and infrastructure, thus causing challenges for people who live there. The attraction and retention of suitably trained medical professionals is a problem faced almost universally in rural areas (Cooke, Couper & Versteeg, 2011; Goodyear-Smith & Janes, 2008; RHAP, 2013; Wilson, Lewis & Murry, 2009) and can result in challenges such as lack of services and increased cost of healthcare, to the detriment of those residing in rural settings. The South African Constitution and the National Patients' Rights Charter state that access to quality health services is a human right; however, a mandate is given to the government to determine how and when resources are distributed (The

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Government of South Africa, 2015). Access to qualified health professionals by people in rural areas is a pressing matter, especially when faced with mobility barriers imposed by lower-limb amputation. Attending rehabilitation sessions and receiving prosthetic service delivery in rural areas is difficult to attain (Gray, Vawda & Jack, 2013). Furthermore, with a rising incidence of diabetes in rural areas of developing countries (Guariguata, Shaw, Weil & Whiting, 2011), the resultant number of people living with diabetic-related amputations is on the rise.

Due to the unique challenges in accessing healthcare services in rural settings, the World Health Organisation (WHO) has strongly advocated for implementing a community-based approach to rehabilitation in developing countries (WHO, 2010). The purpose of the initial development of the community-based approach to rehabilitation (CBR) was to improve access to health services by utilising local resources in resource-poor settings. A component of CBR includes training community members to provide basic rehabilitation. The World Health Organization & The World Bank (2011) defined rehabilitation as a set of measures that assists individuals who experience disability to achieve and maintain optimal functioning in their interaction with their environment. For example, fitting a prosthesis for a person with a lower-limb amputation would allow for improved mobility, leading to autonomy and, therefore, greater quality of life. However, pre-prosthetic rehabilitation is essential for successfully fitting a prosthesis, improving functional outcomes, and preventing secondary complications and re-amputations (Ennion & Johannesson, 2017). In South Africa's rural settings, many challenges prevent adequate rehabilitation for prosthetic fitting. According to Ennion and Johannesson (2017), therapists working in rural areas identified that poor support from government health systems, poor socioeconomic circumstances, and cultural factors were the three main barriers to accessing rehabilitation in rural settings. Furthermore, Wegner and Rhoda (2015) found that cultural beliefs regarding the aetiology of

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disease and disability may impact the utilisation of healthcare and rehabilitation services, but may also assist in informing education and health programmes in rural South Africa. Thus, community intervention and cooperation with cultural leaders and CHWs can assist in promoting health programmes and beneficial roles such as CHWs.

Community members living with lower-limb amputations in a rural community in South Africa reported a lack of rehabilitation and difficulty accessing public transport as the two main points of struggle (Ennion & Rhoda, 2016). This finding identifies a potential need for locally trained individuals in healthcare, such as CHWs. The need for a contextually relevant training programme arises as the medical and rehabilitation needs of those in rural areas may be the same as those in urban areas; however, the access to medical supplies, equipment, medical technology, specialised healthcare professionals, and other resources is less prevalent and accessible. Defining or identifying learning needs and outcomes, and matching the learning objectives to the educational method(s) best suited to teach those objectives, will lead to improved outcomes and are essential in effective learning (Motola, Devine, Chug, Sullivan, & Issenberg, 2013). Developing a contextually relevant training programme tailored to the specific needs of those CHWs in rural areas is therefore vital.

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There is a need to provide contextually relevant training to community members who could assist those in need of rehabilitation in rural settings within South Africa. No training course currently exists for community-based care workers to rehabilitate a person with lower-limb amputation that is specific and appropriate to a rural setting within South Africa. Access barriers include vast distances and high travel costs, especially in rural areas; high out-of-pocket payments for care; long queues; and disempowered patients (Ennion & Manig, 2018; Naidoo & Ennion, 2018). These

barriers, created by uneven social power relationships, resonate with access hurdles experienced elsewhere in low- and middle-income countries (Harris et al., 2011), impacting the level and quality of care provided to those in poorly-resourced areas. The WHO has strongly advocated for the implementation of a community-based approach to rehabilitation in developing countries (WHO, 2010). A community-based approach to rehabilitation aims to improve access to health services by utilising local resources in resource-poor settings and training community members to provide basic rehabilitation.

Community health workers are the closest link the hospitals have to the community and also refer patients with various disabilities to hospitals and appropriate disciplines. Lower-limb amputations are on the increase in rural settings. Prosthetic fitting is the ultimate goal of rehabilitation for a person with a lower-limb amputation. Substantial rehabilitation and preparation for prosthetic fitting are required to be successfully fitted with a prosthesis. Challenges with access to rehabilitation in rural settings (Naidoo & Ennion, 2018), coupled with a lack of prosthetists servicing rural areas, significantly reduce the number of prosthetic candidates that ultimately receive a prosthesis in rural settings.

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A potential solution for the lack of rehabilitation staff to provide rehabilitation for persons with lower-limb amputations, and challenges with accessing rehabilitation in rural settings, would be to train CHWs. Ennion and Rhoda (2016) suggested that CHWs would be best suited to perform basic rehabilitation in the community to prepare amputees for prosthetic fitting. Currently, CHWs are not trained in providing basic lower-limb amputation rehabilitation for prosthetic fitting, which does not fall within their scope of practice in certain provinces.

The project is part of a bigger project aimed at developing a pre-prosthetic training course for community workers in rural settings. Prior to this study, a needs analysis was conducted with community workers, and a small group of experts developed a preliminary training course. This course was piloted and evaluated with community health workers in rural Mpumalanga and the Western Cape. The contribution of this project to the bigger study will be that it will assist with the refinement and tailoring of the piloted course and reach a consensus amongst international experts on the format and content of the course. Once this is achieved, the course will be implemented and evaluated again.

1.3 PROBLEM STATEMENT

The incidence of diabetes is increasing in rural settings (Guariguata, Shaw, Weil & Whiting, 2011), resulting in an increase in the number of amputations being performed. Individuals who undergo lower-limb amputation rely on active rehabilitation post-amputation to regain general coordination, strength, and endurance through specific programme prescriptions to achieve functional independence (Portugal, 2021). Healthcare professionals are an important part of patient rehabilitation, and in their absence or scarcity, CHWs provide essential rehabilitative services in rural settings as part of a multidisciplinary team (Ennion & Rhoda, 2016). Access to health and rehabilitation services in rural settings is challenging, and there is a known lack of rehabilitation staff to service the need (Gray et al., 2013). Inadequate or absence of sufficient rehabilitation in post-amputation of the lower-limb will ultimately lead to the development of complications of immobility, which will disqualify patients from potentially receiving a prosthetic leg. Community-based rehabilitation is one strategy to assist with decentralising rehabilitation services in rural settings and includes training community-based care workers. CHWs could potentially be trained to perform basic pre-prosthetic rehabilitation. However, there is currently no training course on

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the most relevant content and format that is appropriate for training CHWs in a rural setting within South Africa. So far, there is a lack of information in the literature that describes an ideal format with relevant content to formulate and conduct a training course specifically for CHWs in rural settings. Research on developing such a programme is imperative to better the outcomes for persons with lower-limb amputations living in rural areas. The latter, coupled with a lack of consensus among experts, led to this study.

1.4 RESEARCH QUESTIONS

1. What content and format (relating to pre-prosthetic rehabilitation) is currently used in training courses for community care workers in rural settings?
2. Can consensus be reached among experts in rehabilitation regarding the content and format for a pre-prosthetic rehabilitation training course for community care workers in a rural setting within South Africa?

1.5 STUDY AIM

The study aimed to explore the literature on training courses for community care workers and reach a consensus on the content and most appropriate format for a pre-prosthetic training course for community care workers in a rural setting within South Africa.

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1.6 STUDY OBJECTIVES

The following objectives were developed to guide the study's purpose:

1. To explore the content and format of existing community-based training courses relating to pre-prosthetic rehabilitation for community-based rehabilitation workers in a rural setting within South Africa.

2. To reach a consensus among rehabilitation professionals regarding the format and content for a pre-prosthetic rehabilitation training course for community care workers in a rural setting within South Africa.

1.7 SIGNIFICANCE OF THE STUDY

Further research into pre-prosthetic rehabilitation and specialised training courses for CHWs in rural South Africa is needed to train community health workers. The findings of such a study may assist local communities, patients, and healthcare professionals. Training community-based care workers in pre-prosthetic rehabilitation techniques may indirectly assist with job creation. By receiving appropriate rehabilitation, patients may return to a functional level that will allow them to work in a more dynamic employment line, uncovering better employment options and, thus, becoming more autonomous. In turn, quality of life can be improved in local communities through autonomy, where the link between autonomy and happiness is consistent in reports (Leicester, 2017). Patients receiving regular, appropriate rehabilitation from trained caregivers will improve their chances of successful prosthesis fitment and usage, improving patient quality of life through headway in mobility independence. Additionally, with the alleviation of pressure on healthcare professionals, the time and costs of visiting outlying rural areas regularly will be reduced.

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1.8 OPERATIONAL DEFINITIONS

Tailoring: Any combination of information or change strategies intended to reach one specific person [or group], based on characteristics that are unique to that person [or group], related to the outcome of interest, and have been derived from an individual assessment (Kreuter et al., 1999).

Appropriate: Suitable and contextually relevant for community care workers (non-professional volunteers) working in a rural setting within South Africa to understand and apply.

Content: The information (knowledge) and skills you want community care workers to learn and apply to meet the course's goals or outcomes.

Format: The way in which a training course is arranged or presented. This includes course duration, the organisation of the content, the inclusion of practical/theoretical components, supervision provided for practical training (one on one or group), number of instructors involved in supervision, assessment of the caregivers and evaluation of the course.

Community health worker: Community health workers should be members of the communities where they work, should be selected by the communities, should be answerable to the communities for their activities, should be supported by the health system but not necessarily a part of its organisation, and have shorter training than professional workers (World Health Organisation, 2017).

Rural: Areas without access to ordinary public services such as water, sanitation, and easily accessible healthcare and are without formal local authority (Human Sciences Research Council Report, 2012).

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Ideal: Perfect, or the best possible (Cambridge Dictionary, 2021).

1.9 OUTLINE OF THE THESIS

Chapter Two - Literature review

This chapter will provide and discuss a review of relevant available literature, or lack thereof. In addition, this chapter will give an overview of the potential problems, needs, and solutions in rural community rehabilitation healthcare and expose the need for intervention and further research based on a lack of available literature.

Chapter Three - Research methodology

This chapter will discuss the methods used to gather data for the study, how the information from the gathered data was analysed and interpreted, and measures taken to ensure the unbiased and trustworthiness of the data in its collection. Furthermore, this chapter will present multi-method data collection in two phases, where a scoping review will be presented first as phase one, after which a Delphi study will then be delivered as phase two.

Chapter four - Results

In this chapter, the results of the scoping review and the Delphi study will be presented. The scoping review results will be presented as Phase 1, followed by the results from the Delphi study presented as Phase 2.

Chapter five - Discussion

In this chapter, both the quantitative and qualitative results will be discussed. A comparison of the relevant findings to the literature will be provided, and the clinical implications will be discussed further with future research recommendations.

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Chapter six - Conclusion

This chapter will provide an overview of the study's most significant findings and discuss the study's limitations. Finally, further suggestions on clinical recommendations and research will be presented based on the study's results.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter will discuss the relevant literature on pre-prosthetic rehabilitation, patients' needs, solutions and alternatives to challenges with rehabilitation, training community care workers, the significance of tailored interventions, and education in healthcare.

2.2 PRE-PROSTHETIC REHABILITATION IN RURAL SOUTH AFRICA

Optimum rehabilitation of persons with amputations depends on a well-functioning multidisciplinary team (MDT) (Ennion & Rhoda, 2016). It is seen as the standard for post-amputation prosthetic rehabilitation and is lacking in many developing countries. Physiotherapists are most often in charge of the physical rehabilitation of any person with a disability in developing countries and can also be an important source of information for patient care and management. However, prosthetic rehabilitation and service delivery in developing countries such as South Africa are immensely challenging, especially in rural settings. Several problems serve to prevent prosthetic rehabilitation in rural areas. These include, and are not limited to, the inaccessibility of healthcare services, lack of trained rehabilitation personal to provide rehabilitation services, inappropriate preparation of healthcare personnel for rural settings, difficulty attracting and retaining staff, and lack of research and evidence-based practice (Ennion & Rhoda, 2016).

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In developed urban settings, the MDT involved in rehabilitating people living with amputations will usually include the surgeon, therapist, social worker, and prosthetist. In traditional rural areas of South Africa, traditional healers and community care givers play a big part in the post-amputation management of patients' health and progress (Ennion & Rhoda, 2016). However, they

are not formally included and utilised as a part of the MDT. With insufficient literature on the roles and challenges facing the MDT in lower-limb amputation rehabilitation in rural settings, research into this domain is paramount.

2.3 PATIENT NEEDS

Ennion and Rhoda (2016) found that a lack of rehabilitation and difficulty accessing public transport were two main points of struggle after interviewing community members living with lower-limb amputations in rural South Africa. Lack of communication and instructions from the hospital to the patients were also reported and led to no or poor rehabilitation efforts post-amputation. In addition, the same interviewees also stated improved functionality with a prosthesis, where the use of a prosthesis helped them become functionally more independent.

Persons with lower-limb amputations are not included and recognised as a member of the MDT. Furthermore, literature revealed that these patients are not often included in planning their own rehabilitation. Inclusivity in decision-making would empower them and improve patient compliance with rehabilitation (Ennion & Rhoda, 2016).

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2.4 SOLUTIONS AND ALTERNATIVES TO CHALLENGES WITH REHABILITATION

Approximately 10% of the world's population lives with disabilities, of which 80% live in low-income countries (WHO, 2010). Inability to afford technology, difficulty accessing assistive technology, healthcare facilities, and healthcare professionals that fit the devices is a problem in low-income countries and outlying areas.

Previous studies revealed a lack of provision for prosthetic and orthopaedic instructors to train enough professionals to treat the high numbers of people living with lower-limb amputations worldwide (Giesberts et al., 2017). More recent studies show that the demand for rehabilitation and assistive technology cannot be met by the limited number of appropriately-trained professionals needed to assist in rehabilitating people with amputations (Ennion & Rhoda, 2016).

Giesberts et al. (2017) mentioned a strategy where community-based rehabilitation (CBR) could be implemented by providing assistive technology in less-resourced settings. The CBR model was developed in the 1960s and was promoted by the WHO. However, little related literature, reports, or case studies are available, and the development outcomes remain unclear.

An alternative option to the traditional lower-limb prosthesis, the modular socket system (MSS), was investigated by Giesbert et al. (2017) specifically for people living with disabilities in rural areas of developing countries. The MSS could be measured, manufactured, and fitted in one day instead of several visits to fit the traditional prosthesis type. This alternative technology improves access and is thought to be a potential asset to prosthesis fitment in rural areas of South Africa. In addition, there was strong potential for the ability to manufacture the MSS where electricity was unavailable. The MSS is more costly but could optimise the productivity of prosthetists servicing rural areas (Ennion, Rhoda & Johannesson, 2017). However, a strong healthcare organisation needs to be established before its implementation in rural settings is considered.

Even though the MSS provides an alternative solution to improve access to prosthetic services, patients who did not undergo sufficient pre-prosthetic rehabilitation still would not qualify for prosthetic fitting. The need for an alternative approach to providing pre-prosthetic rehabilitation is hence apparent.

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2.5 TRAINING COMMUNITY HEALTH WORKERS

Community health workers are currently the closest link the hospitals have to the community and also refer patients with various disabilities to hospitals and appropriate disciplines. Community health workers' initial roles were to connect households with service delivery entities and ensure that citizens receive appropriate health care. Ennion and Rhoda (2016) suggested that CHWs would be best situated to perform basic rehabilitation for prosthetic fitting but that it does not fall within their current scope of practice. Additionally, this role should be covered by the CHWs, whose titles and duties are unclear and very contextual. Community health workers are trained to assist healthcare professionals out of the hospital and to provide home-based care. However, due to low remuneration and lack of defined roles, the turnover of CHWs is high. To address the challenges to accessing rehabilitation services in rural areas, CHWs could be trained to perform basic pre-prosthetic rehabilitation to prepare patients for prosthetic fitting.

