MASTER OF SCIENCE IN PHYSIOTHERAPY DISSERTATION

THESIS

Physiotherapy Management of People with Peripheral Artery Disease in the Western Cape

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DECLARATION

I, Lisa Lauren Abrahams, hereby declare that the work on which this dissertation is based is my original work, except where acknowledgements indicate otherwise and that neither the whole work nor any part of it has been, is being, or is submitted for another degree at this or any other university.

I have used the APA convention for citation and referencing.

Signed by candidate

Lisa Abrahams

29 June 2023

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ABSTRACT

Physiotherapy management of people with peripheral artery disease in the Western Cape

Background

Peripheral artery disease is a growing public health burden of disability and death worldwide. This is especially the case in lower-income countries like South Africa. Peripheral artery disease is a risk factor for major cardiovascular events and a leading cause of non-traumatic lower limb amputations. In other countries, supervised exercise therapy has been proven to improve patient outcomes of pain and mobility. Community walking and treadmill walking to the point of claudication onset are established and effective forms of management for peripheral artery disease. These are challenged in an African context due to lack of resources or safety in the community. Minimal research has been done regarding conservative rehabilitation for people with peripheral artery disease in under-resourced environments. There is no known data about the physiotherapy management of people with peripheral artery disease in the Western Cape, South Africa. With ageing populations and risk factors such as obesity, sedentary lifestyle and diabetes mellitus expected to increase, it is of vital importance that we understand how this disabling condition is currently being managed in the Western Cape.

Aims

The primary aim of this study was to describe the physiotherapy management of people with peripheral artery disease in the Western Cape and to compare with local and international guidelines. The secondary aim was to describe the profile of peripheral artery disease patients attending the GSH and TBH vascular clinics.

Objectives

1. To determine the number of physiotherapists in the Western Cape currently managing people with peripheral artery disease using a researcher-designed online questionnaire.

2. To compare the current physiotherapy management of people with peripheral artery disease — as described by physiotherapists in the Western Cape — to the latest evidence-based management guidelines from the Vascular Society of Southern Africa and American Heart Association, respectively.

3. To determine the knowledge, attitudes and beliefs that physiotherapists currently working in the Western Cape hold about peripheral artery disease.

4. To describe the people with peripheral artery disease attending GSH and TBH vascular clinics in terms of demographics, peripheral artery disease risk factors, health-related quality of life (HRQoL), self-efficacy levels, pain severity and interference with function, using a researcher-designed survey (demographics), the EQ-5D (HRQoL), Self-Efficacy for Managing Chronic Diseases 6-item Scale (Self Efficacy) and the Brief Pain Inventory Short Form (pain severity and interference with function).

5. To determine patients' knowledge, attitudes and beliefs about peripheral artery disease at the GSH and TBH vascular clinics using a researcher-designed questionnaire.

Methodology

A quantitative study was conducted between July 2021 and January 2022 using an online survey to describe the physiotherapy management of people with peripheral artery disease in the Western Cape.

A cross-sectional study comprising of researcher-administered surveys was conducted with 141 patients who have peripheral artery disease presenting to the GSH and TBH vascular out-patient clinics between 12 November 2021 and 29 March 2022 to describe their patient profile in terms of demographics, risk factors, knowledge, attitudes and beliefs about peripheral artery disease, pain, HRQoL, self-efficacy and exercise behaviours.

Results

Seventy-one physiotherapists working in the Western Cape completed the voluntary, anonymous online survey regarding their management of people with peripheral artery disease. The majority of physiotherapists had between 1-5 years of work experience, practicing in the private healthcare sector in the City of Cape Town and had not received training for the management of peripheral artery disease. More than a third of the physiotherapists who were surveyed manage people with peripheral artery disease after undergoing a lower extremity amputation relating to gangrene. Participating physiotherapists reported that a wide range of treatment modalities are used to manage HRQoL, pain, impaired mobility, balance, gait speed and endurance with their patients that presented with peripheral artery disease.

A total of 141 people with peripheral artery disease attending the GSH and TBH vascular clinics consented and participated in this study, with an average age of 60 years. Nearly half of the patients smoke cigarettes and nearly 75% had hypertension. Interestingly, the presence of non-healing ulcers was dependent on patient's having diabetes mellitus.

Gender differences were significant for presence of greater interference with mood and more severe pain at worst and least pain severity in female than male patients. Despite moderate pain outcomes, patients reported no problems with self-care or usual activities and higher than expected self-efficacy scores. Exercise participation is extremely poor amongst patients and they require more support from healthcare workers regarding advice to walk as a form of exercise and stop smoking.

Conclusion

The findings of the physiotherapy survey highlighted the need for physiotherapists to receive training for managing people with peripheral artery disease at an undergraduate level. Short courses should be offered for working physiotherapists. Emphasis should be placed on promoting screening and referral at a primary healthcare level with focus directed on earlier detection and management of peripheral artery disease to promote patient self-efficacy through home exercise programmes and education. Local guidelines should be more aligned to an African context, acknowledging barriers to transport, smoking cessation programmes and late peripheral artery disease diagnosis.

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ABBREVIATIONS

ABI – Ankle-Brachial Index

AHA – American Heart Association

BPI-sf – Brief Pain Inventory short form

EQ-5D – EuroQol-5D

GSH – Groote Schuur Hospital

HIV – Human Immuno-deficiency Virus

HPCSA – Health Professions Council of South Africa

HREC – Human Research Ethics Committee

HRQoL – Health-Related Quality of Life

LMICs – Low-Middle Income Countries

NHRD – National Health Research Database

NSAID – Non-Steroidal Anti-Inflammatory Drug

OPD – Out-Patient Department

PAD – Peripheral Artery Disease

PASA – Physiotherapy Association of South Africa

SASP – South African Society of Physiotherapy

SD – Standard Deviation

TBH – Tygerberg Hospital

TENS - Transcutaneous Electrical Nerve Stimulation

VASSA – Vascular Society of Southern Africa

WCPG – Western Cape Provincial Government

GLOSSARY

Ankle-Brachial Index: “The ratio of ankle to brachial systolic pressure” (Casey, Lanting, Oldmeadow, & Chuter, 2019a).

Cardiovascular Disease: “An umbrella term for a number of linked pathologies, commonly defined as coronary heart disease, cerebrovascular disease, peripheral artery disease, rheumatic and congenital heart diseases and venous thromboembolism” (J. Stewart, Manmathan, & Wilkinson, 2017).

Chronic-Limb Threatening Ischemia: Most extreme form of peripheral artery disease with chronic rest pain, characterised by ulcers and gangrene (Uccioli et al., 2018).

Diabetes Mellitus: A collection of metabolic diseases where insufficient insulin action or release causes chronic hyperglycemia (Kharroubi & Darwish, 2015).

Dyslipidemia: Changes in total cholesterol concentration in plasma (Mosca et al., 2022).

Hypertension: Constantly elevated blood pressure (Oparil et al., 2018).

Lower extremity: the leg (hip to toes).

Peripheral Artery Disease: An atherosclerotic disease occluding blood flow to the peripheral arteries, especially in the legs (Shu & Santulli, 2018).

Sedentary: “Any waking behaviours characterised by an energy expenditure ≤ 1.5 METs, while in a sitting, reclining, or lying posture” (Tremblay et al., 2017).

CHAPTER 1: INTRODUCTION:

Peripheral artery disease is caused by the partial or complete obstruction of one or more peripheral arteries (Criqui & Aboyans, 2015; Padilla & Fadel, 2017). As peripheral artery disease progresses, arterial stenosis becomes more severe. Stenosis is the reduction in the surface area inside the peripheral arteries, wherethrough blood circulates to the limbs (Tran, 2021). This results in depleting arterial blood flow, worse for the lower extremities and causes intermittent claudication (Hennion & Siano, 2013). Intermittent claudication, defined as "pain in the lower extremities due to lack of blood flow and potentially oxygen to the leg muscles", is often mistaken with musculoskeletal injuries (Harwood et al., 2020). This is referred to as a discrepancy between oxygen supply and demand during movement, which explains symptom relief with rest (Englund et al., 2015).

According to Fontaine classification, peripheral artery disease can present in several forms. The most common form of peripheral artery disease presents asymptomatically (Fontaine stage I) or can be functionally limiting by symptom onset after walking 200 metres (Fontaine stage IIa) or less than 200 metres (Fontaine stage IIb) (Abdulhannan, Russell, & Homer-Vanniasinkam, 2012). Ischemic pain at rest (Fontaine stage III) and tissue loss, ulceration and gangrene (Fontaine stage IV) is experienced when arteries are further narrowed or occluded (Caldieraro-Bentley & Andrews, 2013). People with peripheral artery disease experience loss of mobility and poor function in walking due to ischemic pain relating to intermittent claudication (Hammond, Tian, Zhao, Zhang, & McDermott, 2021).

Peripheral artery disease affects more than 200 million people worldwide (Zemaitis, Boll, & Dreyer, 2021). In 2010, nearly 70% of people with peripheral artery disease worldwide were from low-income and middle-income countries (LMICs) like South Africa (Fowkes et al., 2013). Peripheral artery disease was one of the leading co-morbidities prevalent (nearly 80%) among 152 people who received a lower limb amputation at a hospital in Cape Town (Husein, Bougard, Naidoo, & Chu, 2021). People with peripheral artery disease often present to physiotherapists in South Africa once they have already undergone a life-saving lower extremity amputation relating to chronic limb-threatening ischemia (T. Kim, Mena, & Sumpio, 2020). Physiotherapists seldomly intervene in the rehabilitation of people with peripheral artery disease at a preventative level, potentially due to under-diagnosis or lack of interdisciplinary referral (Haigh, Bingley, Golledge, & Walker, 2013). Peripheral artery disease is frequently reported as being under-diagnosed worldwide due to the asymptomatic nature of the condition and lack of screening measures in place (Lin, Chen, Jiang, Li, & Xu, 2022). This is further supported by the lack of evidence for ankle-brachial index screening in patients with asymptomatic peripheral artery disease (Guirguis-Blake, Evans, Redmond, & Lin, 2018).

Peripheral artery disease is prevalent in older populations, up to a quarter in those over 70 years of age (Shu & Santulli, 2018) with other existing co-morbidities (Rafnsson & Fowkes, 2020). In the elderly, peripheral artery disease can be mistaken for musculoskeletal conditions and diabetes-associated neuropathy, which reduces the likelihood that accurate peripheral artery disease diagnostics are likely to be pursued (Hap, Biernat, & Konieczny, 2021). This is because peripheral artery disease has such inconsistent presentations and develops slowly, by the time symptoms are experienced these can be confused with muscle sprains, cramps or neural tension at common peripheral artery disease pain sites at hips, thighs, calf, ankle and foot (Walsworth, de Bie, Figoni, & O'Connell, 2017).

In the Western Cape, little exploration has been done on physiotherapy management of people with peripheral artery disease. South African physiotherapists are highly concentrated in Urban areas and the majority of the Western Cape is urbanized, namely the city of Cape Town (Morris et al., 2021). The Western Cape model of management of peripheral artery disease would serve as an example of the referral pattern because they already have established vascular out-patient clinics. South African research has been conducted in the Western Cape province (Parr, Noakes, & Derman, 2009) and a rural Eastern Cape population (Kumar, Mash, & Rupesinghe, 2007) regarding peripheral artery disease, but more evidence is needed regarding the profile of people with peripheral artery disease.

Considering the heterogeneity between people with peripheral artery disease and the debilitating nature of this chronic condition, it is important to identify the role of physiotherapists in the Western Cape in managing what is currently a poorly managed and poorly understood chronic disease. Physiotherapists are uniquely trained and qualified to equip patients to manage their chronic disease through exercise prescription, functional exercises, relaxation techniques, gait training and health education (Noumairi, Bouallala, El Mir, Allam, & El Oumri, 2021). Physiotherapists are important members of the multi-disciplinary team that can assess, diagnose and issue evidence-based exercise prescription to monitor symptom progression for appropriate referral and management (Walsworth et al., 2017). This may preserve health-related quality of life (HRQoL), function and pain-free walking distance in people with peripheral artery disease.

As is seen internationally, within suitable rehabilitation settings, people with peripheral artery disease can manage their condition and live a life with reduced pain and improved HRQoL (Casillas et al., 2011). Exercise is known to positively influence risk factors associated with peripheral artery disease and other cardiovascular diseases (Hap et al., 2021).

1.1 RESEARCH AIMS:

The primary aim of this study was to describe the physiotherapy management of people with peripheral artery disease in the Western Cape and to compare with local and international guidelines.

The secondary aim was to describe the profile of peripheral artery disease patients attending the GSH and TBH vascular clinics.

1.2 RESEARCH QUESTIONS:

1. What is the current physiotherapy management of people with peripheral artery disease in the Western Cape and compared to local and international guidelines?

2. What is the peripheral arterial disease profile of people with peripheral artery disease attending the Groote Schuur Hospital (GSH) and Tygerberg Hospital (TBH) vascular out-patient department?

3. What are the HRQoL, exercise behaviours, pain-, and self-efficacy levels of people with peripheral artery disease attending the vascular out-patient department at GSH and TBH?

4. What are the knowledge, attitudes and beliefs of physiotherapists currently working in the Western Cape regarding peripheral artery disease?

5. What are the knowledge, attitudes and beliefs of patients attending the GSH and TBH vascular clinics regarding peripheral artery disease?

1.3 STUDY OBJECTIVES:

4. To determine the number of physiotherapists in the Western Cape currently managing people with peripheral artery disease using a researcher-designed online questionnaire.

5. To compare the current physiotherapy management of people with peripheral artery disease — as described by physiotherapists in the Western Cape — to the latest evidence-based management guidelines from the Vascular Society of Southern Africa and American Heart Association, respectively.

6. To determine the knowledge, attitudes and beliefs that physiotherapists currently working in the Western Cape hold about peripheral artery disease.

4. To describe the people with peripheral artery disease attending GSH and TBH vascular clinics in terms of demographics, peripheral artery disease risk factors, health-related quality of life (HRQoL), self-efficacy levels, pain severity and interference with function, using a researcher-designed survey (demographics), the EQ-5D (HRQoL), Self-Efficacy for Managing Chronic Diseases 6-item Scale (Self Efficacy) and the Brief Pain Inventory Short Form (pain severity and interference with function).

5. To determine patients' knowledge, attitudes and beliefs about peripheral artery disease at the GSH and TBH vascular clinics using a researcher-designed questionnaire.

1.4 SIGNIFICANCE OF THE STUDY:

There is a substantial need for research into the management of individuals with peripheral artery disease in an African context, especially considering South Africa's quadruple burden of disease (Hofman & Madhi, 2020). Literature to date focuses on management post-amputation (Husein et al., 2021; Yu & Ennion, 2019) or surgical intervention (Steunenberg et al., 2018; Thukkani & Kinlay, 2015). Both the American Heart Association and the Vascular Society of South Africa's peripheral arterial disease management guidelines advocate for supervised cardiovascular exercise programmes and pharmacotherapy (Gerhard-Herman et al., 2017; N. Naidoo et al., 2022). Physiotherapists can develop home exercise programs and are able to provide supervised exercise therapy (Parr et al., 2009). Physiotherapists play a key role in the management of peripheral arterial disease as they can manage pain, provide supervised exercise therapy through gait re-education and strengthening, improve cardiovascular endurance and improve functional- and quality of life outcomes (Casillas et al., 2011; Lanzi, Fresa, Keller, Pedrazzoli, & Mazzolai, 2022).

Due to the initial asymptomatic nature of peripheral artery disease, lack of screening at a primary health level and overlapping symptoms with other conditions of the lower limb, peripheral artery disease remains under-diagnosed (Hirsch et al., 2001). During the COVID-19 pandemic, access to healthcare services was impacted globally and patients with diagnosed or undiagnosed peripheral artery disease was no exception. Fear of contracting the virus or reduced service provision further reduced the likelihood of patients seeking care for non-emergency procedures. By the time that many people with peripheral artery disease receive management or are diagnosed they already have severe functional impairments or tissue loss. This was especially detrimental to older people with vascular compromise and multiple co-morbidities whether they were infected with COVID-19 or not (Panzavolta, Zalunardo, Irsara, Ferretto, & Visonà, 2021).

The pathological process of peripheral artery disease reduces blood flow due to atherosclerosis in the peripheral arteries (Signorelli, Fiore, & Malaponte, 2014). Poorer circulation delays healing and increases the likelihood of non-healing ulcers or gangrene that result in lower extremity amputations (Meffen, Pepper, Sayers, & Gray, 2020). Up to 4% of people with peripheral artery disease will have an amputation (Steffen, Duprez, Boucher, Ershow, & Hirsch, 2008). Non-traumatic lower extremity amputations are largely preventable (Minc et al., 2021) and it is far more cost-effective to focus efforts on preventative management strategies than an estimated yearly R68 billion nationwide on full cost of medical intervention, equipment and rehabilitation for people with diabetes undergoing lower limb amputations (Thompson, Bruce, Kong, Clarke, & Aldous, 2020). Among people living with diabetes, peripheral artery disease is the main contributing cause of lower limb amputation (J. Kim et al., 2019).

A KwaZulu-Natal study explored the costs associated with lower-limb amputations and found that each patient that undergoes an amputation due to diabetes mellitus could cost the department of health R5 million including their hospital stay, surgery, prosthesis, assistive devices, wheelchair and counselling (Thompson et al., 2020). Indications for lower extremity amputation is largely spurred on by poor health literacy, unsanitary conditions and destitution in the Middle East and North Africa, where there is a mixture of high income, upper middle and LMICS (Al Wahbi, 2018). This is a reminder that poverty poses a threat to healthcare acquisition, especially to LMICs like South Africa (de Villiers, 2021). Similarly, in North America, people with lower education and lower economic status were more likely to have peripheral artery disease (Pande & Creager, 2014). Those in rural and under resourced areas may be unable to access free public health facilities due to financial barriers of transport costs and extreme distance (McLaren, Ardington, & Leibbrandt, 2014) to the closest hospital or clinic, specifically considering the distance between Groote Schuur Hospital and outlying townships in the city of Cape Town (de Villiers, 2021).

A European survey, including the United Kingdom, Greece, Italy, Spain, Netherlands, Germany, Switzerland and France explored home exercises for people with peripheral artery disease found that 48.1% of supervised exercise programmes are physiotherapist-led (Makris, Lattimer, Lavida, & Geroulakos, 2012). A study exploring the physiotherapy management of patients with peripheral arterial disease has not yet been conducted in the Western Cape or South Africa. Existing South African data on exercise in people with peripheral artery disease is limited (Parr et al., 2009) or focuses solely on a biomedical perspective (Kumar et al., 2007) and does not consider the person holistically or place enough value on outcomes such as HRQoL and self-efficacy (Parmenter, Dieberg, Phipps, & Smart, 2015).

Modifiable risk factors were identified in people with peripheral artery disease. If people with peripheral artery disease are able to manage their modifiable risk factors, such as diabetes mellitus, better then they may be able to avoid secondary complications and adverse cardiovascular incidents (Sethi & Arora, 2008). Other modifiable risk factors include smoking, hypertension, sedentary lifestyle, obesity, (Elfghi et al., 2021), renal disease, dyslipidemia (Garimella et al., 2012) and human immuno-deficiency virus (Kamdem et al., 2018). There are many known secondary complications such as stroke associated with the risk factors of peripheral artery disease. A local study attributed the stroke burden of disease to be 38% from hypertension and 20% from high BMI in rural South Africa (Maredza & Chola, 2016).

A local study conducted on hypertension and diabetes mellitus reported that patients in the public health sector have poor self-efficacy, health literacy and struggle with behaviour change because they are not empowered to understand and manage their chronic conditions (Murphy, Chuma, Mathews, Steyn, & Levitt, 2015).

Knowledge is a combination of facts and experiences (Sujarwoto, Holipah, & Maharani, 2022). As pain is a prominent symptom in people with peripheral artery disease (Hennion & Siano, 2013), understanding patients' pain, beliefs about the condition and prognosis, and self-efficacy levels may better guide physiotherapeutic management of peripheral artery disease in a South African context. This study has been the first of its kind to investigate pain mechanisms using the brief pain inventory in people with peripheral artery disease in the Western Cape. With ischemic pain being the major limiting factor (Abaraogu et al., 2020) to function and HRQoL in people with peripheral artery disease, this study hope to inform future research and management about the pain and patient presentation of people with peripheral artery disease that attended the vascular clinics at the two tertiary hospitals in the Western Cape. People tend to benefit from the affordability of accessing public health care facilities, when they do not have medical insurance, despite the difficulty accessing intervention and private healthcare often being superior quality (Govender et al., 2021). It is beneficial to promote self-efficacy of people with peripheral artery disease in the Western Cape, as there are many barriers to accessing private or public healthcare such as transport, finances, time, language, physical ability and capacity of healthcare facilities (Chiwire, Beaudart, Evers, Mahomed, & Hiligsmann, 2022; Cummins, 2002; Sutherns & Olivier, 2022).

Due to the presence of modifiable risk factors, it is important to equip people with peripheral artery disease to be more self-sufficient as these may improve lifestyle choices such as a more balanced diet and participation in regular physical activity (Sol, van der Graaf, van Petersen, & Visseren, 2011) in alignment with disease management. Chronic pain is common amongst people with peripheral artery disease (Seretny & Colvin, 2016) due to the nature of the ischemic disease pathway (Rüger et al., 2008).

Exercise, whether aerobic or anaerobic, has been established as an effective chronic pain management strategy, especially when person specific and accommodating co-morbidities and physical limitations (Ambrose & Golightly, 2015). The risk factors for peripheral artery disease such as older age and lifestyle related conditions correlate with lower levels of physical activity (Velescu et al., 2016). People with multiple co-morbidities and chronic pain are more likely to have impaired mobility (Brown & Flood, 2013). Physiotherapists can prescribe rehabilitation programmes to reduce pain and improve exercise compliance in people with peripheral artery disease (Yeom, Keller, & Fleury, 2009). Research favours treadmill walking (McDermott, 2018), despite relevance less applicable to community walking. Hydrotherapy, resistance training, community walking programs have proven to improve distance walked before onset of pain, improve function and HRQoL (Abaraogu et al., 2020; Makris, Lattimer, Lavida, & Geroulakos, 2012).

This study's significance largely concerns the potential for preventative physiotherapy involvement in the Western Cape to re-enforce the multi-disciplinary management of people with peripheral artery disease. To develop better management strategies, this study describes outcomes of people with peripheral artery disease and the management approaches of physiotherapists in the Western Cape.

1.5 RESEARCH SETTING:

This study was conducted in the Western Cape province, South Africa. The link to an electronic questionnaire was shared with physiotherapists working in the public and private sector in the Western Cape.

In South Africa, the healthcare system functions on a tiered public healthcare system, where people seek primary healthcare services first and are referred for further specialist care if necessary (Mofokeng, Ndlovu, Beshyah, & Ross, 2020). In the Western Cape there are two tertiary hospitals. GSH and TBH are both public (National Department of Health) hospitals and run vascular clinics for persons with peripheral arterial disease.

Tygerberg Hospital is a tertiary hospital, that runs speciality clinics that receive referral from primary health care centres or secondary hospitals. Tygerberg Hospital is located in the Northern suburbs of Cape Town with a 1384-bed capacity (Allwood et al., 2020). Tygerberg Hospital has a vascular clinic which held a weekly out-patient service where patients presented with newly diagnosed peripheral artery disease, lower limb amputations and a wide variety of vascular conditions such as femoropopliteal disease or abdominal aortic aneurysm. This clinic was held once a week on a Tuesday and featured a mixture of new and follow-up patients.

Groote Schuur Hospital is a tertiary hospital in the Southern suburbs of Cape Town with a 975-bed capacity. Groote Schuur Hospital hosts a well-established vascular clinic that operated in a different capacity to accommodate for the Covid-19 pandemic. GSH held different clinics each week specific to patients with varicose veins, vascular disease follow-ups and new referrals. For the purposes of this study, the clinic was attended by the researcher only on Fridays to interview new referrals, so that there would be no duplication of interviews by follow-up patients. Both the GSH and TBH out-patient clinics function with a waiting room where patients present their appointment card or referral letter and wait to be seen in the order that they arrive. Some participants arrive at around six o'clock in the morning, waiting up to three hours to be attended to. This worked in favour of the researcher as there was sufficient time in between the first attendee at the clinic and the first consultation with the doctor at about eight o'clock.

1.6 OUTLINE OF DISSERTATION:

Chapter 1 provides an introduction of peripheral artery disease and the relevance of this study.

Chapter 2 covers the literature review — including background- and related co-morbidities and impairments associated with peripheral artery disease.

Chapter 3 reports on the methodology used to conduct this research study.

Chapter 4 reveals the results obtained from the online physiotherapist survey and face-to-face patient survey conducted at two tertiary hospitals.

Chapter 5 discusses the findings of this study. The discussion covers the reported physiotherapy management of people with peripheral artery disease and profile of patients presenting to vascular clinics. Then, the self-reported knowledge, attitudes and beliefs of physiotherapists and patients is described. Study limitations, significance and recommendations for future research are included.

Chapter 6 highlights the main takeaway message from the study and what contribution this has made for the management of people with peripheral artery disease.

CHAPTER 2: LITERATURE REVIEW:

An extensive literature review was performed including published literature between January 2001 – June 2022. Online databases PubMed, SciELO, SAGE Publishing, South African Medical Journal, Google Scholar, Science Direct, Cochrane Library and Elsevier were used.

The following key words were used for the search:

(Self-efficacy) OR (Self-management) AND “Peripheral Artery Disease”

“Physiotherapy” OR physical therapy” AND “Peripheral Artery Disease”

Pain AND “Peripheral Artery Disease”

“Function” and “Peripheral Artery Disease”

“Health-Related Quality of Life” OR “Quality of Life” AND “Peripheral Artery Disease”

Exercise AND “Peripheral Artery Disease”

Hydrotherapy OR Aquatherapy AND “Peripheral Artery Disease”

Cycling AND “Peripheral Artery Disease”

Stretching AND “Peripheral Artery Disease”

The literature review will provide an overview of peripheral artery disease, its prevalence, risk factors and impact on function, health-related quality of life and pain. Thereafter, it will describe the latest physiotherapy evidence-based management of peripheral artery disease.