Task shifting of tasks from more to less highly trained individuals was seen as an effective way of managing resources in resource poor areas (Hoeft et al., 2017). Community health worker intervention with less sever, more common mental health conditions was effective in improving depression knowledge, stigma, and efficacy to seek treatment (Hoeft et al., 2017). However, the imprecision of task allocation may lead to the ineffectiveness of healthcare workers in the delivery of services to patients (Okyere et al., 2017), supporting the need for tailored CWH training programs. Furthermore, clear policy and regulation of task shifting were important facilitating factors and barrios in Uganda that affected CHW task shifting progression (Dambisya & Matinhure, 2012).

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2.6 SIGNIFICANCE OF TAILORED INTERVENTIONS

Tailoring of health interventions aims to enhance the relevance of information presented and thus to produce greater desired changes in response to the communications, where content matching is related to outcomes (Hawkins, Kreuter, Resnicow, Fishbein & Dijkstra, 2008). Successful implementation of an intervention is a function of the relationship between the nature of the evidence, the context in which the proposed change is to be implemented, and the methods by which the change is facilitated (Kirsh, Lawrence & Aron, 2008). If we choose the right contexts, the learners' brains will learn to recognise the trigger conditions for the ability and the elements that can change without affecting the requirement to execute (Quinn, 2016). Rarely, when developing health interventions or training courses is guidance provided for thinking about local challenges and opportunities, nor is there guidance for decision-making (Kirsh, Lawrence & Aron, 2008). The point is thus to minimise the difference between the learning event and the performance environment (Quinn, 2016).

In a study by Krish et al. (2008), a general structure and process for conducting shared medical appointments had been established but lacked success in its implementation due to a lack of specific guidance concerning the context. This further motivates the importance of tailored guidance when implementing a new or changed intervention.

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Claims about why and how tailoring enhances health communication fall into two distinct classes of mechanisms: i) that tailoring enhances cognitive preconditions for message processing or acceptance, and ii) that it enhances messages' impact by selectively modifying initial behavioural determinants of desired outcomes (Hawkins, Kreuter, Resnicow, Fishbein & Dijkstra, 2008). Krish et al. (2008) found that although generally accepted, tailored strategies in healthcare revealed

mixed results. They further suggested that part of the problem is conceptualising the process as simply tailoring interventions to the context and not recognising or adjusting the unique local context to optimise the success of that intervention, of which the latter, in part, this study proposes to achieve.

2.7 EDUCATION IN HEALTHCARE

The learning environment impacts many aspects of healthcare education, including student outcomes, where the learning environment in healthcare education is a manifestation of the curriculum as experienced by students and influences healthcare professions students in several ways, including behaviour, satisfaction, and educational outcomes (Isba, Rousseva, Woolf & Byrne-Davis, 2020). The most powerful outcomes are achieved by having an organised and systematic approach to incorporating simulations and training in an existing or new curriculum (Motola, Devine, Chung, Sullivan & Issenberg, 2013). Students' perceptions of learning environments are also affected by physical space and organisational culture, their backgrounds, social relationships, and the degree to which they feel included in clinical activities. Two important factors for a good micro-learning environment are teaching quality and staff attitudes and behaviour (Isba, Rousseva, Woolf & Byrne-Davis, 2020).

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The most frequent setting for formative peer assessment activities is within clinical skill-training courses involving intraprofessional peers (Stenberg, Mangrio, Bengtsson & Carlson, 2021), which includes community health workers. Effective support in training CHWs can be explained in the inherent learning of the feedback process and in preparing them with the skills required in the healthcare professions (Stenberg, Mangrio, Bengtsson & Carlson, 2021). Therefore, the responsibility of trainers and a well-developed training course are key components in formative

peer assessment, and the aim of the training activity must be clearly stated. In addition, the learning activities need to be well-designed and supported by guidelines on how to use them. Otherwise, it could discourage students from participating in training activities. Moreover, some students expressed how they favoured small groups more than larger groups (Stenberg, Mangrio, Bengtsson & Carlson, 2021).

Activities such as observing others' performance are seen as beneficial for learning because this allows trainees to reflect on their own performance and assists in self and peer identification of knowledge gaps. Formative peer assessment activities support students' reflection on their knowledge and development when mirrored in a peer by alternating the role of observer and observed. It further contributes to skills such as communication, transfer of understandable knowledge and collaboration, all significant core competences when caring for patients and their relatives. Healthcare education must consider preparing and introducing students to collaborative learning; thus, well-designed learning activities aligned with the learning outcomes need to be developed. A collaborative learning environment throughout the training course should be achieved for training to be more effective (Stenberg, Mangrio, Bengtsson & Carlson, 2021). Defining or identifying learning outcomes and then matching the learning objectives to the educational method(s) best suited to teach those objectives will lead to improved outcomes. Periodic assessment of learning outcomes and participant satisfaction and making any needed modifications based on the findings is essential. Continuous evaluation of the curriculum and revising as necessary is crucial to achieving the best results (Motola, Devine, Chung, Sullivan & Issenberg, 2013).

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Feedback is critical to effective learning in simulation and practical skills development, such as in healthcare, and should be planned and intentional, regardless of when, how, or by whom it is given. Reviewing the literature, debriefing training modules and formalised instructor courses with clearly defined outcomes were found to be essential in effective learning (Motola, Devine, Chung, Sullivan & Issenberg, 2013). Additionally, through directed self-guided learning, trainers create conditions for effective learning through the appropriate instructional design of unsupervised learning activities. Directed self-guided learning can maximise learning efficiency and minimise the overall use of educational resources (Motola, Devine, Chung, Sullivan & Issenberg, 2013).

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter will discuss the methods used to gather data for the study and how the information from the gathered data was analysed and interpreted. The study used a multi-method approach in data collection and was conducted in two phases. The scoping review will be presented first as phase one, after which the Delphi study will be presented as phase two.

3.2 OVERARCHING STUDY DESIGN AND APPROACH

A multi-method approach was used to collect data for this study in two phases. First, a multi-method approach was adopted when more than one independent research method is required to answer the research question/s. Due to a lack of scientific evidence informing the development of a training course specifically for CHWs in rural areas, a scoping review of the literature was considered ideal for providing an overview of the available literature on this topic and for providing a basis for the Delphi study (Jünger, Payne, Brine, Radbruch & Brearley, 2017). Due to the limited literature and a lack of consensus on the topic, a Delphi study was considered ideal for reaching a consensus on this topic. Therefore, it was determined that a multi-method approach be used by conducting a scoping review of available literature and a Delphi study. Upon initial research, the scoping review revealed a lack of available evidence and research for the study topic. After a discussion between the researcher and the study supervisor, it was decided that an additional approach - a Delphi study - would be beneficial for acquiring information from experts in the field of rehabilitation.

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3.2.1 Phase 1: Scoping review

3.2.1.1 Study design

A scoping review of the literature was conducted in accordance with Arksey and O'Malley's (2005) five-step framework for conducting a scoping review. The five stages included identifying the research question; identifying relevant studies; selecting the study; charting the data; and collating, summarising and reporting the results.

3.3 RESEARCH QUESTION

The research question that guided the review was: "What is the content (relating to pre-prosthetic rehabilitation) and format used in existing training courses for community care workers in rural settings?" For the purpose of this review, the first guiding research question was used. No studies were found with relevance to the first guiding research question.

The second research question was, thus, attempted: "What is the **format** used in existing training courses for community care workers in rural settings?" A three-part Delphi study was performed where the data was captured and analysed, and the results shown within the Delphi study.

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Identifying the research question: The study defined the parameters of the research question by using wide definitions of search terms to reduce the likelihood of missing relevant articles. Adopt a comprehensive approach to identifying primary studies of relevance by narrowing down the search terms and searching for research evidence via different sources. This aimed to remove unmanageably large references.

Study selection: This involved eliminating studies that do not address the central research question. This can be achieved through systematic review methods developing inclusion and exclusion criteria based on the specific research question.

Charting the data: This meant synthesising and interpreting qualitative data by sifting, charting and sorting information according to key issues and themes through data extraction.

Collating, summarising and reporting the results: The scoping review seeks to present all materials reviewed while not attempting to present a view regarding the weight of evidence in the findings.

3.4 IDENTIFYING THE RELEVANT STUDIES

The scoping review search strategy commenced on November 13, 2018, in five electronic databases. A literature search from 2008–2018 was done in the following databases: PubMed, CINAHL with full text, SAGE Journals Online, Wiley online library and BioMed Central (BMC). Different search term combinations were used to retrieve as many studies as possible. The search began by using broad search terms and then including more specific terms such as "prosthetic" and "community-based care workers". If the results exceeded 1 000 hits per combination of initial search terms, an additional term would be added to narrow the search. This was an *a priori* decision considering the time required to screen each hit, and it is unlikely to yield many more relevant articles (Stevenson & Lawlor, 2004). If no studies were identified using the specific terms, another term was added to the search for a broader approach to discovering relevant literature.

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The following search terms were used in different combinations; "community-based care workers", "community health workers", "community caregivers", "community-based

rehabilitation workers", "training", "course", "lower limb/lower extremity amputation", "prosthesis", "prosthetic", "rehabilitation" and "rural".

Searches were also limited to English, full-text articles published from 2008–2018.

3.5 STUDY SELECTION

The relevant titles of articles were identified and recorded in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram. It was also recorded for each database on a data extraction sheet. Initially, the titles of the retrieved studies were screened for relevance to the topic. Then, relevance to the topic was determined by scoring the titles against the following inclusion criteria:

- Population: Studies which include community-based caregivers or non-professional healthcare workers providing rehabilitation to patients in rural communities as participants were included as the study population.
- Intervention: Studies describing community-based caregiver training courses or interventions were included.
- Study designs: Due to a paucity of literature pertaining to this field of study, all study designs (observational studies such as descriptive cohort and case-control studies and randomised control trials) apart from systematic reviews were included.

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Studies which focused on the training of CHWs, in relation to a different clinical condition (for example, stroke) were also considered for inclusion since there were no articles specifically focused on lower-limb amputation or pre-prosthetic rehabilitation.

The researcher independently screened the titles and discussed them with the study supervisor to reach a consensus if there was uncertainty about whether a title should be included or not. A total of 6 500 records were identified by title, of which 6 495 records were screened after duplicates were removed. Titles that did not seem appropriate for the study's aims were excluded from the list. Any duplicates from different databases were removed. Forty-three (n=43) full-text articles were assessed for eligibility upon review of their abstracts. The abstracts of the shorter list of studies were then screened by both the researcher and study supervisor, and if the information was not related to the research topic, the articles were again excluded, and the list was shortened. A total of 39 articles were excluded against the inclusion criteria. Where the decision about the relevance of the article could not be made based on the abstract, the full-text article was downloaded and read. Full-text articles that proved relevant were then downloaded and analysed against the inclusion criteria. Articles that did not meet the inclusion criteria were again excluded, and the list was shortened. The selection of the studies was based on the type of participants, outcome measures and the type of intervention. Full-text studies retrieved and assessed by the researcher were also checked for relevance by the study supervisor to avoid bias. The study included in qualitative synthesis four (n=4) full-text articles.

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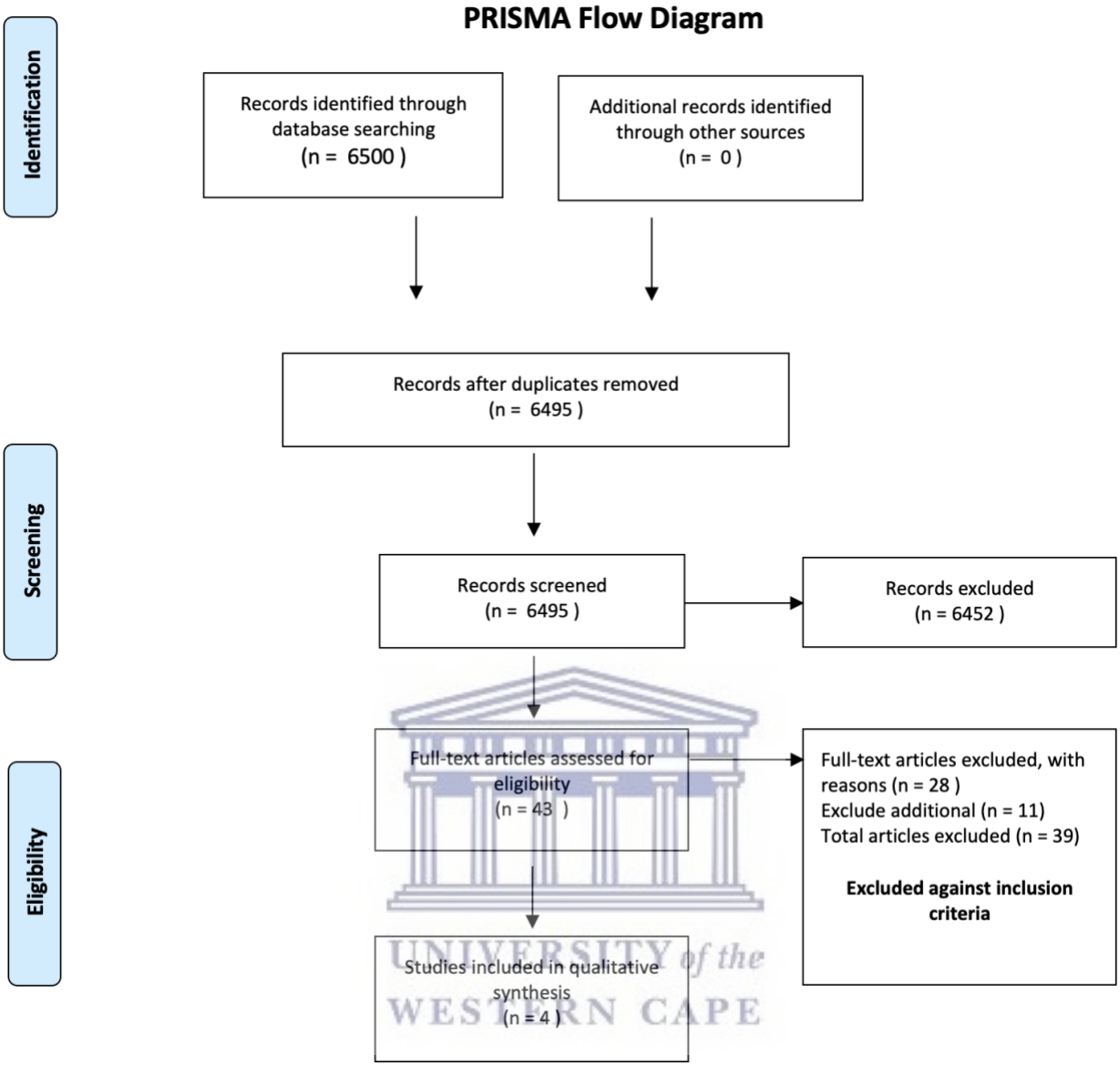

Figure 3.1: Prisma flow diagram

3.6 CHARTING THE DATA

The researcher sorted through, extracted and charted relevant information using a data extraction sheet in accordance with the content and format of the courses. The data was then captured and charted in Microsoft Excel.

The researcher recorded the following information:

- Author, year of publication, country of study
- Setting of study: urban/ rural
- Study design
- Study population – Community-based care/health/rehabilitation worker-specific condition: e.g. Lower-limb amputation/stroke
- Data collection method/s
- Content covered during the training course (if it relates to lower-limb amputation rehabilitation)
- Specifics relating to format: e.g. Duration of course, number of instructors, components (theoretical/practical), method of instruction (direct, distance, online), organisation of content
- Measures used to assess the participants (community health workers)
- Measures used to evaluate the effectiveness of the training

3.7 COLLATING, SUMMARISING AND REPORTING THE RESULTS

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In this review, no studies were identified that focused specifically on a pre-prosthetic training course, so only the second research question pertaining to the format of a CHW training course will be reported on and described in a narrative summary table.