2.1 PREVALENCE OF PERIPHERAL ARTERY DISEASE:

In 2015, it was approximated that more than 236 million people worldwide were determined to have peripheral artery disease (Criqui & Aboyans, 2015). Of these, 72.91% were from lower-middle income countries (LMICs), like South Africa (Song et al., 2019). The global prevalence of peripheral artery disease doubled between 1990 and 2019 (Eid et al., 2021) and it continues to be a growing public health burden (Abaraogu, Dall, & Seenan, 2017). It is estimated that in the coming decades, peripheral artery disease will continue to pursue this increasing trend globally, especially in LMICs such as South Africa, as risk factors such as diabetes and smoking will presumably increase (Song et al., 2019). In a rural South African community with a high stroke prevalence, 12% had an ankle-brachial index of <0.9, which diagnosed them with peripheral artery disease (Thorogood et al., 2007). This study found equal prevalence in participants from urban and rural areas (Krishnan, Geevar, Mohanan, Venugopal, & Devika, 2018).

In Sub-Saharan Africa, community-based surveys revealed that between 3.1-24% of adults older than 65 had peripheral artery disease (Johnston et al., 2016). In other LMICs such as India, peripheral artery disease was prevalent in 26.7% of an elderly population (Krishnan et al., 2018). From limited Brazilian data on the prevalence of peripheral artery disease, a study found a 1.05% prevalence of peripheral artery disease in a population 18-102 years of age. In accordance with literature, peripheral artery disease was more prevalent (5.2%) amongst adults older than 70 years of age in this Brazilian population (Alvim et al., 2018).

The prevalence of peripheral artery disease is generally accepted as equal between men and women globally (Pabon et al., 2022), but there may be a slight tendency to be more common in women (52.23%) (Horváth et al., 2022). This may be due to women being more likely to be diagnosed with peripheral artery disease, as they tend to report greater perceived levels of pain, mood state changes, and interference with activities of daily living and function associated with peripheral artery disease (Gommans et al., 2015). With men reporting on average higher function scores on the Short Form 36 quality of life outcome measure, with lower scores describing worse functioning. With significant differences between physical function (36.4%), mood state (53.3%) and bodily pain (49.9%) than women (30.8%, 47.8% and 42.1% respectively) (Oka, Szuba, Giacomini, & Cooke, 2003).

2.2 PATHOPHYSIOLOGY:

Peripheral arterial disease is indicative of atherosclerosis in the lower extremities (Dua & Lee, 2016). Due to decreased blood flow to the lower extremities, macrovascular changes take place in the form of inflammation and vascular remodeling. When this is no longer enough to combat ischemia, microvascular changes take place in the form of angiogenesis (Pipinos et al., 2008). Prolonged insufficient tissue perfusion results in damage to the muscle fibres, pain at rest, non-healing wounds and gangrene (Krishna, Moxon, & Golledge, 2015). This inadequate oxygen supply to the skeletal muscles, required for mobility produces the major functional impairment in patients with symptomatic peripheral artery disease, which is reduced distance in walking due to intermittent claudication (Muller, Reed, Leuenberger, & Sinoway, 2013). The main contributing factors to poor walking in people with peripheral artery disease may include inflammation, diminished haemodynamics, arterial stiffness and atypical muscle features (Grenon et al., 2014). Claudication produces changes to ankle mobility and gait pattern, compared to before symptom onset (Celis et al., 2009).

Although peripheral artery disease is easily diagnosed with ankle-brachial index tests, it is frequently reported as under-diagnosed (Oyelade, OlaOlorun, Odeigah, Amole, & Adediran, 2012). The under-diagnosis of peripheral artery disease is mainly attributed to the asymptomatic nature of the condition or atypical presentation of people with peripheral artery disease, particularly in the early stages of the disease (Mourad et al., 2009). Poor understanding and cognisance of peripheral artery disease by patients and even medical practitioners further exacerbates the issue of under-diagnosis (Afzal et al., 2017).

2.3 CLINICAL ASSESSMENT AND DIAGNOSIS OF PERIPHERAL ARTERY DISEASE:

2.3.1 SIGNS AND SYMPTOMS:

Clinical assessment of a patient suspected to have peripheral artery disease includes identifying potential risk factors such as being older than 65 years, the presence of atherosclerosis risk factors (smoking, hypertension, hyperlipidaemia), diabetes mellitus and other diseases of atherosclerotic origins. The general history taking should include identifying the symptomatic patient presentation (Spannbauer et al., 2019). Intermittent claudication — the main complaint of patients with symptomatic peripheral artery disease — is described as pain in the lower extremities which is brought on by exercise and alleviated with rest (Abaraogu, Dall, & Seenan, 2017).

Signs indicative of peripheral artery disease include abnormal pulses, audible bruits, non-healing lower extremity wounds, ulcers or gangrene, elevation pallor, delayed capillary refill and cold extremities (Tummala & Scherbel, 2018). During a clinical assessment, the peripheral pulses should be palpated and documented as present, absent or weak and compared with the alternate extremity. The femoral popliteal, posterior tibial and dorsalis pedis pulses should be palpated and can be done so by physiotherapists, nurses or medical doctors (Bailey, Griffin, & Scott, 2014; Spannbauer et al., 2019). During gait assessment it is important to assess pain-free walking distance and maximum claudication distance (Spannbauer et al., 2019).

Peripheral artery disease is classified frequently in literature using the Fontaine and Rutherford-Becker classifications as shown in Table 1.

Table 1: Classification of peripheral artery disease (Dua and Lee, 2016)

Fontaine classification	**Rutherford-Becker classification**	**Definition**	**Ankle-Brachial Index (ABI) or Toe Pressure**
Stage I	Grade 0	Asymptomatic	ABI > 0.95
Stage IIa	Grade I	Mild claudication	ABI > 0.80
Stage IIb	Grade I	Moderate-severe claudication	ABI > 0 .40
Stage III	Grade II	Ischemic rest pain	ABI <0.40
Stage IV	Grade III	Tissue loss	Toe Pressure < 30 mmHg

2.3.2 SPECIAL INVESTIGATIONS:

The diagnostic golden standard in peripheral artery disease is the ankle-brachial index, a non-invasive blood pressure measurement dividing the highest ankle pressure by the highest arm pressure (Migliacci, Nasorri, Ricciarini, & Gresele, 2008). A doppler probe or sphygmomanometer are used to measure the ankle-brachial index (Crawford, Welch, Andras, & Chappell, 2016; Song et al., 2019). Additional diagnostic imaging such as ultrasound, magnetic resonance imaging (Krishna, Moxon, & Golledge, 2015) or computed tomography may also be used when necessary. Diagnostic imaging is unwarranted in most cases, unless for purposes of intervention monitoring or to assess arterial occlusion (Conte & Vale, 2018).

2.3.3 ANKLE-BRACHIAL INDEX:

An ankle-brachial index test should be conducted by a physician if symptoms include claudication, abnormal lower extremity symptoms (unrelated to joints), decreased walking functioning, ischaemic rest pain or any non-healing wounds (Tummala & Scherbel, 2018). An ankle-brachial index < 0.9 can predict future cardiovascular and cerebrovascular events, cardiovascular disease associated morbidity and mortality (Nie, He, Cao, & Hu, 2021).

Unfortunately, despite its proven ability to forecast the presence of atherosclerosis (Mourad et al., 2009), the ankle-brachial index is not utilised to its full potential in the clinical setting (Rac-Albu, Iliuta, Guberna, & Sinescu, 2014). The ankle brachial index is proven reliable, although studies have found bias and inconsistencies between testers (Brouwers, Willems, Goncalves, Hamming, & Schepers, 2022) using automated ankle-brachial testing (Chongthawonsatid & Dutsadeevettakul, 2017). A systematic review suggests that the ankle-brachial index is reliable but that studies enter into the review may have validity issues due to the nature of manual mechanical testing (Casey, Lanting, Oldmeadow, & Chuter, 2019b).

A normal ankle-brachial index is classified as 1.0-1.3, with criteria to diagnose peripheral artery disease as 0.7-0.9 being mild, 0.4-0.7 being moderate and < 0.4 being severe (Firnhaber & Powell, 2019). A low ankle-brachial index is a result of blood flow blocked off by atherosclerotic plaque, as well as arterial wall changes and inadequate vasodilation (Muller, Reed, Leuenberger, & Sinoway, 2013). An ankle-brachial index > 1.4, characterised by hardened blood vessels (T. Khan, Farooqui, & Niazi, 2008), common among those with obesity, diabetes mellitus and renal disease and it is associated with calcification of the blood vessels and decreased quality of life (Allison, Hiatt, Hirsch, Coll, & Criqui, 2008; Hennion & Siano, 2013; Rac-Albu et al., 2014). High (>1.4) and lower (<0.9) ankle-brachial index scores are associated with functional limitations that mostly translate to walking impairment due to intermittent claudication (Allison et al., 2008).

2.4 RISK FACTORS:

Among people with peripheral artery disease, it is common to struggle with controlling risk factors such as hypertension, diabetes and smoking (Pohlman et al., 2022). People with peripheral artery disease present with additional co-morbidities, many of which are known risk factors for the condition. Non-modifiable risk factors include advancing age (65 years and older), ethnicity, high C-reactive protein levels (Due & Lee, 2016; Morcos et al., 2018; Olin & Sealove, 2010). Modifiable risk factors include smoking, diabetes mellitus, hypertension, renal disease, dyslipidaemia, obesity and sedentary lifestyle (Dua & Lee, 2016). Modifiable risk factor management such as medication compliance, engaging in a physically active lifestyle and smoking cessation is important for controlling the progression of atherosclerosis, which increases risks of morbidity and mortality (Sethi & Arora, 2008). The risks of sub-standard risk factor control are highlighted in section 2.5.

2.4.1 NON-MODIFIABLE RISK FACTORS:

2.4.1.1 Age:

A linear relationship exists between age and peripheral artery disease. Those older than 70 years of age are the most at risk for peripheral artery disease (Dua & Lee, 2016). In the Western Cape, 342 226 people were over the age of 65 years in 2011 (Statistics South Africa, 2012). In a study of 3.6 million participants, more than 20% of 80-89 year-old participants presented with vascular disease in at least one artery, and more than 30% among those aged 90-99 years (Savji et al., 2013).

2.4.1.2 Ethnicity:

A large portion of the Western Cape population presents with known risk factors for peripheral artery disease, including being of Black and Coloured ethnicity. The San Diego Population Study regarding ethnicity and peripheral artery disease found Black ethnicity to be a consistent non-modifiable risk factor for peripheral artery disease, possibly due to genetics, but the results of the study are inconclusive (Criqui et al., 2005). The 2011 South African census information revealed that there were 5822 734 people living in the Western Cape. Of this population, 48.8% were Coloured, 32.8% Black African, 15.7% White, 1.0% Asian or Indian and 1.6% other (Statistics South Africa, 2012). Therefore, 81.6% of the population in the Western Cape are potentially at risk of developing peripheral artery disease. A study conducted in Bellville, Western Cape confirmed a significant prevalence (28.2%) of diabetes mellitus in a Coloured population, (Erasmus et al., 2012), which is a risk factor for peripheral artery disease that is known to exacerbate the disease process into chronic limb-threatening ischaemia (Achim et al., 2022). According to the Genetic Epidemiology Network of Arteriopathy (GENOA) study, a lower ankle-brachial index was predicted in African-American patients (Dua & Lee, 2016).

2.4.1.3 C-Reactive Protein Levels:

Capsular-polysaccharide Reactive Protein (CRP) is a widely used non-specific test marker for acute inflammation in blood (Shankar, Li, Nieto, Klein, & Klein, 2007). CRP may be described as a marker of the peripheral artery disease severity; The more advanced atherosclerosis becomes, the higher the CRP levels (Garofolo, Ferreira, & Miranda, 2014). CRP is associated with a greater likelihood of future thrombosis (Ziegler, Hedin, & Gottsäter, 2022) and higher amounts of CRP are associated with reduced distances in walking (Vainas et al., 2005).

2.4.2 MODIFIABLE RISK FACTORS:

Modifiable risk factors of peripheral artery disease include many conditions of lifestyle. These are medical conditions which cannot be stopped entirely but can be better controlled. The literature suggests that improved compliance to lifestyle modification and adherence to medication (Sunner, Welsh, & Bainey, 2021) can slow down the progression of peripheral artery disease and prevent secondary complications (Lecouturier et al., 2019).

Some recommendations could include smoking cessation, improved blood glucose control and increased physical activity. Modifiable risk factors include smoking, diabetes mellitus, hypertension, renal disease, human immuno-deficiency virus, sedentary lifestyle, and obesity.

2.4.2.1 Smoking:

Smoking is the primary risk factor for peripheral artery disease (Fowler, Jamrozik, Norman, & Allen, 2002). A 2015 study found that 17.6% of South Africans over the age of 18 years smoked tobacco. The Western Cape had the most reported smokers (32.9%) in the country (Reddy, Zuma, Shisana, Kim, & Sewpaul, 2015). Smokers are 80% more likely to have intermittent claudication than non-smokers (Yathish, 2010).

2.4.2.2 Diabetes Mellitus:

Diabetes mellitus is a disease described by higher levels of glucose in the blood (Sapra & Bhandari, 2022) and hyperglycemia is a result of inadequate insulin action or secretion (American Diabetes, 2010). Diabetes mellitus has been described as a global pandemic (Unnikrishnan, Pradeepa, Joshi, & Mohan, 2017), affecting more than 1.8 million South Africans (Sahadew & Singaram, 2019). People with diabetes mellitus and peripheral artery disease are twice as likely to suffer with intermittent claudication and up to ten times more likely to require a life-saving amputation than non-diabetics (Dua & Lee, 2016). Poor glycemic control, usage of insulin and longer length of time as a diabetic affect the severity of peripheral artery disease progression (Criqui & Aboyans, 2015). The percentage of the South African population with Type 2 Diabetes Mellitus is expected to increase due to urbanisation, sedentary lifestyle, and easier access to energy-dense foods (Coetzee et al., 2019). This is seen in the percentage of South African's, aged 20 to 79 years old living with diabetes increasing from 4.5% to 12.7% between 2010 and 2019 (Grundlingh, Zewotir, Roberts, & Manda, 2022).

2.4.2.3 Hypertension:

Hypertension is defined as persisting blood pressure above 130/80mmHg (Flack & Adekola, 2020). In 2015, 26.9% of the South African population over the age of 18 had hypertension, one of the major risk factors for cardiovascular disease (Jongen et al., 2019). People with peripheral artery disease and hypertension require blood pressure control in order to mitigate the danger of stroke and cardiovascular related incidents (Itoga et al., 2018). The American Heart Association (AHA) endorses targeted blood pressure control at 130/80 mmHg (Fudim et al., 2020; Fudim & Jones, 2018). Conversely, the EUCLID (Examining the Use of Ticagrelor in Peripheral Artery Disease) trial revealed that systolic blood pressures below 135 were closely related to major adverse cardiovascular events (Fudim et al., 2020).

2.4.2.4 Renal Disease:

Renal disease describes functional and structural kidney irregularities (Chen et al., 2017; L. Lu et al., 2017) and is four times as prevalent in South Africa, as in first-world countries (Naicker, 2009). Globally, about 10% of the world has varying degrees of chronic kidney disease (CKD) (Sundström et al., 2022). Due to under-diagnosis, it is assumed that approximately 5 million South Africans have CKD (Meyers, 2015). The incidence of peripheral artery disease in populations with CKD is between 10-20% (Garimella et al., 2012).

2.4.2.5 Dyslipidemia:

Dyslipidemia is a disorder caused by plasma lipid irregularities and poor clearance of low-density lipoprotein cholesterol from plasma (Bays et al., 2013). Higher levels of low-density lipoprotein cholesterol exasperates atherosclerosis, the primary cause of peripheral artery disease (Obsa et al., 2022). Up to 89.9% of the African population have dyslipidemia (Dave et al., 2016). The Health and Aging in Africa: A Longitudinal Study of an In depth community in South Africa (HAALSI study) found that in a rural South African population, two thirds had dyslipidemia, less than a third were aware of their diagnosis and less than 1% were taking medication to control it (Ntusi, 2018).

Triglyceride-rich lipoprotein particles are the predominant risk factors associated with lipids for peripheral artery disease (Aday & Matsushita, 2021). Diminished low-density lipoprotein cholesterol levels correlate with decreased adverse cardiovascular and adverse limb events (Bonaca, Hamburg, & Creager, 2021). A South African cross-sectional study found that raised triglycerides were the most prevalent form of dyslipidemia in rural populations in Mpumalanga and peri-urban Eastern Cape region (Masilela, Adeniyi, & Benjeddou, 2022). Participants who were obese, sedentary (physically inactive) and Zulu had a greater chance to have raised low-density lipoprotein cholesterol levels, yet Xhosa participants were unlikely to have raised triglycerides levels (Masilela et al., 2022). This compares to participants who were sedentary, did not consume fruits and vegetables and had diabetes mellitus were more probable to have raised triglyceride levels (Masilela et al., 2022).

2.4.2.6 Human Immuno-deficiency Virus (HIV):

South Africa is the most HIV prevalent country in the world, with approximately 7.7 million people living with HIV in 2018 (van Schalkwyk et al., 2021). Many studies have revealed strong links between human immuno-deficiency virus (HIV) infection and the treatment thereof with peripheral artery disease due to secondary complications such as vasculopathy (Johnston et al., 2016). This could be due to chronic use of antiretroviral drugs and dyslipidaemia, a known risk factor for peripheral artery disease (Agu, Uchendu, Nsonwu, Okwuosa, & Achukwu, 2019).

The likelihood of patients with HIV developing peripheral artery disease increased by 19% (Beckman et al., 2018), compared to uninfected populations, with less likelihood of developing peripheral artery disease in those on antiretroviral treatment (Kamdem et al., 2018). HIV infected populations with a CD4 cell count higher than 500 cells/mm3 have the same probability of developing peripheral artery disease as uninfected populations. This is compared to those with CD4 counts lower than 200 cells/mm3, who are twice as likely to develop peripheral artery disease, considering immune suppression with higher viral loads (Belgrave, Shaikh, & Budoff, 2018).

2.4.2.7 Sedentary Lifestyle:

Sedentary lifestyle correlates with incidence of peripheral artery disease (Padilla & Fadel, 2017). The definition of sedentary includes any activities that require 1.5 or less metabolic equivalent task such as sitting at a computer or watching television (J. Park, Moon, Kim, Kong, & Oh, 2020). Physical activity improves glycemic control, normalises blood pressure and raises high-density lipoprotein cholesterol (Schiattarella et al., 2014). A large population study in the United States of America found that those who participated regularly in vigorous physical activity were less likely to have peripheral artery disease (Stein et al., 2015).

2.4.2.8 Obesity:

Obesity is well established for its causation of cardiovascular related disease (Li et al., 2021) and is defined by a body mass index of more than 30 kg/m2 (Apovian, 2016). However, conflicting opinions are still reported in literature about the relationship between obesity and peripheral artery disease (Galal, van Gestle, & Hoeks, 2009). Data from an epidemiological study on the insulin resistance syndrome study (D.E.S.I.R.) found that after nine years, overweight or obese people were no more likely to have peripheral artery disease than those with a healthy weight (Skilton et al., 2011).

However, a heavily populated study of over 3 million people conducted in United States of America (data from the Life Line Screening Inc.) found that in women who had self-referred for vascular tests, a higher body mass index is an independent risk factor for peripheral artery disease (Heffron et al., 2020). A community-based study in China also reported that obesity poses a causal relationship with peripheral artery disease (Huang, 2016). A study found that in healthy obese populations with no smoking history, strong correlations between obesity and peripheral artery disease were found. However, these findings were not transferable for the greater community (Ix et al., 2011) — a contradiction which may be a result of the 'obesity paradox'. This phenomenon suggests that despite the known risks of obesity, it is conversely associated with acute vascular complications such as the need for amputation, surgical intervention, length of stay and mortality (Ludhwani & Wu, 2019).

2.5 HEALTH CONDITIONS ASSOCIATED WITH PERIPHERAL ARTERY DISEASE:

Peripheral artery disease is associated with unfavourable cardiovascular related events such as myocardial infarction, stroke, and non-traumatic limb amputation (Sutton, Kreider, Thompson, Germanwala, & Greifenkamp, 2018). Transient ischemic attack and ischemic stroke can occur regularly in patients with symptomatic peripheral artery disease, according to the EUCLID trial this was 2.4% (Kolls et al., 2019).

In its most severe form, peripheral artery disease is presented by chronic limb-threatening ischaemia, which is highly associated with risk of limb loss. Atherosclerotic peripheral artery disease results in a need for lower extremity amputation, which has a five-year survival rate of less than 30% and an acute mortality rate around 30% (Dua & Lee, 2016). Limb salvage is essential to prevent reduced HRQoL and maintain ambulation (Imaoka, Sato, Hurukawa, & Higashi, 2019). Health-related quality of life is reduced in people with peripheral artery disease, similar to other cardiovascular diseases, mostly due to physical impairments such as calf pain that reduces walking ability (Regensteiner et al., 2008).

Since the discovery of the Coronavirus SARS-CoV-2 (COVID-19), case studies have reported instances where patients have had severe vascular related complications with delayed access to healthcare services due to the global pandemic (Schuivens et al., 2020). These can be attributed to a myriad of factors such as delayed diagnosis due to fear of hospitalisation and contracting COVID-19, decreased mobility during lockdown and the effects of the viral inflammatory cytokine storm response seen in those that have contracted COVID-19 with pre-existing vascular complications (Panzavolta et al., 2021).

It is well established that vascular disease is strongly linked to poorer cognitive functioning (Gutierrez, Marshall, & Lazar, 2015). People with peripheral artery disease have greater chances of faring unsuccessfully in neuropsychological testing and having cognitive impairment, than in healthy controls (Joyce et al., 2022). These include cognition assessments identified poorer memory, decreased attention, executive functioning, visuospatial memory and processing speed in people with peripheral artery disease, than in those without peripheral artery disease (Rafnsson, Deary, & Fowkes, 2009). A lower ankle-brachial index can anticipate poor outcomes in processing speed, verbal fluency and non-verbal reasoning (Price et al., 2006).

2.6 IMPACT ON PHYSICAL FUNCTION:

Claudication in the peripheral artery disease population limits walking distance and speed, even though more than 50% of people with peripheral artery disease are asymptomatic (Høyer, Sandermann, & Petersen, 2013; Rammos et al., 2021; Weragoda, Seneviratne, Weerasinghe, Wijeyaratne, & Samaranayaka, 2015), while other forms of cardiovascular disease are associated more with complaints of functional limiting dyspnea, heart palpitations and chest pain (Regensteiner et al., 2008).

A 2004 study found that after 2 years, patients did not report worsening of claudication symptoms, as their functional level may be decreasing, which postulates that patients, therefore, won't be aware of their deterioration because they no longer walk to a point of exertion (McDermott et al., 2004). The Walking and Leg Circulation Study found that patients with an ankle-brachial index of < 0.90 were more likely to have poorer walking endurance, slower walking velocity and impaired standing balance, than those with a normal ankle-brachial index (McDermott et al., 2002). Patients with a lower ankle-brachial index tend to be less physically active and decline faster functionally (McDermott, 2013). Due to claudication, patients are inclined to walk less and, therefore, have reduced functional capacity over time (Mays et al., 2011).

2.7 HEALTH-RELATED QUALITY OF LIFE:

Health-related quality of life (HRQoL) is the perception of one's physical, mental and social health status (Clennin et al., 2015) which provides multidimensional insight regarding how disease affects one's life and responses to treatment (Regensteiner et al., 2008). Health-related quality of life is a strong predictor of long-term survival, and people with peripheral artery disease tend to have reduced HRQoL compared to individuals without peripheral artery disease (Parmenter, Dieberg, Phipps, & Smart, 2015).

Numerous factors such as sex, age, function, health complications and treatments that people with peripheral artery disease receive affect their HRQoL (Liles, Kallen, Petersen, & Bush, 2006). Lower ankle-brachial index results often relate to poorer outcomes in people with peripheral artery disease (Crawford, Welch, Andras, & Chappell, 2016). However, diagnostics and standardised outcome measures are unable to fully describe the severity of impairment that people with peripheral artery disease experience, particularly regarding their HRQoL (Koureas, Theodorou, & Samoutis, 2017). This is most likely attributable to ankle-brachial index or doppler testing describing the severity of occlusion, but not necessarily the level of functional impairment (AbuRahma et al., 2020). People with peripheral artery disease have reduced social and vocational participation and are more likely to cease working due to symptoms associated with peripheral artery disease (Mays et al., 2011).

A multi-national study found that amongst employed people with peripheral artery disease (average age in their forties), vocational strain experienced was similar to that of people with other coronary artery diseases (Heikkilä et al., 2020). People with intermittent claudication that achieve greater distances in the six-minute walk test tend to have superior HRQoL outcomes in social and physical components (Golledge et al., 2020). The Edinburgh study found that people with intermittent claudication had significantly reduced HRQoL compared to those with asymptomatic peripheral artery disease and those without peripheral artery disease (Dumville, Lee, Smith, & Fowkes, 2004).

2.8 PAIN:

Vascular diseases may occur as a range of painful presentations. Musculoskeletal, neuropathic, nociceptive and inflammatory pain mechanisms frequently plague people with peripheral artery disease (Seretny & Colvin, 2016). It is suggested that pain mechanisms can change along the peripheral artery disease spectrum from experiences of nociceptive pain in symptomatic intermittent claudication to proportionately more neuropathic pain in patients with chronic-limb threatening ischaemia (Rüger et al., 2008). Chronic widespread pain is seen in nearly double as many people with peripheral artery disease as in the general population (Lindgren, Pärsson, Gottsäter, & Bergman, 2017). Physiotherapists play a key role in providing alternative chronic pain management strategies, especially when pharmaceutical pain management can be complicated by the presence of multiple co-morbidities (Seretny & Colvin, 2016). In a small study, using quantitative sensory testing, sensory impairment was worse in advanced stages of peripheral artery disease (chronic limb-threatening ischemia), reduced temperature discernment (warm or cold) and it is proposed that central sensitisation contributes to the debilitating pain experienced by people with peripheral artery disease (Lang et al., 2006).

2.9 CLINICAL MANAGEMENT OF PERIPHERAL ARTERY DISEASE:

2.9.1 MANAGEMENT GUIDELINES:

Management guidelines have been compiled both internationally and nationally by the American Heart Association (AHA) and Vascular Association of South Africa (VASSA) respectively. Clinical decision-making takes all the patient's co-morbidities and risk factors into account (Gerhard-Herman et al., 2017). Patients with intermittent claudication (Fontaine I-II) generally benefit from physiotherapy interventions by reducing claudication symptoms and improving functional outcomes, while patients classified as Fontaine stage III-IV (ischemic rest pain, ulceration and gangrene) generally require invasive treatment approaches because of the advanced disease process to experience any symptom relief. Therapeutic education, which boosts treatment efficacy, can be carried out by physiotherapists, nurses and vascular specialists (Spannbauer et al., 2019).