3.7.1 Phase 2: Delphi Study

3.7.1.1 Round 1: Participant selection and participation

The first round of the Delphi study invited participants from various universities in South Africa and internationally, academic facilities such as the International Society for Prosthetics and Orthopaedics (ISPO), and professionals in the field. Prospective participants were emailed

individually, inviting them to participate in the study. Round one of the Delphi study commenced in September 2020 and closed in December 2020 when the data was captured. Round one was extended beyond the initially-predicted timeframe as the study had not reached its minimum participant criteria of 15 participants (Francis et al., 2010) until early December 2020. Several reminders were sent out to the participants encouraging them to participate in the study one week after they received the initial invitation. After two weeks of not meeting the required number of participants, new additional participants were contacted and emailed to participate and, again, reminded after one week of receiving the initial invitation. This process was repeated until the minimum number of participants was recruited. Participants were given an additional week to participate in the hope that more individuals would be involved. In total, 170 professionals were invited to participate in the study, and only seventeen (n=17) participants participated in the first round of the Delphi study.

3.7.1.2 Round 2: Refining the information

In January 2020, the seventeen (N=17) initial participants that participated in the first round of the Delphi study were invited to participate in a second round. An email was sent to each invitee individually. After two weeks, the participants who had not responded were sent a reminder email to participate in the study. The study was open for responses for a further two weeks and one additional week where no new responses were logged, after which the study was closed. From the initial 17 participants from the first round, eleven (n=11) participants took part in the second round. All eleven (n=11) participants understood the purpose of the study and gave voluntary consent to participate.

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3.7.1.3 Round 3: Reaching consensus among professionals

The second round of the Delphi study did not reach a consensus among professionals on all the areas; thus, a third round was developed. In March 2020, the eleven (n=11) participants from the second round were invited to participate in a third and final round of the Delphi study. The third round aimed to achieve consensus among the professionals who participated. An email was sent to each invitee individually. After two weeks, the participants who had not responded were sent a reminder email to participate in the study. After that, the study was open for responses for a further two weeks and one additional week where no new responses were logged, after which the study was closed. Out of the eleven (n=11) participants from the second round, seven (n=7) participants took part in the third final round. All seven (n=7) participants understood the purpose of the study and gave voluntary consent to participate.

3.8 DATA RIGOUR

3.8.1 Validity

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Participants invited to participate in the study were screened according to specific inclusion criteria. Only experts in the field of rehabilitation were included in the study. Participant demographics, qualifications, and experience were screened during the initial inclusion criteria and the study's first round.

3.8.2 Reliability

Two methods were used to collect data and ensure reliability. First, a scoping review of available literature was conducted, which guided the development and implementation of a Delphi study. A Delphi study involving three sections would test and retest the correlation between expert opinions and consensus reached. The Delphi study focused on experts in the field of rehabilitation and

specifically aimed to include participants with expert knowledge and experience in rural and poorly-resourced healthcare areas. The technique relies on a group of experts' most reliable consensus of opinion by allowing them to express their own view on a topic (Grobbelaar, 2007). Well-informed individuals, who are better equipped to predict the future than theoretical approaches or extrapolation of trends, are asked to draw on their insights and on prior experiences where their anonymous responses are collected through a series of questionnaires. Expert opinion was gathered over three rounds of questionnaires, where expert consensus was sought. Expert opinion was refined on the questions guided by the scoping review, where expert consensus was not achieved; expert consensus was not reached, but the majority agreed; or, a consensus was reached; on each section.

3.8.3 Generalisability

The study focused on identifying information from literature and experts in the field specific to CHW training and pre-prosthetic rehabilitation in rural areas. The study examined the opinions of professionals known to be experts in their respective fields of community healthcare and rehabilitation.

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3.9 ETHICS STATEMENT

Ethics clearance to conduct the study was obtained from the university's Human and Social Science Research Ethics Committee (HS18/9/15). Informed consent was obtained in writing from all voluntary participants. All information gathered was strictly confidential. Only the researcher and researcher's supervisor had access to the information, whereas online access was secured through privacy settings accessible only to the researcher and research supervisor. Participants in the study were informed of the study results.

The results were stored on a secure private laptop, with password and fingerprint access only to the researcher. The data will be stored for five years. Upon the lapsation of the data storage time, access links to the google document will be terminated, and the data will be deleted and erased permanently from the device. Adherence to the Protection of Personal Information Act (Act 4 of 2013) will be ensured, and prior consent was requested from participants for the information to be collected, stored, processed and shared as described in the information sheet. Only participants that gave consent were involved in the study.

CHAPTER 4: RESULTS

4.1 INTRODUCTION

In this chapter, the study's results will be presented in two phases. Phase one will present the scoping review, followed by Phase 2, which will present the Delphi study.

4.2 RESULTS OF THE SCOPING REVIEW (PHASE ONE)

In total, 6 500 articles were identified using the search terms through the relevant databases. In each database search, the first 1 000 articles were screened according to their titles. In those searches that resulted in more than 1 000 articles, an additional search term was included to narrow the search in accordance with the desired study criteria. No additional records were identified through other sources. Four duplicate articles were found, and the identified articles were removed. In total, 6 495 titles of the selected articles were screened, of which 6 452 were excluded based on the appropriateness of the title alone, where the study did not relate to community caregivers following the study's inclusion criteria. Forty-three abstracts were assessed for eligibility, and 28 were excluded against the preset inclusion criteria. Finally, 15 full-text articles were retrieved and reviewed independently by two researchers.

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On 10 October 2019, a discussion took place between the researcher and the study supervisor, where the decision was made to exclude the additional 11 articles due to the articles' relevance and being misaligned with the study's inclusion criteria. In the excluded articles, the target audience, aim, population, and relevance were considered and further discussed. Most studies were excluded because the training was not aimed at community-based rehabilitation workers or the type of intervention was not a training course or workshop. Four studies met the final inclusion

criteria and were included in the qualitative synthesis. No studies were identified to inform the *content* of the prosthetic rehabilitation course, as none addressed this topic. The following four studies were considered relevant to inform the *format* and structure of a CHW training course.

The most relevant findings from the final four articles that met the inclusion criteria are presented below.

Table 4.1: Study design, sampling and main findings

Study (location & design)	Sample, characteristics & method(s)	Main findings
Siribie et al., (2016) Title: Training community health workers to manage uncomplicated and severe malaria: Experience from three rural malaria-endemic areas in sub-Saharan Africa **Aim**: Probability of training CHWs to diagnose and treat malaria. **Timeline**: Burkina Faso – 3 days Nigeria – 3 days Uganda – 5 days **Location**: Burkina Faso, Nigeria, Uganda **Study**: Quantitative **Design**: Narrative method and cross-sectional surveys **Setting**: Rural	**Study population:** n=220 (73 male/147 female) **Specific condition:** Rural malaria-endemic areas **Data collection method(s):** Standard checklist was developed and used by one physician and one nurse to observe each CHW's practice	**Content covered during the training course:** ● Operational definition of malaria and recognition of signs and symptoms of uncomplicated and severe malaria ● Use of thermometers, measurement of respiratory rates, RDT (rapid diagnostic test) use, cassette storage, and waste disposal **Specifics relating to format:** ● Burkina Faso – 60 CHWs trained with 15 CHWs per training session lasting three days. Practical sessions with theory and demonstrations by facilitators were used and role play and discussion sessions. ● Nigeria – 55 CHWs trained with 28 CHWs per training session lasting three days. Roleplay and practical sessions on communication with caregivers and interactive demonstration sessions were used. ● Uganda – 164 CHWs trained. No trainee limit was given. Training occurred over five days, with three days of theory and two days of practical. A mannequin was used for practical purposes, with visual materials on administering techniques of suppositories and a WHO manual and video was also used. How training was conducted: ● The training was conducted in rural malaria-endemic areas of Burkina Faso, Nigeria, and Uganda. Community members were selected by their communities to serve as CHWs. In Burkina Faso and Uganda, the investigative team and district health representatives trained local facility-based health staff and CHW supervisors as trainers. Trainers then trained CHWs. In Nigeria, the CHWs were selected by their communities but trained by the investigative team. In addition, trainees received training in local languages, Yoruba in Nigeria; English, Luganda, and Lunyankole in Uganda; and French and Dioula in Burkina Faso.

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		• Burkina Faso – 60 CHWs were trained. Each session had a maximum of 15 CHWs and lasted three days. The training involved the operational definition of malaria, recognition of signs and symptoms of uncomplicated and severe malaria, thermometers measurement of respiratory rates, RDT use, cassette storage, and waste disposal. Practical sessions accompanied theory and included demonstrations, RDT practice, role play, and discussions. • In Nigeria, 55 female CHWs were trained with a maximum of 28 CHWs per session, lasting three days. Training included theory on malaria, causes and transmission, signs and symptoms of uncomplicated and severe malaria, malaria diagnosis, demonstrations of RDT using job aids, and preparation of thick smears. Role play, practical sessions on communication with caregivers/children, diagnosis and treatment of febrile children, and record-keeping were used as interactive sessions to observe, share, and correct practices. • In Uganda, 164 CHWs were trained over five days, with three days of theory and two practical days. The training covered respiratory rate counting, communicating with caregivers, the practice of RDTs, counting respiratory rates with timers, and communicating with caregivers about problems. • CHWs were also taught to use gloves when administering a suppository and the number of suppositories according to the child's age. **How the training programme or trainees were assessed** • The training was evaluated through pre-post testing using standardised questionnaires and by observation of CHW practices on real patients by facilitators of training sessions. **Assessment of the effectiveness of training institution** • Regular monthly supervision of CHWs was implemented in Nigeria and Burkina Faso, aimed at assessing the conduct of CHWs' activities according to practical guidelines in their home environment and addressing corrective actions. One refresher training was performed six months after initial training in Burkina Faso, and quarterly refresher training was conducted in Nigeria and Uganda. Review of forms completed and drug accountability occurred at each supervisory visit with supply replenishment.

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		Effectiveness of the intervention(s) • The study provides evidence that CHWs can perform well when well-trained. They should be certified before being deployed, have refresher training, and be closely supervised after training to increase confidence in their performance.
Uwimana et al., (2012) **Title**: Training community care workers (CCWs) to provide comprehensive TB/HIV/prevention of mother-to-child transmission (PMTCT) integrated care in KwaZulu-Natal: lessons learnt **Aim**: To describe a participatory approach to implement and evaluate ways to integrate and train CHWs to enhance collaborative TB/HIV/PMTCT activities, and home-based HIV counselling and testing (HCT) at the community level **Timeline**: Training was implemented from October 2009 to February 2011 **Location**: Sisonke district, KwaZulu-Natal, South Africa **Study**: Qualitative **Design**: Action research	**Study population:** A Phase intervention approach was used to train CCWs in villages. First intervention cluster (n=39), second in non-selected sites (n=120), and lastly in control clusters – CC (n=50). Intervals of 10 months between the training of intervention and control clusters. **Specific condition:** Rural district with very high (39%) antenatal HIV prevalence. **Data collection method(s):** Interviews were conducted in English by the first author and focus group discussions with CHWs were conducted in isiZulu by a bilingual research assistant. ATLAs.ti was used to capture and organise data	**Content covered during the training course:** • General HIV prevention, treatment and ART adherence (5 days). • STIs prevention and care (3 days). • TB prevention, treatment and care (5 days). • HIV counselling and testing-HCT (10 days). • PMTCT/IMCI (5 days). • Recording and reporting tools (2 days). **Specifics relating to format:** • 39 CHWs trained over 30 days and then placed into clinics for practical training on HCT, TB, and STI case finding for one month. • Under the supervision of community health facilitators and professional nurses in charge. • Community mobilisation events were conducted to introduce the project to the community leaders, and CHW services were explained to community members. • CHWs distributed condoms and provided HCT. TB and STI symptom screening, TB sputum collection and referral of TB and STI suspects to health facilities. **How training was conducted:** • A phase implementation approach was used to train CHWs in all villages, with the first intervention cluster – IC (n=39 CHWs), the second in non-selected sites (n=120) and a controlled cluster – CC (n=50). There was an interval of 10 months between the training of intervention and control clusters. The training was implemented from October 2009 to February 2011. A final step involved community mobilisation events with officials, chiefs, traditional

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Setting: Rural	thematically. Baseline household interviews consisted of interviews recorded on cell phones, and questionnaires developed by the first author were programmed into the cell phones. Data were exported to Excel and analysed with Statistical Package for Social Science(SPSS). Routine CCW data was collected for analysis comparing intervention and control clusters concerning the provision of core TB/HIV/PMTCT services. Data was captured using Excel and analysed with statistical software for data science (STATA) version 11 using frequencies and proportions. Bivariate tests were used to compare differences in proportions and means across clusters	healers, and others after training in each cluster to introduce CHWs in the community. **How the training programme or trainees were assessed:** ● Monitoring and evaluation of the project involved routine monthly data on CHW performance collected from March 2010 to December 2011 in both clusters by community health facilitators (CHFs), and the supervisors of CHWs. **Assessment of the effectiveness of training institution:** ● A follow-up household (HH) survey was later conducted to assess the project's impact at the community level. This is an ongoing activity. **Effectiveness of the intervention(s)** ● Our findings suggest that community participation through multi-sectoral community mobilisation events that engage community leaders, such as traditional healers, is an enabling tool for successful community-based programmes in TB/HIV/PMTCT care. Integrating TB/HIV/PMTCT services at the community level through one CHW cadre with an expanded and harmonised scope of action is feasible, acceptable, and successful.
Pilang et al. **(2017)** **Title**: The evolution of the community health worker programme in Papua New Guinea.	**Study population**: Community health workers in Papua New Guinea **Specific condition**: Community healthcare workers in rural	**Content covered during the training course:** ● Two-year certificate programme with access to clinical sites for practical placement and practical skills training after theory training **Specifics relating to format:** ● Two years of in-school training with practical components. ● Minimum of Grade 10 at entry level and a maximum of Grade 12.

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Aim: Identify and explain the five major developmental stages in the current CHW training programme, as well as the changes that have occurred over the past century **Timeline**: 2-year certificate programme **Location**: Papua New Guinea – Highlands region, Momase region, Island region, Southern region. **Study**: Research article **Design**: Systematic evaluation of the effectiveness of the CHW programme **Setting**: Rural/outlying community	communities of Papua New Guinea **Data collection method(s):** Systematic evaluation of literature	• Good community record and experience supporting and living in the community for the last year. **How training was conducted:** • A training curriculum used a framework of four themes: A healthy environment, community participation and education; individual education and counselling; and medical, curative and palliative interventions. CHWs must complete a two-year certificate programme with access to clinical sites for their practical placements and acquire further practical skills after completing the theory. CHW students are also required to demonstrate their simulation skills and are observed by trainers from the institution before being exposed to real settings. **How the training programme or trainees were assessed:** • Entry-level examinations must be passed to enrol in the programme. Set entry criteria where applicants must have completed a minimum of Grade 10 and a maximum of Grade 12 schooling, have a good community record, and have lived in the community for at least one year. Theory and practical examinations are conducted throughout the two-year programme. **Assessment of the effectiveness of training institution:** • After training, graduating students are employed and work in different settings (hospitals, health centres). After graduating as CHWs, they are registered with the medical board and receive support, mentorship, and salary through the different organisations that employ them. **Effectiveness of the intervention(s)** • The training of competent CHWs with essential skills and knowledge may help deliver quality and cost-effective primary healthcare (PHC) health services to the rural majority and the urban disadvantaged. Improving and introducing a competency-based curriculum is essential to building a healthier nation.
Horwood et al., (2017)	**Study population:** Community health	**Content covered during the training course:**

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Title: A continuous quality improvement intervention to improve the effectiveness of community health workers providing care to mothers and children: A cluster randomised control trial in South Africa **Aim**: Investigate the effectiveness of a continuous quality improvement (CQI) intervention amongst CHWs providing home-based education and support to pregnant women and mothers. **Timeline**: 10 days of training over four months **Location**: Ugu Health District, KwaZulu-Natal (KZN), South Africa. **Study**: Qualitative **Design**: Cluster randomised control trial **Setting**: Predominantly rural areas	worker supervisors (CHWs) (n=30). Intervention (n=15) control (n=15). 4/30 CHWs were randomly selected for routine management (n=60 per study arm). **Specific condition:** High HIV prevalence rural community in South Africa. **Data collection method(s):** Paper questionnaires were used at the baseline, and a table-based data collection system was used for the follow-up survey	• Community-based care (CBC) of women and infants prior to study implementation. • Community care of pregnant women and newborns based on World Health Organisation community care management (CCM) materials adapted to include aspects of HIV care. • Guidelines on antenatal and postnatal visits. • Information on HIV and PMTCT. • Identification of signs of illness in newborn infants and children. **Specifics relating to format:** • CHWs received a 10-day KZN Department of Health training on community-based care of women and infants prior to study implementation. • Detailed materials supported the training. • Conducted in the local language (isiZulu). • Included theoretical and clinical components. • Training was conducted with three groups of 25 participants between May and August 2012. **How training was conducted:** • CHW's received 10 days of training from the Government Department of Health on community-based care of women and infants prior to study implementation. CHW improvement teams received two additional weeks of training on community care of pregnant women and newborns based on WHO CCM materials adapted to include relevant aspects of HIV care. Training included guidelines on antenatal and postnatal visits, information on HIV and PMTCT, and identification of signs and symptoms of illness in newborn infants and children. The training was supported by detailed materials in local languages (isiZulu) and included theoretical and clinical components. Training was conducted with three groups of 25 participants between May and August (over four months). **How the training programme or trainees were assessed:** • The 12-month CQI mentoring intervention was preceded by a three-month lead-in phase to establish mentoring meetings and processes and was conducted between August 2012 and November 2013. During mentoring

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		meetings, teams reviewed data elements collected by CHWs to identify gaps and together design tests of ideas for how challenges could be resolved. Quarterly learning sessions were convened at which CHW improvement teams presented their progress to provide opportunities for peer learning across CHW groups. **Assessment of the effectiveness of training institution:** • Assessment of the effect of the intervention on maternal health behaviour, knowledge, and infant feeding practices was done via household surveys conducted amongst independent samples of mothers of infants aged < 12-month old residing in households served by participating CHWs. Surveys were conducted at baseline prior to implementation of CCM training and CQI mentoring and at follow-up 15 months following initiation of the intervention. An independent assessment team conducted two surveys using a structured questionnaire in the local language (isiZulu). Paper questionnaires were used at baseline, and a table-based data collection system was used for the follow-up survey. **Effectiveness of the intervention(s)** • CHW effectiveness will be constrained unless adequately trained and supported. Failing to invest the additional resources to provide effective supervision beyond the human resource costs and supplies may be a false economy.

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ART = antiretroviral treatment

ATLAs.ti = a computer program used mostly, but not exclusively, in qualitative research or qualitative data analysis

CBC = community-based care

CCM = community care management

CCW = community care worker

CFH = community health facilities

CHW = community health worker

CQI = continuous quality improvement

HCT = home-based counselling and testing

HH = household

HIV = Human Immunodeficiency Virus

IMCI = integrated management of childhood illness

KZN = KwaZulu-Natal

MCQs = multiple choice questions

PHC = primary health care

PMTCT = prevention of mother-to-child transmission

RDT = rapid diagnostic test

STIs = sexually transmitted infections

HCT = counselling and testing campaign

TB = Tuberculosis

WHO = World Health Organisation

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Siribie et al. (2016) conducted a quantitative study using cross-sectional surveys where CHWs in Nigeria, Burkina Faso, and Uganda were trained on malaria management over 3-5 days. In Nigeria and Burkina Faso, trainees received training in their local languages. Training sessions consisted of 15-28 CHWs per session over three days, whereas in Uganda, 264 CHWs were trained over five days. In all three countries, the training covered theoretical knowledge of malaria and how to treat the condition, along with practical demonstrations and scenarios based on the theoretical knowledge the trainees were taught. The study evaluated training through pre-post testing using standardised questionnaires and by observation of CHW practices on real patients by facilitators of training sessions and found evidence to support the benefits of well-trained CHWs (Siribie et al., 2016).

Uwimana et al. (2012) used a phased intervention approach to train community health workers in villages in a rural community in South Africa. The CHWs were trained in managing and providing home-based education and support to pregnant women and mothers. Although specific training periods were not provided in the study, the trainees in the first phase (n=39) were trained over 30 days, separated into specific modules lasting between 2-10 days each over 30 days. The second phase (n=120) was identical, with a ten-month interval between the two 30-day training interventions. The findings suggested that community participation through multi-sectoral community mobilisation events that engage community leaders such as traditional healers is one of the enabling tools of successful community-based programmes in Tuberculosis/Human Immunodeficiency Virus/prevention of mother-to-child transmission (TB/HIV/PMTCT) care. Therefore, the integrated provision of TB/HIV/PMTCT services at the community level through one CHW cadre with an expanded and harmonised scope of action is feasible, acceptable, and successful (Uwimana et al., (2012).

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A research article by Pilang, Gray and Oprescu (2017) evaluated a training curriculum using four themes to train CHWs in Papua New Guinea (PNG). Community health workers would need to complete a two-year certificate programme that involved theoretical and practical components and supervised clinical placements after successfully completing the programme. Furthermore, minimum entry requirements were established for applicants to gain acceptance into the programme and pass an entrance examination. The study viewed the training of competent CHWs with essential skills and knowledge as essential in providing services to the rural majority and urban minority. Although the article did not specify whether the training methods discussed were successful or not, it did, however, emphasise that this subject has not previously been researched and, thus, this article contributes new information with regards to past and current development of CHW programmes in PNG as well as other developing countries (Pilang, Gray & Oprescu., 2017)

Horwood et al. (2017) investigated the effectiveness of a CQI intervention among CHWs providing home-based education and support to pregnant women and mothers in a rural district of Southern Africa. Community health workers received ten days of training from the Government Department of Health on community-based care of women and infants prior to the study implementation. Community health workers consisting of three groups of (n=25) participants (n=60 per study arm) were trained using guidelines on antenatal and postnatal visits and theory and identification of illness in newborn infancy and childhood. Detailed materials supported the participants' local language training, including theory and practical components. The training was conducted in three groups of 25 participants over four months. Pre- and post-intervention surveys were used to evaluate the effectiveness of the training. Assessments through surveys by participants were conducted at baseline prior to community case management training and continuous quality intervention mentoring and at follow-up 15 months post-initiation of the

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intervention. The study suggests that CHW effectiveness will be constrained unless CHWs are adequately trained and supported. The study found that further evaluation would be required to assess this approach's feasibility and effectiveness at scale; it is further suggested that failing to invest the additional resources to provide effective supervision beyond the human resource cost and supplies may be a false economy (Horwood et al., 2017).

The training period for CHW training courses varied from a 3-5 day course to a two-year full-time certification. The number of participants per training course also varied significantly, from 15-28 participants to 164 participants, and even 'no limits' on trainee participation numbers. Suggestions on training course content mostly included theoretical knowledge, practical sessions involving demonstrations, scenarios, supervised clinical placements, detailed materials and guidelines, and engagement with community leaders. Two articles mentioned that training and training materials should be conducted and provided in the trainees' local language. Evaluation of the training course was mentioned by two articles, both of which used pre-and post-intervention surveys with standardised questionnaires to be completed by both CHW trainees and the communities in which they worked. Additionally, pre-requisite criteria and entrance examinations were recommended for course acceptance candidacy. Finally, studies emphasised that CHW training methods were in need of further research (Pilang et al., 2017) and that further evaluation and research would be needed to assess the effectiveness and feasibility of current approaches to CHW training interventions (Horwood et al., 2012).

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Training of CHWs should be conducted in their local language where possible, as well as the training materials used throughout the course. Smaller groups of trainees were more favourable, and shorter course duration was preferred, with longer courses conducted in shorter subunits of 2-

10 days. Various training methods were used, with a common trend combination of theory, practical training, and clinical experience. Written and practical examinations and observations by CHW trainees' trainers with real patients assessed trainees. A portfolio of evidence or a logbook was also beneficial for trainee assessment. Assessment surveys completed by the local community on CHW trainee performance were conducted, and the CHW trainees completed surveys to assess the training course. Several weeks or months after the initial training course, a refresher training course was used to develop skills and identify and address problematic areas where the training course may not have been effective.

4.3 RESULTS OF THE DELPHI STUDY (PHASE TWO)

4.3.1 Results of round one: Participant selection and participation

4.3.1.1 Section 1: Demographic details and experience of participants

The participants' age ranged from 28 years to 65 years of age, and the mean age was 47.7 (SD+-3.13). Of the original 17 participants, ten (58.8%) were male and seven (41.2%) were female. Participants were practising in various sectors, with the majority (n=8; 47%) employed at academic institutions/universities or university hospitals. The participants' years of experience ranged from five to 36 years, with an average of 20.4 years of experience, indicating that the participants were very experienced experts in this field.

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Of the 17 participants, the majority were senior lecturers (n=4) and lecturers (n=4) (Figure 4.1). Other professional titles included 'associate professor' (n=2), and 'clinician' (n=2), among others.

Participants' publications in peer-reviewed journals ranged from zero publications to 52 publications, with the average number of publications being 12.8 as a participant cohort. Of 17

participants, the majority (n=11) indicated they had previous experience working in a rural or remote clinical environment. Of those participants who had experience in a rural or remote clinical environment, the amount of experience ranged from eight months to 25 years, with an average of 6.9 years of experience.

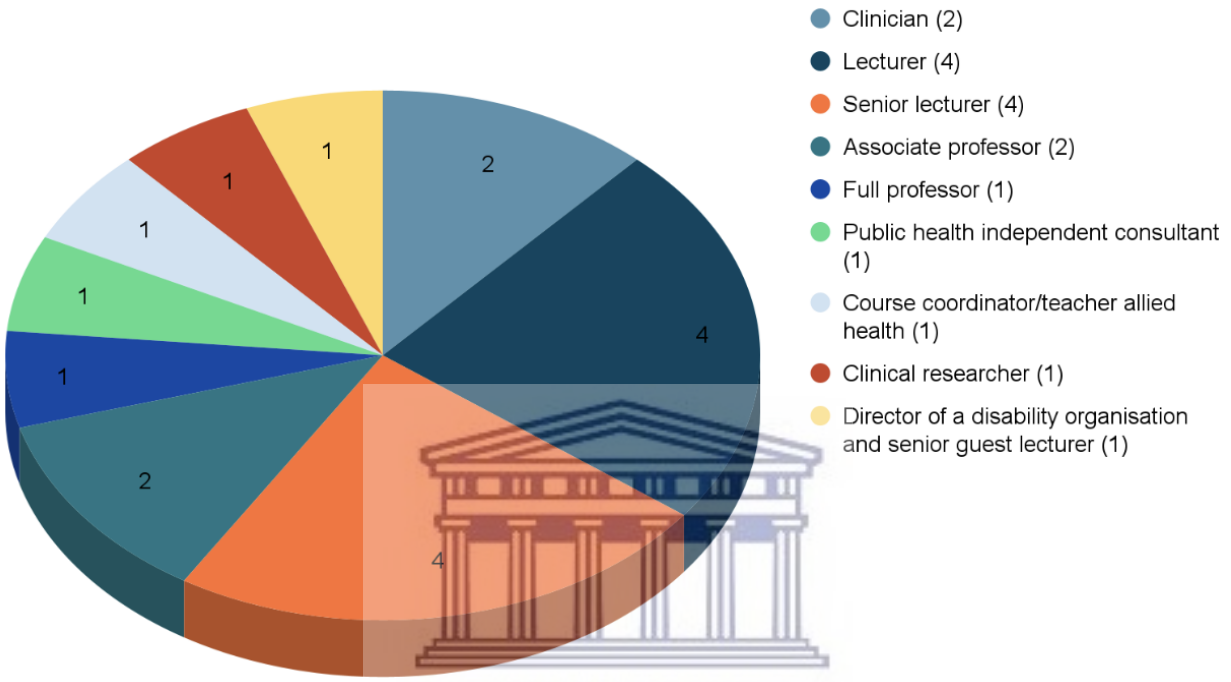

Figure 4.1: Professional titles of participants

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4.3.1.2 Section 2: Establishing an ideal course format

Of the 17 participants, six (35.3%) felt that six months was the most appropriate time for a CHW training course (Figure 4.2). This was followed by three (17.6%) of the participants suggesting a one-year full-time training course and three (17.6%) suggesting a 2-3-day course.

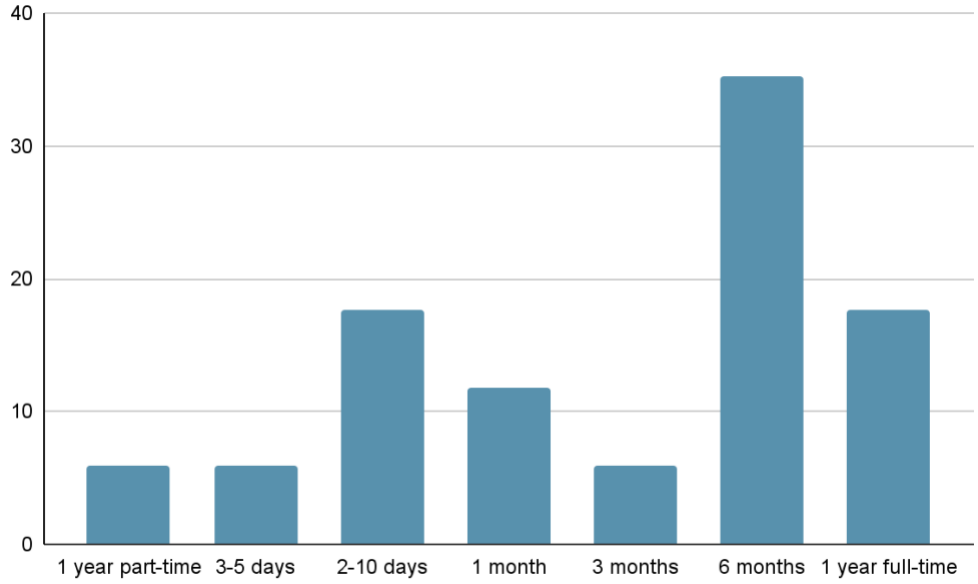

Figure 4.1: Ideal duration of training course

The training course structure showed eight out of 11 (N=8) participants choosing 'combination of theory and practical training', and seven out of 11 (N=7) choosing 'clinical/community-based inter-practical training for CHW trainees'. In addition, six out of 11 (N=6) participants selected both 'scenario/simulation training' and 'involvement of clients/service users/family members', and three out of 11 (N=3) selected the 'use of videos during training' (Figure 4.3).

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Participants were asked for their expert opinions on a preferred location for CHW training. Two out of 11 (N=2) participants suggested 'trainees attend a full-time stay-in course at a training facility with provided housing'. Three out of 11 (N=3) participants opted for 'trainers bring the training course to the trainees in the rural environment in the community', while eight out of 11 (N=8) suggested 'trainees attend practical placements both in and out of their community, but receive theory training in their community'. When asked about materials and interventions that would be useful in training CBR workers in rural areas, eight out of 11 (N=8) suggested 'demonstrations by trainers', and seven out of 11 (N=7) suggested 'mock scenarios for trainees'.