When weighing up hospitalisation costs, risks of mortality and morbidity and functional and medical outcomes, it is debatable whether conservative or invasive treatments yield better outcomes for people with peripheral artery disease on balance. Invasive approaches tend not to produce long term improvement in HRQoL or walking capacity (Djerf et al., 2020). Endovascular therapy, including stenting and balloon angioplasty (Thukkani & Kinlay, 2015) alone do not improve functional capacity (Pandey et al., 2017), are more expensive and less durable than exercise. Exercise is favoured over endovascular treatments at earlier stages since it is more cost efficient (Malgor et al., 2015).

2.9.2 EXERCISE:

Exercise improves endothelial function, muscle metabolism, exercise pain tolerance, induces vascular angiogenesis, limb oxygenation and may delay disease progression (Haas, Lloyd, Yang, & Terjung, 2012, Vascular Society of Southern Africa, 2012). Patients who are unable to attend physiotherapist-led supervised exercise therapy sessions, require behaviour change techniques on performing exercises independently at home (McDermott, 2018, Gerhard-Herman et al., 2017). Behaviour change techniques with motivation in a physiotherapist-led walking intervention have proven to increase walking distance (on average about 20m) over three months (Bearne et al., 2022).

Physical activity directly affects atherosclerosis, by reducing the creation of cytokines that produce inflammation (Peñín-Grandes et al., 2022) and aerobic exercise decreases the progression of adhesion molecules (Palmefors, DuttaRoy, Rundqvist, & Borjesson, 2014). Exercise for patients with chronic limb-threatening ischaemia has not been extensively researched, and therefore may be detrimental and is discouraged. Resting from exertional leg pain avoids injury to endothelium from the 'ischaemia-reperfusion injury' that takes place during intermittent claudication (Nawaz et al., 2001). There is potential for rehabilitative walking to be done once patients with chronic limb-threatening ischaemia have undergone revascularisation (Conte et al., 2019), however, further evidence is required to justify that benefits outweigh the possible risks.

The 2020 Vascular Society of Southern Africa (VASSA) guidelines recommend progressive, supervised cardiovascular training of either treadmill walking or lower extremity aerobics for patients with claudication (N. Naidoo et al., 2022). The VASSA recommend that exercise should be performed at least three times a week for a minimum of three hours per week, to manage peripheral artery disease and patients with diabetes mellitus should be supervised while they exercise, wearing appropriate footwear (N. Naidoo et al., 2022).

The American Heart Association (AHA) guidelines recommend exercise programmes consisting of intermittent walking exercises with or without cardiac rehabilitation in a hospital or out-patient facility, directly supervised by a healthcare provider (Gerhard-Herman et al., 2017). Sessions should be between 30 and 45 minutes long, three times a week for a minimum of 12 weeks, including intermittent walking and rest stints, exacerbating moderate to maximum claudication with warm-up and cool-down exercises (Gerhard-Herman et al., 2017).

In a South African randomized control trial of only thirty participants, it was found that a conventional six-week exercise rehabilitation programme was more effective in improving patient treadmill maximum walking distance, pain-free walking distance and peak oxygen uptake than upper body strength training and verbal encouragement to walk as much as possible (Parr et al., 2009).

The most advantageous combination of exercise prescription may be "high intensity, non-walking aerobic exercise" and intermittent walking (Parmenter, Dieberg, & Smart, 2015). In the Western Cape, supervised exercise therapy three times a week may be limited by transportation or financial barriers. Peripheral artery disease rehabilitation can be conducted using home exercise programmes (Askew, Parmenter, Leicht, Walker, & Golledge, 2014). A randomized control trial of 168 participants in North America found that home-based exercise programme that incorporated group-mediated cognitive behaviour interventions has proven to be more effective in improving walking endurance, patient-perceived walking speed and endurance and physical activity levels when compared to health education alone over 12 months (McDermott et al., 2013), which may not be feasible in South Africa.

Less frequently explored treatment techniques include Nordic walking, Buerger's training, stationary bike cycling, upper limb exercises, electrotherapy and hydrotherapy. These have established benefits to increase peripheral blood flow, provide pain relief and decrease inflammation (Chang, Chang, & Chen, 2015; Spannbauer et al., 2019). These are further described below.

2.9.2.1 Weight bearing Exercises

Treadmill walking improves maximum treadmill walked distance, but does not effectively replicate walking in the community most likely due to the training process improving what is practiced or repeated (McDermott et al., 2020). A rehabilitation review of physiotherapy for peripheral artery disease found poor durability of supervised treadmill walking at a 12-month follow up with little to no difference in 6-minute walk distance, compared to control groups (McDermott, 2018). Marching for 20 to 45 minutes twice a day, stair climbing, Nordic walking and Buerger's training may all be beneficial in improving peripheral blood flow, although there is not extensive research involved in these treatment modalities (Chang, Chang, & Chen, 2015; Spannbauer et al., 2019).

These walking alternatives may be beneficial to replicate walking programs that is a proven effective management strategy for people with peripheral artery disease because walking as a form of exercise will improve walking outcomes (McDermott et al., 2021). A community-based walking programme with training, monitoring and coaching elements over 14 weeks improved patient outcomes in the walking impairment questionnaire and claudication onset time, compared to advice to walk (Mays et al., 2015). It is established that just providing advice or verbal motivation to "walk as much as possible" is not an effective form of treatment in people with peripheral artery disease (Parr et al., 2009). This may be because unsupervised advice is difficult to follow by untrained people with peripheral artery disease (Mays, Rogers, Hiatt, & Regensteiner, 2013). It is advised to conduct an education session in an out-patient setup to optimise the skills necessary for self-management, as opposed to a hasty discharge after conservative or invasive management (Abaraogu, Ezenwankwo, Dall, & Seenan, 2018).

2.9.2.2 Non-weight bearing Exercise:

Stationary bike cycling is a suitable aerobic alternative to walking if exercise sessions avoid dyspnea and claudication symptoms. However, lower limb cycling was found to be inferior to treadmill walking over a 6 week period, most likely due to the conditioning process of training in walking to improve walking outcomes (Sanderson et al., 2006). Upper limb exercises have been hypothesised to improve patient gait as a result of cardiovascular training and should be completed at 50-75% of the patient's maximum heart rate (calculated as 220 – age) to prevent any damage to myocardium (Spannbauer et al., 2019). Upper limb aerobic exercise for 20 minutes, twice a week for 12 weeks resulted in 30% improvement of Maximum Walking Distance and claudication onset distance improved by 50% (Treat-Jacobson et al., 2019).

2.9.2.3 Water-based Exercise:

Hydrotherapy is known for improving circulation and the function of the peripheral blood vessels and the cardiovascular system (Spannbauer et al., 2019). An intensive 12-week study in South Korea reported that in asymptomatic peripheral artery disease and patients with intermittent claudication, exercise tolerance, cardiorespiratory capacity and muscular strength increased with underwater walking and lower limb exercises (S. Park, Kwak, & Pekas, 2019). One hour group sessions were held four times a week with participants in waist or chest deep in water (S. Park et al., 2019). A 12-week randomised control trial in New Zealand investigated the effects of 90 minutes of supervised exercise therapy and gym-based exercises for 1-2 days per week and hot water immersion for about 30 minutes for 3-5 days per week followed by about 30 minutes of calisthenic exercises (Akerman et al., 2019).

Heat therapy in a spa bath at 39° Celsius was found to normalise resting blood pressure and enhanced walking distance in people with peripheral artery disease (Akerman et al., 2019).

2.9.3.4 Electrotherapy:

Transcutaneous electrical nerve stimulation (TENS) improves exercise capacity (Pellinger, Pearce, & Simmons, 2017), by increasing blood flow to the outermost tissues (Besnier et al., 2017). It may be beneficial to apply TENS to the lower limbs in conjunction with other treatment modalities. When TENS is applied at 10Hz, it has been found to improve the distance walked before claudication onset in people with peripheral artery disease (Seenan et al., 2016).

Dosage and frequency usage for TENS is commonly reported in literature as a once off 10Hz for 30-45 minutes on the lower limbs just before walking (Besnier et al., 2017). Many limitations exist for the adherence and validation for the prescription of TENS in people with peripheral artery disease (Ferreira et al., 2020).

Other electrotherapy modalities such as interferential therapy (Afzal et al., 2017), infrared radiation, shortwave diathermy and ultrasound decrease inflammation and provide pain relief for people with peripheral artery disease but are reported with very low level evidence or unclear dosages and guidelines (Landry, Louie, Giraud, Ammi, & Kaul, 2021).

Taken together, the studies referred to above regarding exercise modalities demonstrate low-level evidence and mostly small sample sizes in Europe or North America. Thus, more research is required regarding establishing exercise prescription and dosage guidelines suitable for people with peripheral artery disease (Parmenter, Raymond, Dinnen, & Singh, 2011).

CHAPTER 3: METHODOLOGY:

3.1 STUDY DESIGN:

The study comprised of two components. An online survey was used to obtain data from physiotherapists working in the Western Cape, and an in-person questionnaire was used to collect data from patients attending the GSH and TBH vascular clinics. A quantitative, cross-sectional descriptive study was conducted between July 2021 and January 2022 which used an online survey (Appendix A). This aimed to describe the physiotherapy management of people with peripheral artery disease in the Western Cape. This study method was used to identify the number of physiotherapists managing people with peripheral artery disease and was suitable for social distancing during the COVID-19 pandemic and allowed the researcher to reach physiotherapists throughout the Western Cape.

Further, a cross-sectional study using a researcher-administered questionnaire (Appendix B) was conducted at the GSH and TBH vascular out-patient department (OPD) with patients diagnosed with peripheral artery disease attending between November 2021 and March 2022. Tygerberg Hospital and GSH have large physiotherapy departments with physiotherapists working in a range of specialties including in-patients and out-patient settings, however the capacity of these teams is limited to hospital-based caseload and refer out to local clinics to continue ongoing rehabilitation post-discharge. This aimed to describe their patient profile in terms of demographics, risk factors, knowledge, attitudes and beliefs about peripheral artery disease, pain, HRQoL, self-efficacy and exercise behaviours. This methodology was used to compare multiple patient outcomes simultaneously.

3.2 RESEARCH SETTING:

The physiotherapy management of people with peripheral artery disease was explored via an online survey, using Microsoft Forms software. This included physiotherapists working in the Western Cape public and private sectors.

Patient data collection was conducted at GSH and TBH vascular OPD. GSH and TBH are the main public tertiary hospitals in the Western Cape and both have established vascular clinics managing patients with vascular conditions. These were optimal settings to identify people with peripheral artery disease, and achieve the study objectives and answer the relevant research question.

3.3 INCLUSION CRITERIA:

Physiotherapists:

- Physiotherapists were included if they were Health Professions Council of South Africa registered physiotherapists working directly with people with peripheral artery disease (Fontaine I-IV) in the private or public health care sector in the Western Cape, including community service physiotherapists.

- Physiotherapists were included if they were able to read and write in either English, Afrikaans or isiXhosa.

Patients:

- People with peripheral artery disease were included if they attended the Groote Schuur Vascular OPD or Tygerberg Hospital Vascular OPD.

- People with peripheral artery disease were included if they had been diagnosed with peripheral artery disease.

- People with peripheral artery disease were included if they could read and write in English, Afrikaans or isiXhosa as these are the most spoken languages in the Western Cape.

3.4 EXCLUSION CRITERIA:

Physiotherapists:

- Physiotherapists who did not have access to the internet for the online survey.

Patients:

- People with peripheral artery disease who previously had a limb amputation.

3.5 SAMPLING:

Sample Size of Physiotherapists:

There were 1,322 physiotherapists registered with the South African Society of Physiotherapy (SASP) in the Western Cape in 2020 and 130 were registered with the Physiotherapy Association of South Africa (PASA). The sample size is calculated with a 95% confidence level as 265 participants (Appendix C).

The physiotherapist survey used a voluntary response sampling methodology, which relies on physiotherapist participants to willingly respond without incentive which generally increases motivation to participation to meet the necessary sample size (Smith, Witte, Rocha, & Basner, 2019). This methodology is convenient and eligible physiotherapists would participate voluntarily, however this methodology can be prone to non-response bias (Cheung, Ten Klooster, Smit, de Vries, & Pieterse, 2017), as there is little control over number of participants when aiming for sample size. The main strategy for promoting involvement is then down to participation reminders which not all physiotherapy societies were open to sending. The success of this sampling method relied on physiotherapy societies to timeously distribute the survey link with their members. Busy times of month or day could have impacted participation but was beyond the control of the researcher.

Sample Size of Patients:

The GSH Vascular OPD had not been operating at full capacity due to COVID-19 restrictions. Ten people with vascular conditions were booked per week to be seen weekly on a Friday. These ten people included persons with other vascular conditions and not those with peripheral artery disease alone. A similar population size was anticipated at TBH weekly on a Tuesday. The required sample size for this study was calculated with a 95% confidence level at 138 participants (Appendix C) (Johnston et al., 2016). The patient survey used voluntary convenience sampling, where participants in two specific hospital out-patient clinics could volunteer to participate in the study and complete the questionnaire about their management of peripheral artery disease. This relied on participants being willing to answer questions in a private room before their doctor's appointment. This type of sampling is easy but can be vulnerable to bias because it is possible that only specific patients were willing to volunteer. It was not possible to conduct random sampling amongst this small group attending the clinic. Due to the fear of contracting COVID-19, attendees were also reluctant to engage with the researcher if it was unrelated to their appointment, based on individual risk analysis during rise of infections during the pandemic. To ensure there was voluntary consent, it was not possible to individually engage with potential participants as they may have experienced a level of coercion. The main technique used to reduce bias dependent on volunteers was to maintain participant anonymity to encourage participation.