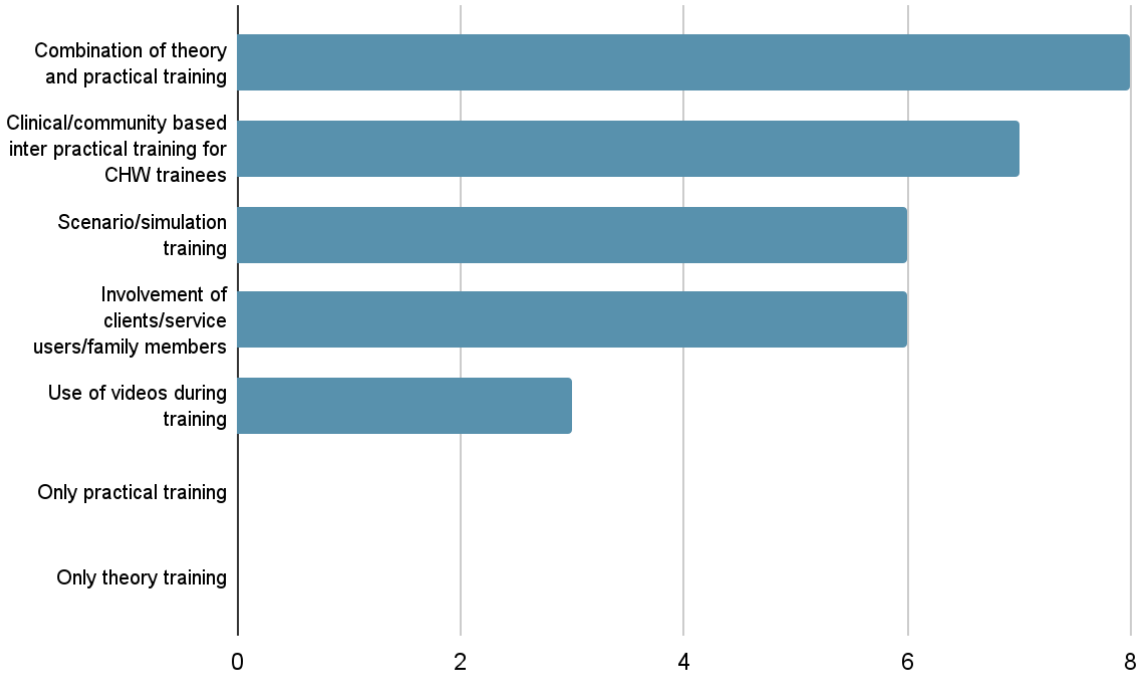

Figure 4.2: Structure of CHW training course

Thirteen (n=13) of the seventeen (N = 17) participants agreed that there should be prerequisite criteria to enrol as a CHW trainee, while four (n=4) did not agree. Out of the thirteen participants that chose 'yes' for prerequisite criteria, five (n=5) participants chose 'have lived in the community for a set period of time', and five (n=5) chose 'interview'. Five (n=5) participants selected the option for 'other', and provided professional opinions as follows (Figure 4.4):

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- "Secondary education".
- "Chosen in collaboration with outpatient department (OPD), maturity, good interpersonal skills, minimum ten years of education".
- "Prerequisites for CHW workers should be at least a Grade 10. This will assist in grasping the CHW concepts, and the person will be able to compile reports with some level of understanding".
- "Should be interested in doing disability and rehabilitation work in their communities".

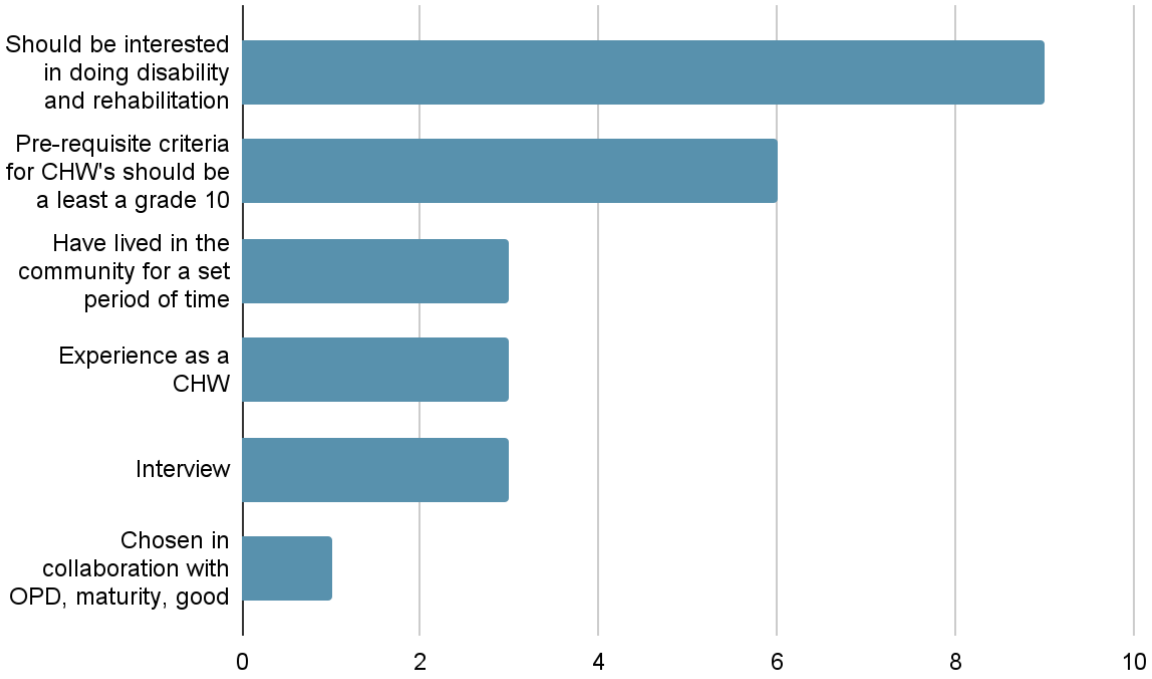

Figure 4.3: Prerequisite criteria to enrol CHW trainees

4.3.1.3 Section 3: Content for a basic amputation rehabilitation course

Experts shared their opinions on ROM, strengthening exercises, and early mobilisation care (theory). On ROM and strengthening exercises, 16 experts opted for 'hip flexion/extension', 15 opted for 'static quadriceps exercises', and 14 opted for 'knee flexion/extension'. Expert opinions on early mobilisation care (theory) found the majority (n=16) in favour of 'stump hygiene', followed by 'identifying complications' (n=14) and 'pain control: acute and phantom limb pain' (n=14).

For detail added to contracture prevention and management, 15 participants opted for 'theory and practical: patient positioning to prevent contractures'. Sixteen (n=16) participants opted for 'theory and practical: strengthening exercises that are important to maintain daily function', and fifteen (n=15) opted for 'theory and practical: strengthening exercises to prepare for prosthetic fitting'

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when asked what detail should be added to the physical exercise section. In stump preparation for prosthetic fitting, fifteen (n=15) participants felt that 'practical: demonstration and practice of stump bandaging for trans-tibial and trans-femoral amputations' was important.

4.3.2 Results of Round 2: Refining the information

4.3.2.1 Section 1: Returning participant participation

In January 2020, the seventeen (N=17) initial participants that participated in the first round of the Delphi study were invited to participate in a second round. An email was sent to each invitee individually. After two weeks, the participants who had not responded were sent a reminder email to participate in the study. The study was open for responses for a further two weeks and one additional week where no new responses were logged, after which the study was closed. Out of the initial 17 participants from the first round, eleven (n=11) participants took part in the second round. All eleven (n=11) participants understood the purpose of the study and gave voluntary consent to participate.

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4.3.2.2 Section 2: Ideal format for course

Experts provided their professional opinion on the 'duration of course' and 'number of participants per training course'. For the 'duration of course', the majority (n=7) opted for 'flexible, dependent on resources and work requirements' (Figure 4.5).

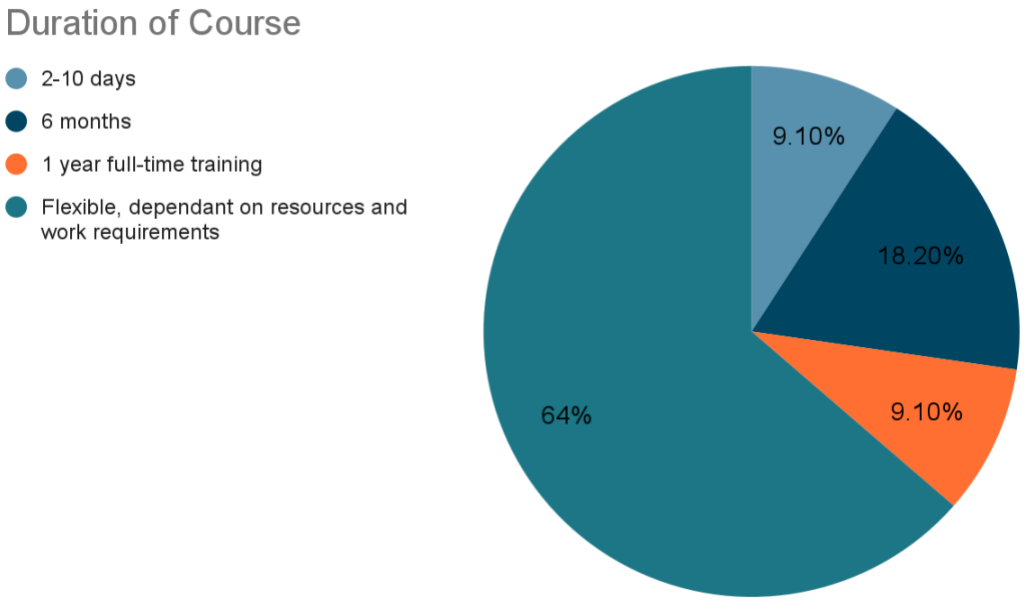

Figure 4.4: Duration of the course

Regarding the number of participants per training course, the majority (n=6) selected 10-15 participants as the most appropriate (Figure 4.6).

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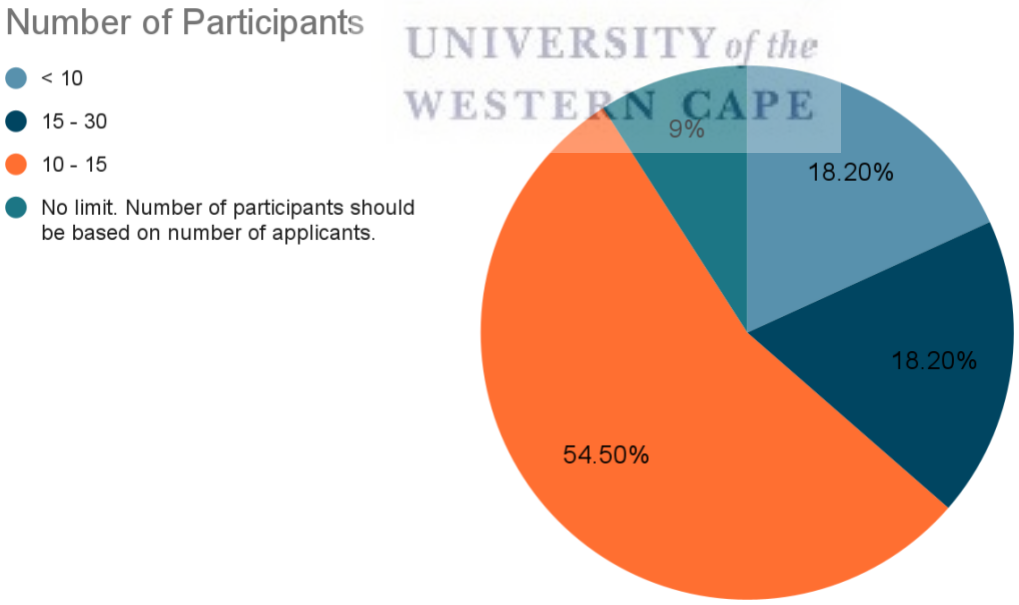

Figure 4.5: Number of participants per training course

The combined results of trainee assessment during training and the effectiveness of training course assessment are presented below (Figure 4.7). Expert opinion on 'trainee assessment during training' reached consensus and showed eight out of 11 (n=8) participants suggested 'a combination of written tests and practical skills assessments'. On the 'assessment of the effectiveness of the training course', the majority of participants (n=7) suggested 'log book (or digital) records of daily patient treatments/interventions by each newly trained CHW', while (n=6) chose both 'student feedback', and 'close supervision after training'.

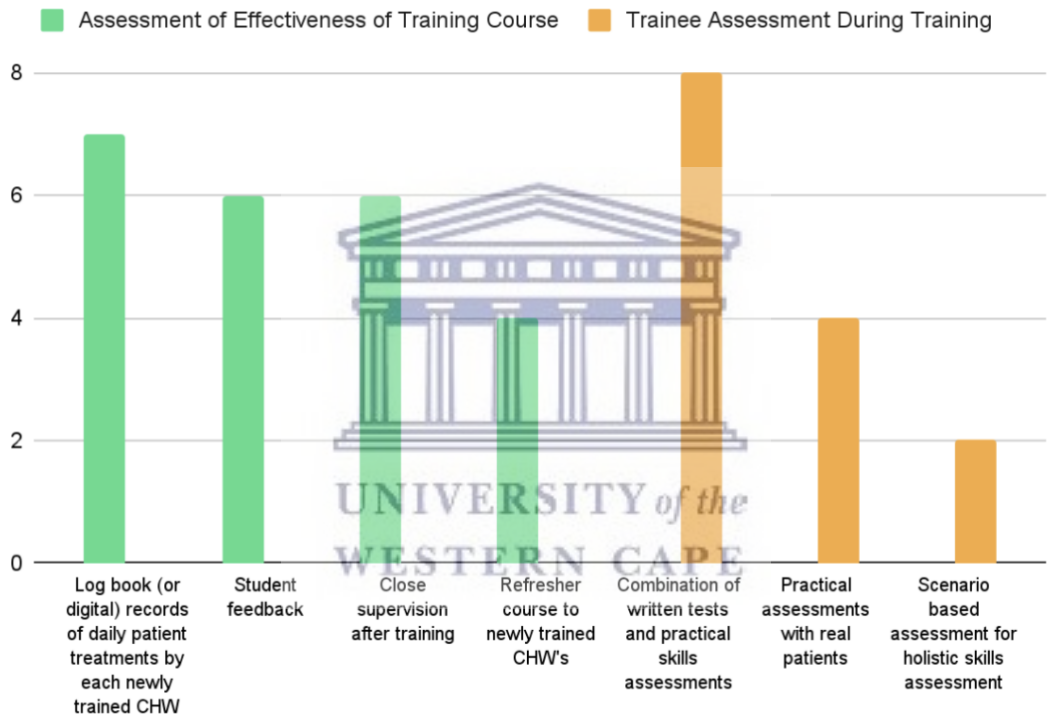

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Figure 4.6: Trainee assessment during training and evaluation of the effectiveness of the training course

4.3.2.3 Section 3: Refining content for basic amputation and prosthetic rehabilitation course

In section 3, experts were asked to further share their expert opinion on content for a basic amputation and prosthetic rehabilitation course. Again, the expert consensus was reached (n=10)

on what sections they would recommend to be added to this course, where 'early mobility and transfers', and 'stump care' was agreed as being most important.

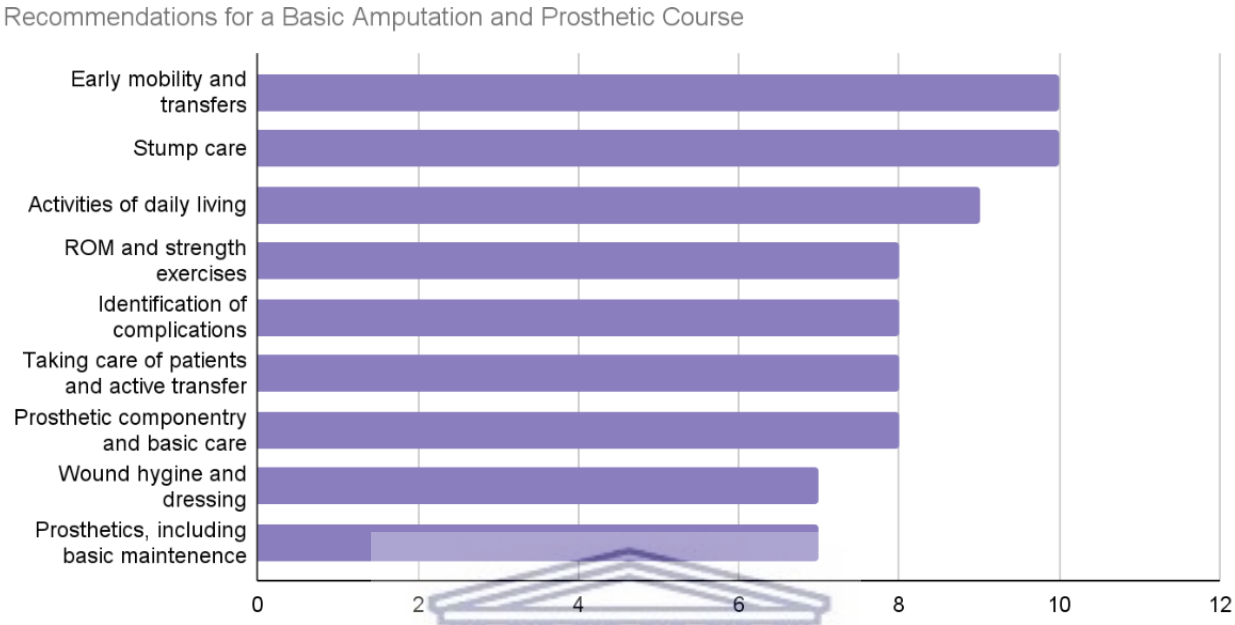

Figure 4.7: Refined content for a basic amputation and prosthetic rehabilitation course

Participants provided expert opinions on additions to the ROM and strengthening exercise section and the early mobility and transfers section. The consensus was reached (n=10) on ROM and strengthening exercises, where participants agreed that both 'knee flexion/extension', and 'hip flexion/extension' were most important (Figure 4.9). The consensus was also reached (n=10) for early mobility and transfers, where participants agreed that both 'stump hygiene' and 'identifying complications and when to refer' were most ideal.