Clinic attendees who arrived earlier for their appointment, when the clinic had not opened yet may were more willing to volunteer as there was no pressure to miss their appointment which was on a first come, first served basis. This is compared to participants who arrived later, watching other clinic attendees moving through the queue having their details taken and vital signs measured before they saw the doctor. This may have posed a pressure on them to remain seated and not miss their appointment, by leaving the room, even though their spot in line would have been reserved.

3.6 RECRUITMENT:

Recruitment of Physiotherapists:

Following Human Research Ethics committee (HREC) approval (Appendix D), the SASP and PASA were used to distribute the study link and recruit physiotherapists. Not all physiotherapists are registered with professional bodies, which is why the Western Cape Provincial Government (WCPG) physiotherapy group chairperson was asked to share the survey link with its members as well. The SASP emailed the survey link with 1,158 physiotherapists in the Western Cape. PASA emailed the survey link with 130 physiotherapists in their mailing list. WCPG physiotherapy group chairperson, Sameer Rahim, emailed the survey link to their mailing list. An application was submitted to the National Health Research Database (NHRD) for access to necessary hospitals for data collection. Physiotherapy departments employed by the Western Cape Department of Health were contacted directly or through their facility switchboard to promote participation by the public sector and those less likely to be a part of physiotherapy societies (such as SASP or PASA).

Recruitment of Patients:

A letter requesting permission from the Western Cape Department of Health was written to approve face-to-face data collection at GSH and TBH (Appendix E). With approval from the National Health Research Database (NHRD), permission was granted by the chief operational officer at GSH (Appendix F) and the manager of medical services at TBH (Appendix G) to conduct the study at the respective vascular out-patient clinic. The head of the vascular clinic and surgery at GSH and TBH were informed of the study taking place at the vascular out-patient clinics and logistical arrangements were discussed with them prior to commencing data collection.

People with peripheral artery disease were invited to participate in the study by posters (Appendix H) in the OPD waiting area at visible contact points at the TBH Vascular OPD, as posters were not allowed to be put on walls at GSH. Clinic attendees were informed of the study taking place independently of their appointment. Clinic attendees arrived one to two hours before their existing appointment, to wait for their turn on a first-come first-serve basis and had enough time to participate. Participants' position in the line was maintained with a reservation sign over their seat. In a private room next to the waiting area, consent was obtained before eligibility criteria was screened and cross-referenced with their file or referral letter. Patient folders or referral letters confirmed diagnoses from a referring doctor. Diagnosis of peripheral artery disease was obtained and other vascular related conditions such as varicose veins were excluded.

3.7 TOOLS AND OUTCOMES:

3.7.1 Online Physiotherapy Survey:

The researcher-designed survey was created with Microsoft Forms software and comprised of 30 questions that used a mixture of open-ended, close-ended and Likert scale questions. These questions were specifically designed to identify the profile and beliefs of physiotherapists working with people with peripheral artery disease and describe the treatment modalities they used for different types of impairments. To test the content validity of the researcher-designed survey, a panel of three expert physiotherapists were invited by validation letter (Appendix I) to provide feedback regarding amendments for ease of use and appropriateness of questions. The panel of experts was chosen on the basis that they each had a minimum five years of clinical experience in acute physiotherapy, completed a master's level degree in physiotherapy, had experience of working with people with peripheral artery disease, and were currently working in South African provinces excluding the Western Cape. This was to avoid using panel members would be eligible to participate in the actual study. Feedback from physiotherapists was merged into one document and changes were made (Appendix J) to the order and phrasing of questions.

1.7.2 Face-to-face Patient Survey:

This researcher-administered survey comprised of two components: a researcher-designed survey and a section using four self-reported outcome measures.

1.7.2.1 Researcher-designed Survey:

This researcher-designed survey was developed to answer the study objectives relating specifically to peripheral artery disease impairment and describe patient beliefs, attitudes and knowledge about peripheral artery disease. These questions were chosen specifically to meet the study objectives to describe the people with peripheral artery disease, their pain, beliefs and attitudes.

This also allowed a way to describe types of management that patients have received and what they would be willing to partake in for future recommendations, which was not available in an established outcome measure. There is much room to further investigate the experience of people with peripheral artery disease globally as well as the management they currently receive.

This researcher-designed survey was created using Microsoft Forms software. It comprised of 17 questions that used a mixture of open-ended, close-ended and Likert scale questions. The researcher asked the patients the questions, and completed the answers electronically on a tablet.

The researcher-designed patient survey questions were translated into Afrikaans and Xhosa, which are the three most spoken languages in the Western Cape. To test the content validity of the researcher-designed survey, a panel of three expert physiotherapists were invited by validation letter (Appendix K). This validation process was to suggest amendments to ease usage and improve appropriateness of questions in the survey. This was completed in July 2021. The panel of experts had to have a minimum five years of clinical experience in acute physiotherapy, completed a master's degree in physiotherapy and had to work with people with peripheral artery disease in South African provinces excluding the Western Cape. These physiotherapists were used as it was sensible to utilize the same physiotherapists for patient and physiotherapist validation so that they would see both sides of survey questioning. Then, to test the face validity, three people with peripheral artery disease attending the GSH vascular OPD were invited to complete the validation letter (Appendix K). The feedback was summarized in Appendix L.

The patient validators were people with peripheral artery disease and had no other condition-based differences than the study participants. Patient validators were eligible and willing to consent to being a part of the validation process. The process of obtaining validation was entirely voluntary and all people with peripheral artery disease attending the clinic on that day were able to volunteer to participate. Patients with a variety of vascular conditions attended the out-patient department and were told about the study validation taking place before their doctor's appointment. Feedback was given regarding any questions that were difficult to understand. The order that questions were asked was changed to improve flow and link similar themes. These validation surveys were timed to estimate what the survey duration would be. This was completed in November 2021.

3.7.2.2 Self-reported Outcome Measures:

Participants completed four self-reported outcome measures (EQ-5D-5L, Self-Efficacy for Managing Chronic Diseases 6-item Scale, Brief Pain Inventory- Short Form and Exercise Behaviours Scale) to obtain information on HRQoL, self-efficacy, pain and exercise behaviours. These outcome measures were researcher-administered in hard copy and participants that required translation were assisted by the researcher if necessary. The outcome measures listed below have been proven reliable in patients with other chronic diseases. This makes them very useful to compare outcomes of pain, HRQoL, self-efficacy and exercise behaviours in more researched conditions such as osteoarthritis or cancer. These self-reported outcome measures allow for a more holistic understanding of peripheral artery disease and its impact on the persons HRQoL, function, attitudes and behaviours.

European Quality of Life 5 Dimensions (EQ-5D-5L):

Approval was obtained by the EuroQol group to use the EQ-5D-5L in English, Afrikaans and isiXhosa (Appendix M). The EQ-5D-5L (Appendix N) was created by the EuroQol Group and measures HRQoL. It consists of five domains: mobility, self-care, usual activities, pain or discomfort and anxiety or depression. It reports current experience from "no problems" to "extreme problems" (Burton et al., 2016). The second component, a visual analogue scale (VAS) is included for participants to rate their perceived health status on a scale from "0" to "100". In South Africa, it has been translated (Mkoka, Vaughan, Wylie, Yelland, & Jelsma, 2003) and proven reliable and valid in isiXhosa (Jennifer Jelsma, Mkoka, Amosun, & Nieuwveldt, 2004), Afrikaans (J. Jelsma & Ferguson, 2004) for chronic conditions such as HIV (Jelsma, Maclean, Hughes, Tinise, & Darder, 2005). The self-completed version is available and was used. A cross-sectional study conducted in Spain revealed that within in-patient population groups with intermittent claudication, no difference was found between self-administered and researcher-administered surveys of the EQ-5D-5L (Lozano et al., 2016).

Self-Efficacy for Managing Chronic Diseases 6-item Scale:

This 6-item scale (Appendix O) was created by the Self-Management Resource Centre and encompasses domains which are customary in chronic diseases, such as peripheral artery disease. Domains include role function, emotional function, symptom control and communication with physicians. Six questions are answered and rated from 1-10, with 1 being "not confident at all" and 10 being "totally confident". This outcome measure has been used in various studies in the peripheral artery disease population (Collins, Lunos, & Ahluwalia, 2010). It has proven to have good cross-sectional validity and internal consistency for chronic disease (Gruber-Baldini, Velozo, Romero, & Shulman, 2017).

It has been translated and validated into English, Afrikaans, isiXhosa and Zulu which are languages that are hugely relevant in South Africa (Barnes, Jelsma, & Parker, 2019).

Brief Pain Inventory- Short Form:

The brief pain inventory-short form (BPI-sf) was created by the University of Texas M. D. Anderson Cancer Centre (B. Yang et al., 2020). The BPI tool license agreement is referenced as Appendix P.

The BPI-sf (Appendix Q) has not been widely used in the peripheral artery disease population. However, it has been used in assessing a South African population of amputees (Limakatso, Madden, Manie, & Parker, 2020) and has been frequently used and proven valid and reliable in patients with other chronic conditions such as osteoarthritis (Mendoza, Mayne, Rublee, & Cleeland, 2006).

The BPI-sf measures pain severity, rated “0” to “10” with 0 being “no pain” and 10 being “pain as bad as you can imagine” and interference with general activity, mood, walking ability, normal work, relations with other people, sleep and enjoyment of life (Stanhope, 2016). The BPI-sf has been translated into isiXhosa for chronic pain and HIV populations (Parker, Bergman, Mntambo, Stubbs, & Wills, 2017; Parker, Jelsma, & Stein, 2016).

Exercise Behaviours Scale:

This 6-item scale (Appendix R) was created by the Self-Management Resource Centre and reports on time spent on stretching, strengthening and aerobic exercise in the last week on a scale from 0 to 4, with 0 being “none” and 4 being participation in “more than 3 hours per week” of exercise. It has been validated for use with chronic diseases (Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001). It was translated for patients who could not answer questions in English.

3.8 PROCEDURE:

The study procedure is summarised in Figure 1 below.

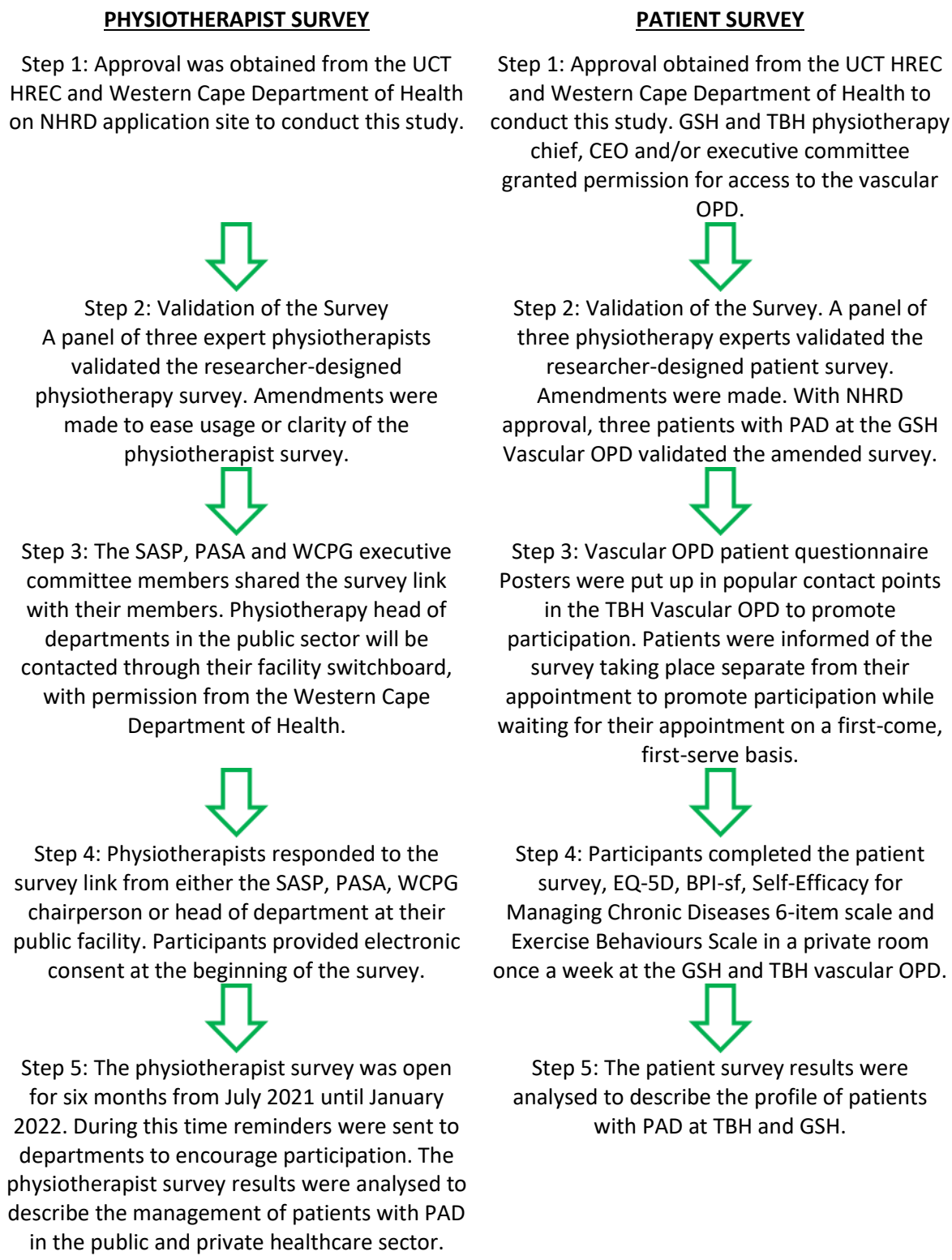


Figure 1: Procedure of study

3.9 APPROVAL AND PERMISSION:

Figure 1 shows the two components of this study that were completed. The University of Cape Town (UCT) HREC provided ethical approval to conduct this study on 22 June 2021 (HREC ref 207/2021).