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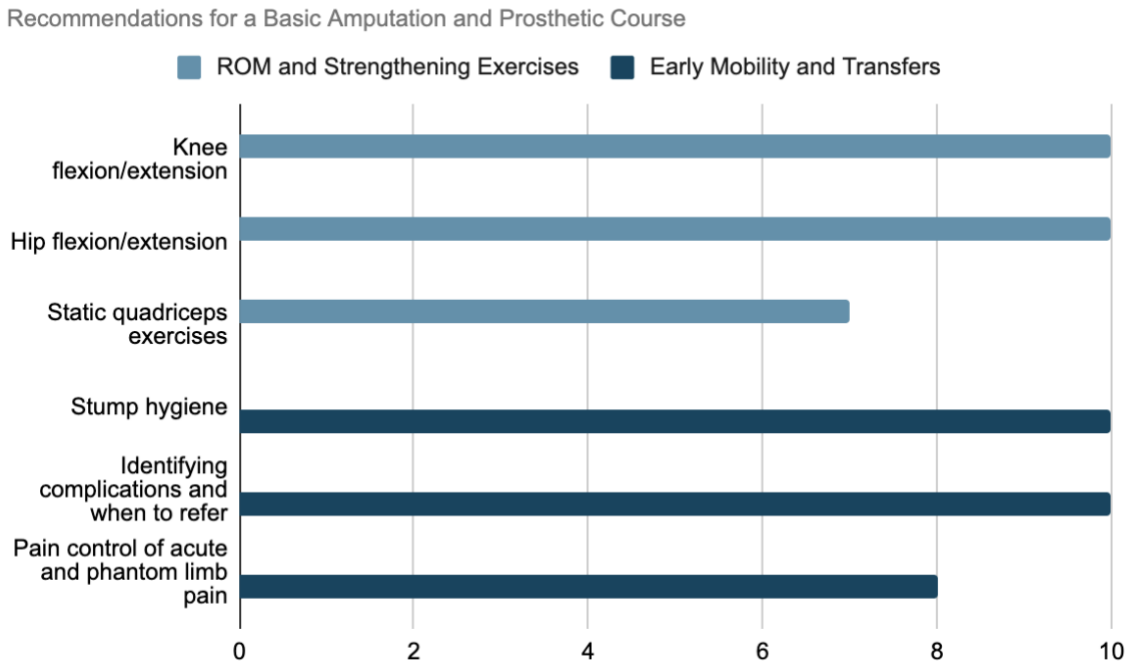

Figure 4.8: ROM and strengthening exercise, and early mobility and transfers

The expert consensus was reached when asked what guidelines should be added for screening prosthetic candidates for prosthetic fitting. The majority of participants agreed that 'the guidelines should be simple and easy to follow'.

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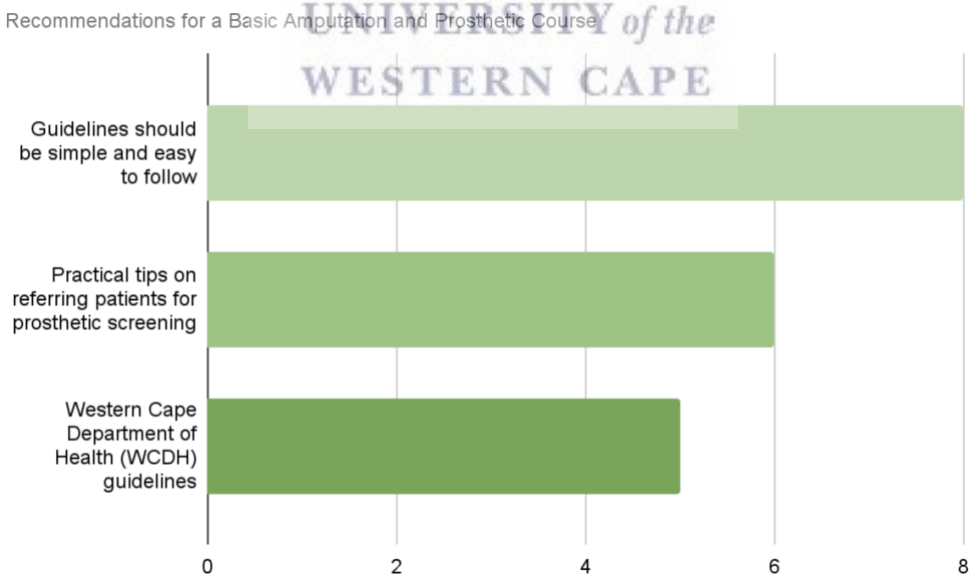

Figure 4.9: Guidelines for screening of prosthetic candidates for prosthetic fitting

Eleven (N = 11) experts provided professional opinions on what detail should be added to the contracture prevention and management and the physical exercise section (Figure 4.12). For contracture prevention and management, nine (n=9) participants selected 'practical: stretching of the shortened muscles', and eight (n=8) selected 'theory and practical: patient positioning to prevent contracture'. For the physical exercise section, nine (n=9) participants chose 'theory and practical: strengthening exercises to prepare for prosthetic fitting', and eight (n=8) selected 'theory and practical: strengthening exercises important to maintaining daily function'.

Participants shared expert opinions on stump preparation for prosthetic fitting, where all 11 out of 11 (n=11) suggested 'practical: demonstration and practice of stump bandaging for trans-tibial and trans-femoral amputation'. Seven out of 11 (n=7) participants selected 'not strictly a stump preparation activity, but candidates should be able to dress themselves independently – enable an easier transition to donning/doffing a prosthesis'. Six out of 11 (n=6) participants selected both 'theory: oedema control and shaping the stump' and 'pre-sensitisation of the stump', while five out of 11 (n=5) suggested 'achieving independence with lower body dressing'.

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4.3.3 Results of Round 3: Approaching consensus

4.3.3.1 Section 1: Final participating participants

The second round of the Delphi study did not reach a consensus among professionals on all the areas; thus, a third round was developed. In March 2020, the eleven (N = 11) participants from the second round were invited to participate in a third, final round of the Delphi study. The third round aimed at achieving consensus among the professionals who participated. An email was sent to each invitee individually. After two weeks, the participants who had not responded were sent a reminder email to participate in the study. After that, the study was open for responses for a further

two weeks and one additional week where no new responses were logged; the study was closed. Of the eleven (N = 11) participants from the second round, seven (N = 7) participants took part in the third and final round. All seven (N = 7) participants understood the purpose of the study and gave voluntary consent to participate.

4.3.3.2 Section 2: Most ideal course format

Seven (N = 7) participants provided expert opinions on the duration of a CHW training course and the number of participants per training course. Six (n=6) participants opted for 'depending on resources available', as a mix of learning designs could be used to make the most of face-face teaching and learning time and limit the time workers are required to be away from their job roles. For the number of participants per training course, six (n=6) participants suggested 10-15 trainees per course.

Participants (N=7) were asked if they felt mock scenarios for trainees would be useful in training CHWs in a rural setting. The majority (n=6) of participants said 'yes' (Figure 4.11).

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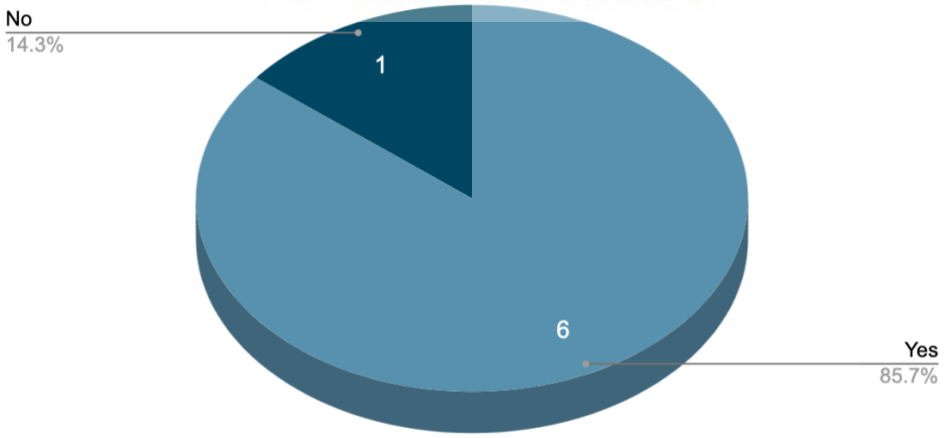

Figure 4.10: Mock scenarios for trainees

Participants were further asked how they felt the effectiveness of the training course should be assessed. Again, the consensus was not reached among experts where three out of seven (n=3) participants suggested 'close supervision after training' and 'log book (or digital) recording of daily patient treatments/interventions by each newly trained CHW, while one out of seven (n=1) suggested 'student feedback'(Figure 4.12).

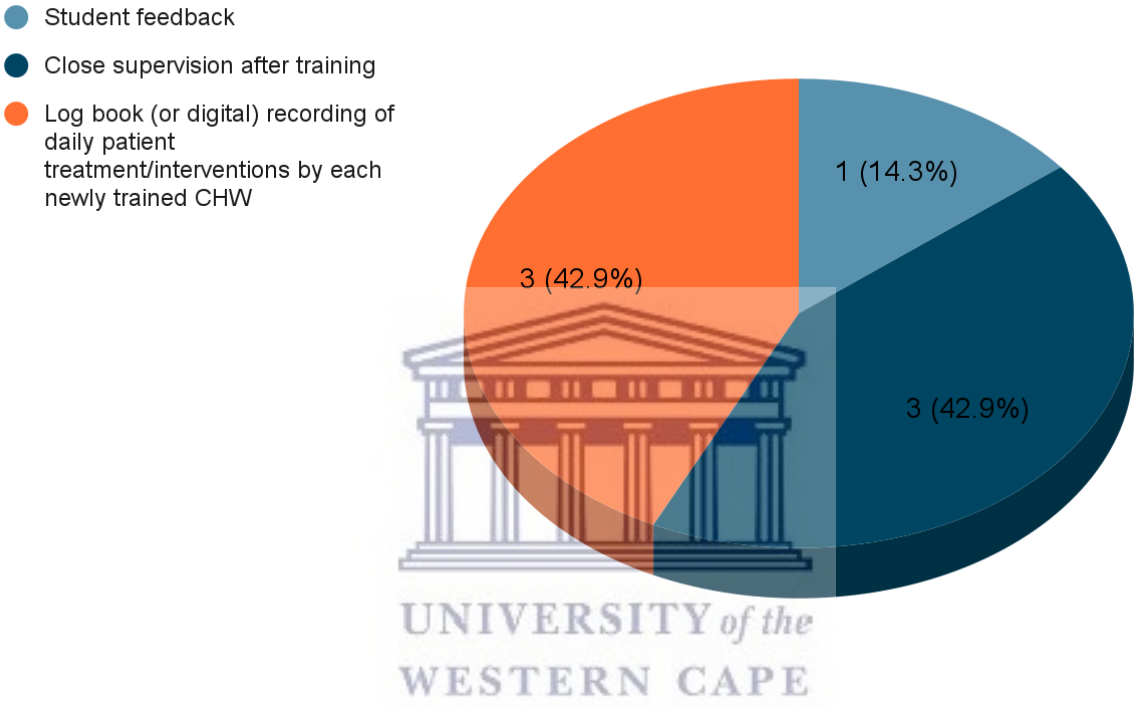

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Figure 4.11: Effectiveness of the training course

4.3.3.3 Section 3: Final agreement on content for basic a basic amputation and prosthetic rehabilitation course

Participants were asked which section they would recommend adding to a training course for basic amputation and prosthetic rehabilitation in a rural setting. The consensus was reached among participants where five out of seven (n=5) preferred 'prosthetics, including basic maintenance', and two out of seven (n=2) preferred 'wound hygiene and dressings'.

Participants' opinions on static quadriceps exercises did not reach a consensus. Four out of seven (n=4) said ‘yes’, and three out of seven (n=3) participants said ‘no’ when asked if they agreed that static quadriceps exercises should be added to the ROM and strengthening exercises section.

Participants were asked about their preferences on additions to the contracture prevention and management section, physical exercise section, and stump preparation for prosthetic fitting. For contracture prevention and management, the consensus was reached by five out of seven (n=5) participants who suggested ‘ROM exercises, use of resting splints (splinting where necessary)’. Likewise, a consensus was reached regarding physical exercise, where all participants (n=7) agreed on ‘how to incorporate physical activity into daily life, especially if now using a wheelchair’. Finally, stump preparation for prosthetic fitting showed six out of seven (n=6) participants suggested ‘theory: oedema control and shaping the stump’.


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CHAPTER 5: DISCUSSION

5.1 INTRODUCTION

A combination of the findings from the scoping review (phase one) and the Delphi study (phase two) will be integrated, interpreted, and presented. Where possible, the findings of this study will be compared to similar studies, and recommendations will be made for future research.

Effective rehabilitation of persons living with amputations strongly depends on a multidisciplinary healthcare team that functions well and is lacking in many developing countries (Ennion & Rhoda, 2016). Therefore, the need for CHW workers has been established, but they are poorly supported in terms of rehabilitation training. There is limited evidence in the literature informing the training of CHWs. From the scoping review conducted, four articles were considered relevant to inform the format and structure of a CHW training course. However, no studies were identified to inform the content of the prosthetic rehabilitation course, as none addressed this topic. Furthermore, there is an absence of research studies on contextualising the known content to that of a rural population. The studies provide a superficial overlapping variety of methods to conduct training but no specific information relating to relevant content. Studies emphasised that CHW training methods needed further research (Pilang et al., 2017) and that further evaluation and research would be needed to assess the effectiveness and feasibility of current approaches to CHW training interventions (Horwood et al., 2012). These findings thus validate the study and the need for conducting the Delphi study.

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5.2 SPECIFICS RELATING TO FORMAT

5.2.1 Duration of training

There was much variance in the ideal format pertaining to the duration of the course and the perfect number of participants from the scoping review. The scoping review identified that the duration of the courses varied between three days and two years. In the Delphi study,consensus was reached on the duration of a CHW training course. The availability of resources was deemed the most important determining factor when deciding on the duration of the course. Considering the availability of resources, experts agreed that *six months* is the ideal training course duration.

A study of interprofessional and interdisciplinary simulation-based training for physicians and nurses found effectiveness in training during a one-day training course (Sauter et al., 2016), and a monthly refresher training of three hours for all staff was then conducted. This shows a similarity between related literature and the scoping review findings, where shorter training durations of one day are still shown to be effective. However, expert opinion from the Delphi study suggests a longer duration of six months as most ideal. A six-month duration could be seen as long enough for trainees to receive appropriate training, conserve resources appropriately, and allow CHWs to start working or continue working sooner post-intervention.

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Online modalities for public health professionals in Ottawa, Canada, were shorter, ranging from 20 minutes to 20 hours per training module (Archer et al., 2020). In-person training was generally described as workshops and lasted over a full day, multiple days, often over a few weeks, and occasionally over a year. The use of online and digital modalities for learning was not suggested in the literature review or by experts in the field from the Delphi study, although it is viewed as a useful tool for training. Although this may shorten training duration and improve educational

access to more trainees, socioeconomic or funding constraints by both trainers and trainees and access to technology and operational skills training to those in rural areas would impede online modality intervention. Clinically, shorter online and digital modalities may benefit those individuals doing additional course training, but benefits may be limited to those with access to appropriate technologies or who already have prior knowledge on a topic and desire skills development. However, considering resource availability, longer training durations of six months, as suggested by experts in the Delphi study, appear most ideal for improving the quality and skill level of new CHW trainees post-intervention.

5.2.2 Number of participants

There was significant variation in the ideal number of participants attending CHW training courses identified in the scoping review. The number of participants varied from 15 to 164, and even 'no limit' on participation numbers was mentioned. Additionally, there was a discrepancy in participant grouping, with some courses training all trainees together and some dividing larger groups into subgroups. Finally, consensus was not reached on the number of participants per training course; however, the majority of experts agreed that 10 - 15 participants per training course was the ideal number.