An application was submitted to the National Health Research Database (NHRD) for approval for use of the TBH and GSH Vascular OPD. This approval was also required before the survey link could be emailed to public physiotherapy departments for approval from July 2021. GSH and TBH CEO and/or executive management were then contacted via email for permission to conduct the study at the respective facilities. Tygerberg Hospital granted permission (Appendix G) and GSH granted permission (Appendix F) to conduct researcher-administered surveys at their facility. The Vascular OPD Head of Department at GSH and TBH were then contacted to approve the study taking place once a week in their respective departments.

Application was made to the University of Texas M. D. Anderson Cancer Centre to request permission for usage of the Brief Pain Inventory-short form in English, Afrikaans and Xhosa. Permission was granted.

The EuroQol Research Foundation granted permission for usage of the EQ-5D-5L in English, Afrikaans and Xhosa. SASP, PASA and WCPG chairperson were approached to distribute the online survey link to their members. The Exercise Behaviours Scale and Self-Efficacy for Managing Chronic Disease 6-item scale are free to use without permission from the Self-Management Resource Centre.

3.9.1 DATA MANAGEMENT:

For the patient interviews, data was saved onto the researcher's private password-protected Google Drive account. For the physiotherapist survey, data was saved in excel spread sheets from Microsoft Forms. Both data sheets were shared with the supervisors via an electronic password protected shared file. The participants cannot be identified from the data sheet, as no personal identifying information was recorded for the participants. The researcher analysed collected data to describe the physiotherapy management of people with peripheral artery disease in the Western Cape. Hard copies of forms are stored in a locked cabinet in the UCT physiotherapy department and will be kept for five years.

Physiotherapist Survey:

The online survey used Microsoft forms software and was exported into an Excel spreadsheet.

Patient Survey:

Hard copies of the four outcome measures were scanned using the Camscanner application and uploaded onto a password protected Google Drive account. Each participant's completed forms were numbered with their participant numbers (for example GSH029) and stored in a plastic sleeve. TBH and GSH participants' data was stored in separate folders. Data from the hard copies of outcome measures was manually extracted from each outcome measure and uploaded onto an Excel spreadsheet summary. The online survey used Microsoft forms software and was exported into an Excel spreadsheet.

3.9.2 DATA ANALYSIS:

The data from both the physiotherapist survey and the patient questionnaires was extracted into separate excel spreadsheets. The data spreadsheets were shared with the study supervisors via google sheets. These spreadsheets allowed for easier data analysis using SPSS software (version 13.3). The data was cleaned and translated into English manually.

Nominal and ordinal data was obtained in this study. Data from the patients in the Vascular OPDs was described using frequencies, percentages, mean and standard deviation. Characteristics of people with peripheral artery disease, management and physiotherapist profiles were described. Statistical significance was accepted as $p < 0.05$. The chi-squared test was used to determine the relationship between categorical variables, and a t-test was used to determine significant difference between categorical and continuous variables.

3.9.3 ETHICAL CONSIDERATIONS:

This study abides by the Declaration of Helsinki ethical principles (Assocation, 2013). All participation was voluntary and participants were able to withdraw at any time.

3.9.3.1 Sources of Potential Bias:

Confirmation bias: Two supervisors were a part of this study to mitigate intentional or unintentional alignment of data interpretation with their pre-existing ideas.

Selection bias: A very specific patient population was selected and everyone did not have equal opportunity to partake in the research, but this was done intentionally. However, all patients attending the TBH and GSH clinics had equal opportunity to participate in the study on those days, given that they were diagnosed with peripheral artery disease. Specific days were selected at hospitals. TBH had only one vascular clinic with both new and follow-up patients, whereas GSH had separate days for this.

GSH clinic days for new referrals was specifically chosen to decrease the likelihood of repeat patients attending clinics and the attendance of amputees.

Amputees were excluded from the study due to impairments with mobility that may obscure interview questions about their mobility. This study was conducted during the COVID-19 pandemic, and this may reflect a different demographic of patients as many people due to fear of contracting the virus did not attend out-patient appointments over this time. It is possible that the presenting cohort would have been older, with more co-morbidities as is the typical pattern of peripheral artery disease if this study was conducted before the onset of the pandemic. Likewise, the physiotherapy survey was open to selection bias, as the primary portal for distributing the physiotherapist survey link was through the PASA and SASP emailing groups, which excludes physiotherapists who may not be registered with these bodies or working in the public sector (WCPG).

Recall bias: A standardised recall time frame was used to describe pain, exercise behaviours and HRQoL. The BPI-sf specifies "today", "now" and "24 hours" when asking about pain severity and interference. The exercise behaviours scale specifies "during the past week". The EQ5D specifies "today" and the self-efficacy for managing chronic diseases 6-item scale asks for confidence for "the present time".

Non-response bias: The electronic survey conducted with the physiotherapists relied on the physiotherapist to voluntarily respond and complete the survey. When participants do not respond, it is unknown whether the findings are generalisable.

3.9.3.2 Autonomy:

Participants signed a consent form to allow research participation and are allowed to withdraw their participation at any time during the study.

3.9.3.3 Beneficence:

There is no direct benefit to study participants, but the physiotherapy profession may benefit in the future. Patients will receive an educational pamphlet after participating in the study (Appendix S).

3.9.3.4 Non-Maleficence:

There were no other foreseeable risks associated with this study as no tests or treatments were conducted on participants. Emotional fallout of patient participants was managed immediately, with counselling and an educational pamphlet which was issued to every patient. Any participants that reported requiring mental health support due to not coping with their diagnosis or condition, were referred immediately for mental health support. The researcher obtained consent to write a referral. This was taken into the doctor's appointment that they were attending.

3.9.3.5 Justice:

Participants were selected based on their eligibility for the inclusion criteria.

3.9.3.6 Confidentiality and Privacy:

Participants were identified by participant number and data was stored on a password-protected shared drive between supervisors and researcher. Only participant numbers are identifiable to ensure no harm comes to their name or reputation and to maintain anonymity. All hard copies are kept in a locked cupboard and will be destroyed after five years.

3.9.3.7 COVID-19 Protocols:

During the COVID-19 pandemic, online surveys, personal protective equipment and social distancing were employed to minimise possible transmission risks. Hands and pens were sanitised before and after filling out any hard copy forms. Social distancing of 1.5m was always maintained between the researcher and participants. The physiotherapist survey was conducted online preventing in person contact or paper forms to reduce possible transmission risks.

3.9.4 TIME SCHEDULE AND BUDGET:

The total cost for running this study was R15,174.98.

The study time frame and budget are outlined in Appendix T.

3.9.5 FUNDING AND PROGRESS:

This study received partial funding for research study data collection expenses from the SASP and partial funding towards study fees from the University of Cape Town Department of Nephrology. During the study process, it was discovered that additional support was required to conduct face-to-face patient interviews. An application was made to request approval to recruit a research assistant (Appendix U). A portion of funding was to cover research assistant fees.

Appendix V details the progress submitted during study completion.

CHAPTER 4: RESULTS:

This chapter presents the results derived from two populations: physiotherapists and patients. Seventy-one physiotherapists participated in an online anonymous survey about how they were managing people with peripheral artery disease in the Western Cape. One hundred and forty-one patients participated in a researcher-administered survey comprising of a researcher-designed survey and four self-reported outcome measures.

4.1 PHYSIOTHERAPIST SURVEY RESULTS:

One of this study's objectives were to describe the physiotherapy management of people with peripheral artery disease in the Western Cape, in comparison with local and international guidelines. The physiotherapist survey yielded a very low response rate of 4.9% which is not uncommon for online surveys. Figure 2 shows the sampling process of physiotherapists.

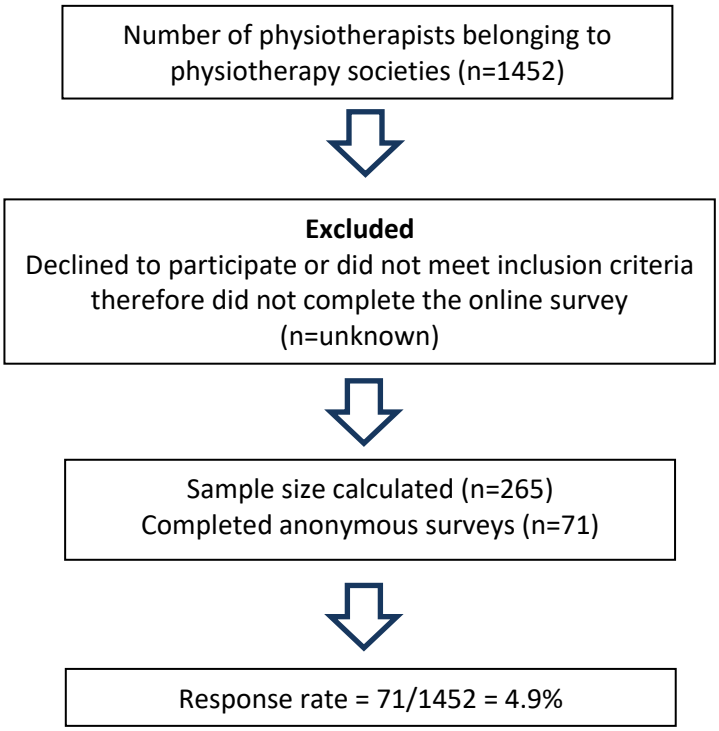


Figure 2: Process of physiotherapist sampling

With over 8,000 physiotherapists registered with the HPCSA, it is difficult to ascertain how many physiotherapists are currently practicing in South Africa, are retired or how many are practicing within the Western Cape, specifically.

Out of over 1,400 physiotherapists who were contacted through the SASP, PASA, WCPG and public physiotherapists (National Department of Health) a fraction of this group (71) were able to consent to participate, provided they met the other inclusion criteria and wanted to participate in the study. The number of physiotherapists who declined or did not meet the inclusion criteria remains unknown. Appendix V, W, X, Y, Z and AA detail the Western Cape Department of Health facilities that provided approval to be contacted to distribute the online physiotherapist survey.

4.1.1 PHYSIOTHERAPIST DEMOGRAPHICS:

The link to the researcher-designed online survey was shared with members of the SASP, PASA, WCPG and heads of public physiotherapy departments. A total of 71 eligible physiotherapists consented and completed this survey between 17 July 2021 and 31 January 2022. The estimated sample size (n=265) was not reached. The researcher made many attempts to share the link for the online physiotherapist survey with different public hospitals and clinics to promote participation. All responses were anonymous.

Table 2: Profile of the physiotherapists managing people with peripheral artery disease

Physiotherapist profile	**Demographic of physiotherapists**	**Frequency (N = 71)**	**Percent (100%)**
Municipality	City of Cape Town District	49	69
	Cape Winelands District	8	11.3
	Overberg District	7	9.9
	Garden Route District	4	5.6
	West Coast	2	2.8
	Central Karoo	1	1.4
Facility Type	Private Hospital	34	47.9
	Private Out-patient Practice	14	19.7
	Public Secondary Hospital	8	11.3
	Public District Hospital	6	8.5
	Private Sub-Acute	3	4.2
	Private Home-Based Care	3	4.2
	Public Tertiary Hospital	2	2.8
	Public Rehab Centre	1	1.4
Years of work experience	1-5 years	35	49.3
	10-15 years	13	18.3
	> 15 years	11	15.5
	5-10 years	8	11.3
	< 1 year	4	5.6
Specific PAD Training	None	57	80.3
	Short course	12	16.9
	BSc in Physiotherapy	2	2.8

(N=71, where N is the total number of physiotherapists and n is the number of physiotherapists)

The average time taken to complete this survey was 9 minutes 56 seconds and the survey comprised of 30 questions. A description of the profile of the 71 physiotherapists who consented and completed the survey can be found in Table 2. The majority of the participants were working in the City of Cape Town area within private hospitals and had less than five years of work experience. Physiotherapists from the City of Cape Town metropolitan region were the greatest contributors to this study, making up 69% (n=49) of participants. Seventeen public physiotherapists participated in this study, making up 23.9% of the participants. About a quarter of physiotherapists currently managing patients reported that they had received training for the management of peripheral artery disease, with 16.9% (n=12) having completed a short course and 2.8% (n=2) having received some form of training in their undergraduate studies. Less than a quarter (23.9%) of physiotherapists manage people with peripheral artery disease once a week or less frequently than once a week. A large portion (42.3%) of physiotherapists reported that they manage people with peripheral artery disease once a week. Table 3 reports on the frequency that physiotherapists manage people with peripheral artery disease in a week.