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The findings from the Delphi study are contrary to a study conducted in Switzerland, where 50 participants were trained together. Trainees underwent a course on interprofessional and interdisciplinary simulation-based sedation training concepts. The course components included a pre-course self-study by trainees; a lecture, simulation-based training, a basic skills workshop on training day; and a practical learning experience after the course. The trainees were divided into two groups based on their subfields (26 nurses; 24 physicians), but all 50 participants were trained

together as one training cohort (Sauter et al., 2016). Smaller training groups (such as suggested by the experts in the current study) would allow more exposure to training materials and interaction with trainers. However, larger trainee groups would require more resource availability; thus, in line with the suggestions from expert opinion in the Delphi study, that participant numbers should also be based on resource availability. The trainee sample size in the study by Sauter et al. (2016) may be bigger than the recommendations by the experts due to the availability of resources such as trainers and equipment being accessible.

A study of public health professionals in Ottawa, Canada, aimed to identify the preferred modalities for delivering continuing education to public health professionals and to determine how equity had been incorporated into public health training. Participant numbers varied from 12 trainees in the smallest programmes to over 4 000 trainees in the largest interventions (Archer et al., 2020). This shows some similarity to this study's expert opinions, where large numbers of trainees can be trained if resource availability permits, such as in the healthcare systems of developed countries with numerous trainers and available equipment. However, for the training of CHWs in rural and under-resourced areas, smaller-sized training groups would need to be considered due to the sharing of resources.

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A study on an ultrasound training programme for nurse midwives trained a total of 25 participants (23 nurse midwives; two physicians) where the training of smaller groups is seen when using more specialised equipment or modalities (Shah et al., 2020). In a clinical context, training courses could be run more frequently to provide more CHWs with an opportunity to be trained if fewer participants per course are recommended. Alternatively, more trainers could also be involved in training CHWs in smaller groups.

5.3 METHOD OF INSTRUCTION

There was some consistency in the literature pertaining to the instruction method; however, various approaches were still observed. The majority of the articles identified in the scoping review combined the use of theoretical and practical training. Methods of instruction included a variety of components that involved general guidelines and special techniques, use of scenarios, role play, use of mannequins, demonstrations, discussions, how to record data and use data recording tools, and clinical components with real patients. Two articles recommended that the training and training materials be conducted and provided in the trainees' local language. The Delphi study achieved consensus among experts, agreeing that a combination of theory and practical training was ideal. Although consensus was not reached, the majority of experts agreed that practical clinical training and mock scenario/simulation training would be beneficial to training CHWs in rural areas.

These suggestions were similar to the methods used in a course on interprofessional and interdisciplinary simulation-based training for physicians and nurses (Sauter et al., 2016). The course consisted of a pre-course study hand-out, a training day comprised of initial repetition lectures, simulation-based team training, a basic skills workshop, simulation-based team training, and a practical learning experience. The study of public health professionals in Ottawa, Canada, included online training via live webinars and on-demand training, tele- or video conferencing and course modules, while in-person training included traditional lectures, facilitated discussions and case studies (Archer et al., 2020). Implementing online hosted interventions would be time-saving; however, this did not address the specific needs and challenges faced by those trainees in rural settings who are less privileged in their technological skills. The use of traditional methods may be more beneficial, where facilitated discussions and case studies could be conducted as a training

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course prerequisite before course commencement and the arrival of the trainers. Blended training programmes included various components of these modalities, the most commonly combined online tutorials complemented by in-person training.

Based on evaluation results, the most popular practices were using adaptive training content and delivery methods, holistic, collaborative training sessions, blended learning using multiple modalities and dedicated technical support or pre-training for accessing or using online platforms (Archer et al., 2020). These findings by Archer et al. (2020) share similarities with the suggestions from experts in the Delphi study and reviewed literature, as they combine holistic, practical, and blended learning while also recognising the benefit and need for technical support or pre-training when potentially using new technologies.

The findings of the Delphi study may have positive clinical implications when training CHWs at both well or poorly-equipped facilities. Trainees would be trained and assessed through written and practical means, with continuous logbook record-keeping to track CHW performance progress as suggested by experts. This training method could be done in rural communities with minimal resources. Potential follow-up training could also be conducted to follow up on CHW competency, skills development, and skills progression. Guidelines and procedures could be implemented and adhered to by CHWs, while waiting for resources to become available. Instructions on how to perform peer coaching and practice sessions could be discussed with experienced or lead CHWs, and implemented if adaptive self-training content and delivery methods are well planned out through the development of frameworks and competency expectations. Resource availability would need to guide the method of instruction based on the needs of each community and the CHWs in that community.

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5.4 HOW THE TRAINING PROGRAMME OR TRAINEES WERE ASSESSED

5.4.1 Training programme assessment

The Delphi study reached consensus on the 'assessment of the effectiveness of the intervention', where most participants agreed that 'logbook (or digital) records of daily patient treatments/interventions by each newly trained CHW' was most ideal. Logbooks can be sent back and forth to trainers regularly or stored at the facility to be checked by training staff routinely, and CHW progress could be seen and monitored on an ongoing basis. This also allows rural and remote areas to keep a detailed record of CHW progress and may assist in the evolution of and progression toward a digital or online database system of record-keeping and progress tracking.

Variations pertaining to both the training programme and trainee assessment were seen. For example, training programme assessment was mentioned in two articles in the scoping review, both of which used pre- and post-course questionnaires. However, one assessment targeted CHW trainees and the community they served, while the other only targeted the community.

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Using surveys with structured questionnaires and logbook entries of CHW treatments and interventions could be used to track CHW performance and satisfaction, and thus the effectiveness of the intervention based on CHW satisfaction and performance.

5.4.2 Trainee assessment

The consensus was reached during the Delphi study on trainee assessment during training, where experts agreed that 'a combination of written tests and practical skills assessments' were most ideal.

There was significant variation in trainee assessment. Assessment techniques varied from entrance examinations and prerequisites to attending the course to theory and practical examinations and clinical observations of trainees with real patients. A study within the Canadian public health system saw the use of pre - and post-questionnaires to assess confidence in trainees before, immediately after, and several months after intervention (Archer et al., 2020). These same assessment formats could be used to assess the training programme in conjunction with the assessment of the trainees.

A study of training assessment among physicians and nurses in Switzerland was based on custom questionnaires, simulation training, and performance during practical learning experiences (Sauter et al., 2016), which relates to the suggestions of practical exams and skills assessments in the Delphi study. An evaluation of professional training programmes in international agricultural research institutions used survey questions to collect data from respondents, and interviews by telephone were then used to gather more in-depth information (Wanjiku, Mairura & Place, 2010). These findings show similarities to those of the scoping reviews findings of using assessment surveys by CHWs and the community they served.

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5.5 CONTENT FOR BASIC AMPUTATION AND PROSTHETIC REHABILITATION

Consensus was reached among participants where the majority of experts suggested that ‘prosthetics and basic maintenance’ was ideal as part of the training course's content. A consensus was reached on contracture prevention and management, where experts agreed that ‘ROM exercises and use of resting splints were necessary’. A consensus was reached among experts

regarding physical activity, where all participants agreed on ‘how to incorporate physical activity into daily life, especially if now using a wheelchair’, as being ideal.

CHAPTER 6: CONCLUSION

6.1 INTRODUCTION

This chapter will provide an overview of the study. It will summarise and highlight the most significant findings, the study's limitations, clinical recommendations and research suggestions, the significance of this study, and a final conclusion.

6.2 SUMMARY OF THE MAIN FINDINGS

The study aimed to answer two research questions:

1. "What is the **content** (relating to pre-prosthetic rehabilitation) and format used in existing training courses for community health workers in rural settings?"

Experts agreed that training about prosthetics and basic maintenance was ideal as part of a training course for CHWs in rural settings. In addition, experts agreed that training on ROM exercises and the use of splints where necessary should also be included, along with being taught how to incorporate physical activity into daily life, especially if a wheelchair is used.

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2. "What is the **format** used in existing training courses for community care workers in rural settings?".

Most of the literature review findings identified the combined use of theoretical and practical training. Methods of instruction included general guidelines, scenarios, role play and use of mannequins, demonstrations, discussions, recording and using data tools, and clinical components with real patients. The Delphi study reached expert consensus, agreeing that theoretical and

practical training was most ideal. However, the majority of experts also agreed that practical clinical training would be beneficial to training CHWs in a rural context.

6.3 LIMITATIONS OF THE STUDY

It is understood that the scoping review may have found additional content if the search was extended to textbooks, online websites, and information in languages other than English, including a broader range of literature options. It is also acknowledged that variations in fields of expertise, clinical experience and exposure, geographical locations, and other factors may contribute to the varying opinions of experts. A broader base of experts involved in the study may have contributed to the finding of additional information and a wider range of expert opinions. Access to the expert opinion of those currently in the rural setting and who are not on the databases that were contacted may be beneficial and could assist in identifying the essential needs of CHWs in rural settings.

6.4 CLINICAL RECOMMENDATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

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Based on the study's findings, there was an apparent lack of information available to guide the development of a training course's specific content and format for community health workers in rural settings. The information provided specifics within the contexts of a developed healthcare system, and was found to be lacking or nonspecific in rural settings. Expert consensus was achieved on several aspects of the study; however, integrating the recommendations from experts into an informative and useful training course for CHWs in rural and less developed healthcare settings would need to be explored further.

Experts in rural care that work with CHWs daily will need to implement and explore the format recommendations provided by the study participants, and these recommendations can be

considered for the tailoring of the initial training course. In addition, feedback on functional and practical components of the recommendations would need to be recorded and submitted, as well as the resources available for each CHW or CHW served area. The initial training course was a one day course, and could be extended if resources are made available to CHWs to accommodate those who travel far distances. The recommended number of participants per training course was similar to the initial training course which consisted of 15 participants and included a practical and theoretical component. A quiz and feedback form were used to assess the trainee's competence and their satisfaction with the course. No follow-up courses were provided but should be considered. The content was similar to the consensus, but the use of splints were not included.

6.5 STUDY SIGNIFICANCE

The broad variations in training assessments may indicate the need for further research interventions specific to the needs of training interventions in rural areas. Given the need to further develop the healthcare systems of developing countries, the study aimed to tailor and improve an existing pre-prosthetic training course for CHW's and the delivery of care to those individuals in rural and resource-poor areas. The study's findings hope to stimulate further development of CHW training programmes that can easily be used in rural communities to train CHWs appropriately, effectively, and with minimal resources. As the findings from the study suggest, there was consensus among experts in several areas. However, refining the best choices shared by professionals in the field hopes to aid in developing a flexibly standardised programme design, specifically for the training and skills development of CHWs in rural and resource-poor areas.

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6.6 CONCLUSION

The study's findings suggest that training programmes should have guidelines for flexibility according to resource availability when implementing or conducting a training course. A CHW training programme should include a combination of theory and practical components, ideally in the trainees' own language, and trainees should receive exposure to practical clinical training with real patients. The ideal duration of training programmes should be six months with small groups of 10-15 participants. Assessment of trainees should be conducted through written and practical assessments, and follow-up training should be conducted post-intervention to assess trainee performance and the effectiveness of the course. Evaluation of the training course should be assessed by means of a survey conducted by the trainee and members of the community in which the CHW trainee had served. These suggestions will be incorporated to tailor an existing pre-prosthetic training course or CHW's in rural settings. This course can potentially improve access to rehabilitation and prosthetic technology and improve functional outcomes for persons with lower limb amputations in the rural settings of South Africa.

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APPENDIX A: CERTIFICATE OF EDITING AND TECHNICAL FORMATTING

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Company registration: 2019/050723/07

To whom it may concern

This serves as confirmation that I, Lize Vorster, performed the language editing and technical formatting of Jarryd Pagel's thesis entitled:

Tailoring a pre-prosthetic training course for community health workers in a rural setting within South Africa

Editing is done in track changes and the student has final control over accepting or rejecting changes at their own discretion. Technical formatting entails complying with the Stellenbosch University's technical requirements for theses and dissertations, as presented in the Calendar Part 1 – General or where relevant, the requirements of the department.

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Yours sincerely

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60 YEARS of hope, action & knowledge

31 March 2021

Mr JE Pagel
Physiotherapy
Faculty of Community and Health Sciences

HSSREC Reference Number: HS18/9/15

Project Title: Tailoring a pre-prosthetic training course for community care workers in a rural setting within South Africa.

Approval Period: 24 March 2021 – 24 March 2024

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the 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.

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Please remember to submit a progress report by 30 November each year for the duration of the project.

The permission to conduct the study must be submitted to HSSREC for record keeping purposes.

The Committee must be informed of any serious adverse events and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

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Email: research-ethics@uwc.ac.za

NHREC Registration Number: HSSREC-130416-049

Delphi Survey: Round 1

Thank you for taking the time to complete this survey. Please answer the following questions and provide your professional advice or opinion.

*Required

1. Do you understand the purpose of this study, and voluntarily consent to participate? *

Mark only one oval.

- ◯ Yes
- ◯ No

Section 1: Demographic details and experience

2. How old are you? *

_____

3. Gender: *

Mark only one oval.

- ◯ Female
- ◯ Male
- ◯ Prefer not to say

4. Where are you currently employed? *

_____

5. How many years of experience do you have in your field? *

_____

6. What is your professional title? *

Mark only one oval.

- Clinician
- Lecturer
- Senior lecturer
- Associate Professor
- Full professor
- Other: _____

7. How many publications do you have in peer-reviewed journals (if any)? *

_____

8. Do you have experience working in a rural or remote clinical environment? *

Mark only one oval.

- No
- Yes

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9. If you answered 'yes' in the previous question, please provide the amount of experience you have in years or months.

_____

Section 2: Ideal format for course

The suggestions for the following section is based on studies on community based care worker training from a scoping review of the literature.

10. Duration of course: Please choose the option that you feel is most appropriate for the amount of time in which a training course for community based rehabilitation or care workers should be conducted. *

Mark only one oval.

- ◯ 3-5 days
- ◯ 2-10 day
- ◯ 1 month
- ◯ 3 months
- ◯ 6 months
- ◯ 1 year full time training
- ◯ Other: _____

11. If you selected 'other' in the previous question, please elaborate by adding your suggestion for the ideal duration for a training course for CBR workers in a rural setting.

12. Number of participants per training course: Please choose the option that you feel is most appropriate for the training of CBR workers, considering that both theory and practical techniques should be taught. *

Mark only one oval.

- ◯ <10
- ◯ 15-30
- ◯ 30-50
- ◯ 100
- ◯ No limit - number of participants should be based on number of applicants
- ◯ Other: _____

13. If you selected 'other' in the previous question, please elaborate by adding your suggestion for the ideal number of participants for a training course for CBR workers in a rural setting.

14. Structure of training course: Please choose the options that you feel are most appropriate for how a CBR training course on prosthetic rehabilitation should be structured. *

Tick all that apply.

- [ ] Only theoretical training
- [ ] Only practical training
- [ ] Scenario/simulation training
- [ ] Use of videos during training
- [ ] Clinical/community based intern practical training for CBR worker trainees
- [ ] Combination of theory and practical training
- [ ] Other: _____

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15. If you selected 'other' in the previous question, please elaborate by adding your suggestion for the ideal number of participants for a training course for CBR workers in a rural setting.

16. What would you suggest as a preferred location for training? *

Tick all that apply.

- [ ] Trainees attend a course at a set location by traveling out of their community to the training site.
- [ ] Trainers bring the training course to the trainees in the rural environment in the community.
- [ ] Trainees attend a full-time 'stay in' course at a training facility with provided housing.
- [ ] Trainees attend practical placements both in and out of their community, but receive theory training in their community.

17. Can you suggest material or interventions you think would be useful in training CBR workers in a rural setting? Tick as many as you think apply. *

Tick all that apply.

- [ ] Training manual in English and the local language.
- [ ] Equipment to practice scenarios and skills training.
- [ ] Audiovisual equipment.
- [ ] Demonstrations by trainers.
- [ ] Mock scenarios for trainees.
- [ ] Assigning a clinical partner for practicals (if any).

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18. Do you think there should be pre-requisite criteria to enrol as a CBR worker trainee? *

Mark only one oval.

- ( ) Yes
- ( ) No

19. If you chose 'yes' in the previous question, which of the following pre-requisites would you feel are appropriate?

Tick all that apply.

- [ ] Entrance exam
- [ ] Primary/secondary education
- [ ] Experience as a CBR worker
- [ ] Have lived in the community for a set period of time
- [ ] Chosen by the community
- [ ] Interview
- [ ] Other

20. If you chose 'other' in the previous question, please provide what you feel would be an appropriate pre-requisite for CBR worker trainees.

_____

_____

_____

_____

_____

21. How would you suggest trainees should be assessed during their training? *

Tick all that apply.

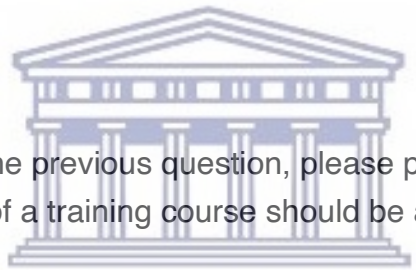
- [ ] Pre- and post-training written theory test
- [ ] Written formative and summative assessments
- [ ] Practical assessments with real patients
- [ ] Scenario based assessment for holistic skills assessment
- [ ] Specific skills assessed individually
- [ ] Oral examinations
- [ ] A combination of written tests and practical skills assessments
- [ ] Other: _____

22. If you selected 'other', please provide further suggestions on what you think would be a good assessment method for CBR worker trainees.

23. How should the effectiveness of the training course be assessed? *

Tick all that apply.

- [ ] Refresher courses to newly trained CBR workers
- [ ] Intern period
- [ ] Close supervision after training
- [ ] Log book (or digital) recordings of daily patient treatments/interventions by each newly trained CBR worker
- [ ] Other



24. If you chose 'other' in the previous question, please provide your suggestions on how the effectiveness of a training course should be assessed.

Section 3: Content for basic amputation and prosthetic rehabilitation course

The nature of the CBR training program will focus mainly on preparing CBR workers to support and care for persons with lower limb amputations in rural settings, assist with stump care and rehabilitation, and pre-prosthetic functional training and rehabilitation.

25. From your expert opinion, what sections would you recommend be added into a training course for basic amputation and prosthetic rehabilitation in a rural setting? *

Tick all that apply.

- [ ] Positioning
- [ ] Chest management
- [ ] ROM and strengthening exercises
- [ ] Early mobility and transfers
- [ ] Oedema management
- [ ] Wound hygiene and dressings
- [ ] Identification of possible complications
- [ ] Stump care
- [ ] Massage (scar tissue, pain, oedema)
- [ ] Referral system

26. If there are additional sections you would like to add, please provide your suggestions on what you would recommend be added into a training course for basic amputation and prosthetic rehabilitation in a rural setting.

27. What detail should be added into the ROM and strengthening exercises section? (Tick as many as you think apply) *

Tick all that apply.

- [ ] Ankle pumps with intact limb
- [ ] Inner range quadriceps (IRQ) exercises
- [ ] Static quadriceps exercises
- [ ] Knee flexion/extension
- [ ] Hip flexion/extension
- [ ] Abdominal and core stability
- [ ] Upper limb ROM and transfer mobility exercises
- [ ] Other: _____

28. What detail should be added into the early postoperative care (theory) section?

Tick all that apply.

- [ ] Stump hygiene
- [ ] Postoperative wound dressings
- [ ] Identifying complications and when to refer
- [ ] Pain control: acute and phantom limb pain
- [ ] Scar management theory and practical
- [ ] Other: _____

29. What guidelines should be added for screening of prosthetic candidates for prosthetic fitting? *

Tick all that apply.

- [ ] Theory: The Western Cape Department of Health (WCDOH) guidelines
- [ ] Practical tips: Can I consider referring this patient for prosthetic screening?
- [ ] Other: _____

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30. If you chose 'other' in the previous question, please provide your suggestions on screening of prosthetic candidates for prosthetic fitting.

_____

_____

_____

_____

_____

31. What detail should be added into contracture prevention and management? *

Tick all that apply.

- [ ] Theory: Patient education
- [ ] Theory and practical: Patient positioning to prevent contracture
- [ ] Practical: Stretching of shortened muscles
- [ ] Other: _____

32. If you chose 'other' in the previous question, please provide your suggestions on contracture prevention and management.

33. What detail should be added into the physical exercise section? *

Tick all that apply.

- [ ] Theory: Why should a patient with an amputation still do exercise?
- [ ] Theory: Which exercises are safe to do and which not?
- [ ] Theory and practical: Strengthening exercises that are important to maintain daily function
- [ ] Theory and practical: Strengthening exercises to prepare for prosthetic fitting
- [ ] Other: _____

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34. If you chose 'other' in the previous question, please provide your suggestions on the physical exercise section.

35. What detail should be added into stump preparation for prosthetic fitting? *

Tick all that apply.

- [ ] Theory: Oedema control and shaping the stump
- [ ] Practical: Demonstration and practice of stump bandaging for trans-tibial and trans-femoral amputation
- [ ] Other: _____

36. If you chose 'other' in the previous question, please provide your suggestions on stump preparation for prosthetic fitting.

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Delphi Survey: Round 2

Thank you for taking the time to complete this survey. Please answer the following questions and provide your professional advice or opinion.

*Required

1. Do you understand the purpose of this study, and voluntarily consent to participate? *

Mark only one oval.

- Yes
- No

Section 2: Ideal format for course

The suggestions for the following section is based on the studies on community based care worker training from a scoping review of the literature, as well as suggestions made by experts who participated in the first round of the study. The top three options from the previous round, as well as additional suggestions are included in this round of the survey.

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2. Duration of course: Please choose the option that you feel is most appropriate for the amount of time in which a training course for community based rehabilitation or care workers should be conducted. *

Mark only one oval.

- 2-10 day
- 6 months
- 1 year full time training
- Depending on resources available, a mix of learning design could be used to make the most of face - face teaching and learning time and limit time that workers are required to be away from their job roles. (i.e. blended learning)

3. Number of participants per training course: Please choose the option that you feel is most appropriate for the training of CBR workers, considering that both theory and practical techniques should be taught. *

Mark only one oval.

- ◯ <10
- ◯ 15-30
- ◯ No limit - number of participants should be based on number of applicants
- ◯ 10-15

4. Structure of training course: Please choose the options that you feel are most appropriate for how a CBR training course on prosthetic rehabilitation should be structured. *

Tick all that apply.

- ☐ Scenario/simulation training
- ☐ Use of videos during training
- ☐ Clinical/community based intern practical training for CBR worker trainees
- ☐ Combination of theory and practical training
- ☐ Involvement of clients/service users/family members

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5. What would you suggest as a preferred location for training? *

Tick all that apply.

- ☐ Trainers bring the training course to the trainees in the rural environment in the community.
- ☐ Trainees attend a full-time 'stay in' course at a training facility with provided housing.
- ☐ Trainees attend practical placements both in and out of their community, but receive theory training in their community.

6. Can you suggest material or interventions you think would be useful in training CBR workers in a rural setting? Tick as many as you think apply. *

Tick all that apply.

- [ ] Training manual in English and the local language.
- [ ] Demonstrations by trainers.
- [ ] Mock scenarios for trainees.

7. Which of the following would you feel are appropriate pre-requisite criteria to enrol CBR worker trainees? *

Tick all that apply.

- [ ] Experience as a CBR worker
- [ ] Have lived in the community for a set period of time
- [ ] Interview
- [ ] Chosen in collaboration with OPD. Maturity. Good interpersonal skills. min 10 year of education.
- [ ] Pre-requisites for CBR worker should be at least a grade 10. This will assist in grasping of the CBR concepts and the person will be able to compile reports with some level of understanding.
- [ ] Should be interested in doing disability and rehabilitation work in their communities

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8. How would you suggest trainees should be assessed during their training? *

Tick all that apply.

- [ ] Practical assessments with real patients
- [ ] Scenario based assessment for holistic skills assessment
- [ ] A combination of written tests and practical skills assessments

9. How should the effectiveness of the training course be assessed? *

Tick all that apply.

- [ ] Refresher courses to newly trained CBR workers
- [ ] Close supervision after training
- [ ] Log book (or digital) recordings of daily patient treatments/interventions by each newly trained CBR worker
- [ ] Student feedback

Section 3: Content for basic amputation and prosthetic rehabilitation course

The nature of the CBR training program will focus mainly on preparing CBR workers to support and care for persons with lower limb amputations in rural settings, assist with stump care and rehabilitation, and pre-prosthetic functional training and rehabilitation.

10. From your expert opinion, what sections would you recommend be added into a training course for basic amputation and prosthetic rehabilitation in a rural setting? *

Tick all that apply.

- [ ] ROM and strengthening exercises
- [ ] Early mobility and transfers
- [ ] Wound hygiene and dressings
- [ ] Identification of possible complications
- [ ] Stump care
- [ ] Activities of daily living, especially focusing of personal care and basic tasks within the home including meal and drink preparation; psychological support
- [ ] taking care of prosthetics and AT
- [ ] Prosthetic componentry and basic repair
- [ ] Prosthetics, including basic maintenance
- [ ] I suggest that this course add our capability to work easily in rural setting

11. What detail should be added into the ROM and strengthening exercises section? (Tick as many as you think apply) *

Tick all that apply.

- [ ] Static quadriceps exercises
- [ ] Knee flexion/extension
- [ ] Hip flexion/extension

12. What detail should be added into the early postoperative care (theory) section? *

Tick all that apply.

- [ ] Stump hygiene
- [ ] Identifying complications and when to refer
- [ ] Pain control: acute and phantom limb pain

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13. What guidelines should be added for screening of prosthetic candidates for prosthetic fitting? *

Tick all that apply.

- [ ] Theory: The Western Cape Department of Health (WCDOH) guidelines
- [ ] Practical tips: Can I consider referring this patient for prosthetic screening?
- [ ] The guidelines should be simple and easy to use

14. What detail should be added into contracture prevention and management? *

Tick all that apply.

- [ ] Theory: Patient education
- [ ] Theory and practical: Patient positioning to prevent contracture
- [ ] Practical: Stretching of shortened muscles
- [ ] ROM EXERCISES, USE OF RESTING SPLINT (SPLINTING WHERE NECESSARY)

15. What detail should be added into the physical exercise section? *

Tick all that apply.

- [ ] Theory: Which exercises are safe to do and which not?
- [ ] Theory and practical: Strengthening exercises that are important to maintain daily function
- [ ] Theory and practical: Strengthening exercises to prepare for prosthetic fitting
- [ ] How to incorporate physical activity into daily life, especially if now using a wheelchair

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16. What detail should be added into stump preparation for prosthetic fitting? *

Tick all that apply.

- [ ] Theory: Oedema control and shaping the stump
- [ ] Practical: Demonstration and practice of stump bandaging for trans-tibial and trans-femoral amputation
- [ ] Achieving independence with lower body dressing
- [ ] De-sensitisation of the stump
- [ ] Not strictly a stump preparation activity, but candidates should be able to dress themselves independently - enables an easier transition to donning/ doffing a prosthesis

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Delphi Survey: Round 3 (Final)

Dear colleagues, this is the third and final round of the Delphi survey on "Tailoring a pre-prosthetic training course for community care workers in a rural setting within South Africa". Thank you for your participation thus far, and taking the time to complete this final survey. See below the study information sheet as a reminder for your reference, and then please answer the following questions if you consent to participate in the study.

INFORMATION SHEET

Project Title: Tailoring a pre-prosthetic training course for community care workers in a rural setting within South Africa.

What is this study about?

This is a research project being conducted by Mr Jarryd Pagel at the University of the Western Cape. We are inviting you to participate in this research project because you are an expert in the field of rehabilitation medicine or prosthetic service delivery. The purpose of this research project is to tailor an existing pre-prosthetic training course for community based care workers in a rural setting in South Africa.

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

You will be asked to participate in a Delphi study in order to reach consensus on the content and format of the course. The Delphi study will be conducted online and will consist of three rounds of questions. The specific questions will depend on the outcome of a scoping review of the literature that will take place prior to the development of the Delphi survey. It will however pertain to issues such as the ideal duration of the course and the organisation of the content included in the course.

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Would my participation in this study be kept confidential?

The researchers undertake to protect your identity and the nature of your contribution. To ensure your identity will be protected and treated confidentially we will do the following: (1) your name will not be included on the surveys and other collected data; (2) a code will be placed on the survey and other collected data; (3) through the use of an identification key, the researcher will be able to link your survey to your identity; and (4) only the researcher will have access to the identification key.
To ensure your confidentiality, electronic data will be kept on the researcher's personal computer, in a password protected folder. If data is to be sent electronically, a security encryption message service will be used and the files will be labelled numerically or under an alias name.
If we write a report or article about this research project, your identity will be protected.

What are the risks of this research?

Any human interaction carries a certain amount of risk. There may be some risks from participating in this research study. If at any point you feel that you are traumatised by participating in this study, we will refer you to an appropriate health professional for counselling.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about the best practices in terms of developing a contextually relevant training
course for community based care givers. We hope that, in the future, individuals with a lower limb amputation living in a rural area in South Africa, might benefit from gaining access to pre-prosthetic rehabilitation services through training community care givers.

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 penalized or lose any benefits to which you otherwise qualify.

What if I have questions?

This research is being conducted by Mr Jarryd Pagel at the University of the Western Cape. If you have any questions about the research study itself, please contact Jarryd Pagel at: jarryd.pagel@gmail.com. Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

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This research has been approved by the University of the Western Cape's Health and Social Sciences Research Ethics Committee.
HSSREC, Research Development, UWC, Tel: 021 959 2988, email: research-ethics@uwc.ac.za

*Required

1. Do you understand the purpose of this study, and voluntarily consent to participate? *

Mark only one oval.

- Yes
- No

Section 2: Ideal format for course

The suggestions for the following section are based on the studies on community based care worker training from a scoping review of the literature, as well as suggestions made by experts who participated in the first and second round of the study. Options from the previous round on which participants did not reach consensus (<70%), are included in this final round of the survey, in an attempt to reach consensus on whether these items are relevant or not.

2. Duration of course: Please choose the option that you feel is most appropriate for the amount of time in which a training course for community based rehabilitation or care workers should be conducted. *

Tick all that apply.

- [ ] 6 months
- [ ] Depending on resources available, a mix of learning design could be used to make the most of face - face teaching and learning time and limit time that workers are required to be away from their job roles. (i.e. blended learning)

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3. Number of participants per training course: Please choose the option that you feel is most appropriate for the training of CBR workers, considering that both theory and practical techniques should be taught. *

Tick all that apply.

- [ ] <10
- [ ] 15-30
- [ ] 10-15

4. Do you feel that "mock scenarios for trainees" would be useful in training CBR workers in a rural setting? *

Tick all that apply.

- [ ] Yes
- [ ] No

5. How should the effectiveness of the training course be assessed? *

Tick all that apply.

- [ ] Close supervision after training
- [ ] Log book (or digital) recordings of daily patient treatments/interventions by each newly trained CBR worker
- [ ] Student feedback

Section 3: Content for basic amputation and prosthetic rehabilitation course

The nature of the CBR training program will focus mainly on preparing CBR workers to support and care for persons with lower limb amputations in rural settings, assist with stump care and rehabilitation, and pre-prosthetic functional training and rehabilitation.

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6. From your expert opinion, which section would you most recommend be added into a training course for basic amputation and prosthetic rehabilitation in a rural setting? *

Tick all that apply.

- [ ] Wound hygiene and dressings
- [ ] Prosthetics, including basic maintenance

7. Do you agree that "static quadriceps exercises" should be added into the ROM and strengthening exercises section? *

Tick all that apply.

- [ ] Yes
- [ ] No

8. Which of the following would you prefer be added into contracture prevention and management? *

Tick all that apply.

- [ ] Theory: Patient education
- [ ] ROM exercises, use of resting splint (splinting where necessary)

9. Which of the following would you prefer be added into the physical exercise section? *

Tick all that apply.

- [ ] Theory: Which exercises are safe to do and which not?
- [ ] How to incorporate physical activity into daily life, especially if now using a wheelchair.

10. Which of the following would you prefer be added into stump preparation for prosthetic fitting? *

Tick all that apply.

- [ ] Theory: Oedema control and shaping the stump
- [ ] De-sensitisation of the stump

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