Table 3: Average weekly frequency of management of people with peripheral artery disease

Frequency	**Percentage and number of physiotherapists % (n)**
Less than once a week	23.9% (17)
Once a week	42.3% (30)
Twice a week	15.5% (11)
Thrice a week	7.0% (5)
Four times a week	7.0% (5)
Five times a week	2.8% (2)
Six times a week	1.4% (1)

(N=71, where N is the total number of physiotherapists and n is the number of physiotherapists)

Less than a quarter (22.5%, n=16) of physiotherapists reported that they manage patients with intermittent claudication, while 38% (n=27) of physiotherapists reported that they manage patients with chronic limb-threatening ischaemia. Table 4 reports on the percentage of physiotherapists managing different classifications and presentations of peripheral artery disease.

Table 4: Classification of peripheral artery disease being managed by physiotherapists

Classification of patients	**Percentage and number of physiotherapists managing patients with different classifications of peripheral artery disease % (n)**
Post-amputation (gangrene)	83.1% (59)
Ulceration or gangrene	36.6% (26)
Ischemic rest pain	25.4% (18)
Asymptomatic	16.9% (12)
Moderate-severe claudication	15.5% (11)
Mild claudication	12.7% (9)

(N=71, where N is the total number of physiotherapists and n is the number of physiotherapists)

4.1.2 PHYSIOTHERAPISTS KNOWLEDGE, ATTITUDES AND BELIEFS:

Most physiotherapists 97.2% (n=69) believe that physiotherapists should manage people with peripheral artery disease, 78.9% (n=56) believe that they should manage patients with chronic limb-threatening ischaemia and 93% (n=66) of physiotherapists believe that physiotherapists should screen for peripheral artery disease. A significant number of physiotherapists who were surveyed 80.3% (n=57) believe that they have not received sufficient training to manage people with peripheral artery disease and 95.8% of them believe that they require further training to sufficiently manage people with peripheral artery disease.

Physiotherapist's perceived knowledge of peripheral artery disease was investigated with eight questions on a Likert scale with five possible responses. The response options ranged from no knowledge to excellent knowledge about the causes, complications and treatment options available for peripheral artery disease. Table 5 reveals that nearly 70% of physiotherapists reported poor or fair knowledge of non-pharmaceutical management. More than half (56.3%) of physiotherapists reported poor knowledge of pharmaceutical management options and more than a third (36.6%) reported poor knowledge of stages of peripheral artery disease.

Table 5: Knowledge of physiotherapists managing people with peripheral artery disease

	No Knowledge % (n)	**Poor % (n)**	**Fair % (n)**	**Good % (n)**	**Excellent % (n)**
Pathophysiology	0	14.1% (n=10)	52.1% (n=37)	33.8% (n=24)	0
Causes	1.4% (n=1)	11.3% (n=8)	42.3% (n=30)	40.8% (n=29)	4.2% (n=3)
Risk factors	0	7.0% (n=5)	31.0% (n=22)	54.9% (n=39)	7.0% (n=5)
Characteristics	0	8.5% (n=6)	42.3% (n=30)	45.1% (n=32)	4.2 (n=3)
Stages	5.6% (n=4)	36.6% (26)	46.5% (n=33)	11.3% (n=8)	0
Complications	1.4% (n=1)	9.9% (n=7)	35.2% (n=25)	47.9% (n=34)	5.6% (n=4)
Pharmaceutical management	5.6% (n=4)	56.3% (n=40)	35.2% (n=25)	2.8% (n=2)	0
Non-Pharmaceutical management	2.8% (n=2)	23.9% (n=17)	45.1% (n=32)	26.8 (n=19)	1.4% (n=1)

(N=71, where N is the total number of physiotherapists and n is the number of physiotherapists)

In an open-ended feedback section on the survey, ten physiotherapists provided comments about the study. Due to the low number of responses received for the open-ended question, no structured content analysis was performed for this data. The comments are summarised quantitively. Overall, the attitudes were positive regarding the study topic, but highlighted the challenges faced by the patients and physiotherapists. These comments are detailed in Table 6 below.

Table 6: Open-ended feedback from the study survey

Physiotherapist participant number	Physiotherapist survey feedback
Participant 5	"Thank you, a good research topic"
Participant 17	"For question 26, I want to clarify that I do not believe we should be managing them alone, they need assessment for surgical management- but we can be part of managing the patient in that context"
Participant 39	"It's not always that easy treating a patient with this condition as its usually a secondary or even third condition and the patients are elderly therefore not that easy to exercise"
Participant 42	"Feedback on your outcome of research study and offering of specialised training to Physiotherapists on PAD would be invaluable to equip us and be clinically efficient in patient management"
Participant 69	"In a rural government setting, there is a high patient load per physio, therefore currently we mostly see pts only after an amputation has been done, very little emphasis is placed on preventative care (only 1 PT for the hospital and 5 clinics and 1 OPD)"

4.1.3 MANAGEMENT OF PEOPLE WITH PERIPHERAL ARTERY DISEASE:

This study compared the physiotherapy management of people with peripheral artery disease in the Western Cape to the latest evidence-based management guidelines from the VASSA (N. Naidoo et al., 2022) and AHA (Gerhard-Herman et al., 2017). Some physiotherapists (21.1%, n=17) manage people with peripheral artery disease infrequently and may not see a patient with peripheral artery disease every week. A minority of physiotherapists manage more than three people with peripheral artery disease per week, while 7% (n=5) see people with peripheral artery disease three times, 7% (n=5) four times, 2.8% (n=2) five times a week and 1.4% (n=1) six times a week.

The majority (76.1%) of physiotherapists work in the private healthcare sector. Using the chi-squared test, there was no significant difference between referrals received by physiotherapists in the private or public sector ($p = 0.14$).

The physiotherapists managed people with peripheral artery disease using exercise and/or education-based interventions. The majority (83%) of physiotherapists manage people with peripheral artery disease using education, general recommendations on physical activity (61.2%), unsupervised home exercise programmes (59.2%), pain management (53.5%) and structured supervised exercise programmes (39.4%) to do so. Referral to other healthcare providers is utilised by 42% of physiotherapists, when they are unsure how to manage patients with peripheral artery disease.

According to various research studies (Caldieraro-Bentley & Andrews, 2013; Collins, Lunos, & Ahluwalia, 2010; Guidon & McGee, 2010), people with peripheral artery disease suffer with pain, decreased mobility, decreased gait speed, decreased gait endurance, decreased balance and decreased HRQoL. The list of impairments, functional limitations and participation restrictions that may be present in people with peripheral artery disease are listed below, along with the reported treatment modalities used by physiotherapists in this study.

Pain:

The primary modalities used for the treatment of pain in people with peripheral artery disease was circulation drills (26.8%) and chronic pain management (23.9%). Notably, 18.3% of the physiotherapists indicated they do not treat pain in people with peripheral artery disease.

Mobility:

Lower limb strengthening exercises was the most prescribed modality (21.1%), followed by advice to walk (19.7%) for managing decreased mobility. Some also reported use of stretching (11.3%) and aerobic exercises (11.3%). Other modalities for the management of decreased mobility included slow active range of movement mobilisation.

Gait Speed:

A significant portion (31.1%) of physiotherapists do not manage patients for impaired gait speed. A quarter of physiotherapists use lower limb strengthening, 14.1% use treadmill walking and 12.7% provide advice to walk to improve gait speed.

Endurance:

Results varied for treatment modalities used to treat decreased endurance in people with peripheral artery disease; 19.7% aerobic exercises, 15.5% advice to walk, 15.5% treadmill walking and 14.1% lower limb strengthening. Nearly a quarter of physiotherapists do not treat impairments for endurance in people with peripheral artery disease.

HRQoL:

Chronic pain management (22.5%) was the most reported modality used to improve the HRQoL in people with peripheral artery disease. Advice to walk (18.3%) and aerobic exercise (12.7%) was also used by some physiotherapists. One participant reported the inclusion of an occupational therapist and one reported using functional exercises to improve HRQoL.

Balance:

More than half of physiotherapists manage decreased balance using lower limb strengthening exercises. 16.9% of physiotherapists do not treat balance impairments in people with peripheral artery disease. Balance training activities was reportedly used by less than 10% of physiotherapists. Some physiotherapists noted the use of neurological-based facilitation exercises such as body schema training for the re-education of balance in people with peripheral artery disease.

Table 7 describes the responses to what the main treatment technique used to manage each known impairment in people with peripheral artery disease. This was based on impairments, functional limitations and participation restrictions most frequently reported in literature associated with peripheral artery disease. It was possible for participants to report 'none' as a response, if they did not treat either of the impairments.

Table 7: Physiotherapy management for impairments associated with peripheral artery disease

Treatment	**Pain % (n)**	**Decreased mobility % (n)**	**Decreased gait speed % (n)**	**Decreased endurance % (n)**	**Decreased HRQoL % (n)**	**Decreased balance % (n)**
Advice to walk	8.5% (6)	19.7% (14)	12.7% (9)	15.5% (11)	18.3% (13)	4.2% (3)
Aerobic exercise	9.9% (7)	11.3% (8)	5.6% (4)	19.7% (14)	12.7% (9)	4.2% (3)
Chronic pain management	23.9% (17)	1.4% (1)	0	1.4% (1)	22.5% (16)	1.4% (1)
Circulation drills	26.8% (19)	5.6% (4)	2.8% (2)	1.4% (1)	1.4% (1)	0
Deep breathing exercises	2.8% (2)	0	1.4% (1)	0	1.4% (1)	0
Electrotherapy	0	0	0	0	1.4% (1)	0
Upper limb strengthening	0	2.8% (2)	0	0	0	1.4% (1)
Lower limb strengthening	1.4% (1)	21.1% (15)	25.4% (18)	14.1% (10)	4.2% (3)	56.3% (40)
Stationary bike cycling	0	2.8% (2)	2.8% (2)	5.6% (4)	0	1.4% (1)
Stretching	1.4% (1)	11.3% (8)	0	0	0	0
Treadmill walking	2.8% (2)	2.8% (2)	14.1% (10)	15.5% (11)	1.4% (1)	0
Gait re-training	0	0	1.4% (1)	1.4% (1)	0	0
Stump desensitisation	1.4% (1)	0	0	0	0	0
Balance training	0	0	1.4% (1)	0	0	9.9% (7)
Issue assistive device	0	1.4% (1)	0	0	0	1.4% (1)
Education	0	1.4% (1)	0	0	5.6% (4)	0
Other	0	4.2% (3)	1.4% (1)	1.4% (1)	2.8% (2)	2.8% (2)
None	18.3% (13)	14.1% (10)	31% (22)	23.9% (17)	28.2% (20)	16.9% (12)

(N=71, where N is the total number of physiotherapists and n is the number of physiotherapists)

4.1.4 SCREENING AND PROMOTION-PREVENTION INTERVENTIONS:

More than half (67.6%) of physiotherapists reported that they do not receive referrals to manage people with peripheral artery disease. The majority of physiotherapists do not perform any screening for people with peripheral artery disease (87.3%, n=62). Those physiotherapists who performed screening for peripheral artery disease made use of varied methods of screening; 12.7% (n=9) of physiotherapists use symptom-based questions, 9.9% (n=7) use physical assessment, 4.2% (n=3) refer patients for medical screening and 1.4% (n=1) of physiotherapists use ankle-brachial index testing. When unsure of how to manage a patient with peripheral artery disease, 73.2% (n=52) of physiotherapists reported that they would refer to a vascular surgeon, 22.5% (n=16) would refer to a general practitioner, 49.3% (n=35) would refer to another physiotherapist and 1.4% (n=1) reported that they were unsure where to refer patients with people with peripheral artery disease.

Table 8 describes the educational tools used by the physiotherapists when educating people with peripheral artery disease. Only 8.5% (n=6) of physiotherapists reported that they do group education or prevention talks regarding the education of peripheral artery disease awareness at their facility and only 8.5% run exercise groups in their facility.

Table 8: Educational tools used for patient education of peripheral artery disease

Educational Tools	**Percentage % (n=71)**
One-on-one patient education	69 (49)
Flyers or pamphlets	16.9 (12)
Posters	5.6 (4)
Group promotional talks	1.4 (1)
None	26.8 (19)

(N=71, where N is the total number of physiotherapists and n is the number of physiotherapists)

A total of seventy-one physiotherapists participated in this study. Participants were mostly from the City of Cape Town, in the private sector with less than ten years of experience as a physiotherapist and had no specialist training to work with people with peripheral artery disease.

Overall, most physiotherapists were from the physiotherapists only manage people with peripheral artery disease a few times a week. There is low usage of promotion or preventative strategies for peripheral artery disease. Most physiotherapists are managing people with peripheral artery disease post-amputation. There is not one clear management strategy for the impairments facing people with peripheral artery disease.

Most physiotherapists believe that physiotherapists should manage people with peripheral artery disease and believe they have not received sufficient training to manage people with peripheral artery disease. A significant portion of physiotherapists reported poor or fair knowledge of non-pharmaceutical management and poor knowledge of stages of peripheral artery disease.

4.2 PATIENT SURVEY RESULTS:

One of this study's objectives were to describe the demographics of patients attending the GSH and TBH vascular clinics using a researcher-designed researcher-administered questionnaire and four self-reported outcome measures. The estimated sample size was reached (N=138), with 141 patient participants between 12 November 2021 and 29 March 2022. Figure 3: Process of patient sampling describes the process of patient sampling.

The patient survey was validated by three physiotherapists and piloted on three patients attending the GSH vascular clinic. The average time to complete this survey was 22 minutes per participant, slightly longer than during patient validation which was an average of 19 minutes. This differed to the participants in the study. Many participants far exceeded the average expected time for completing the survey, with some participants taking over an hour to complete the survey. The time taken to complete the interview ranged between 9 and 68 minutes.

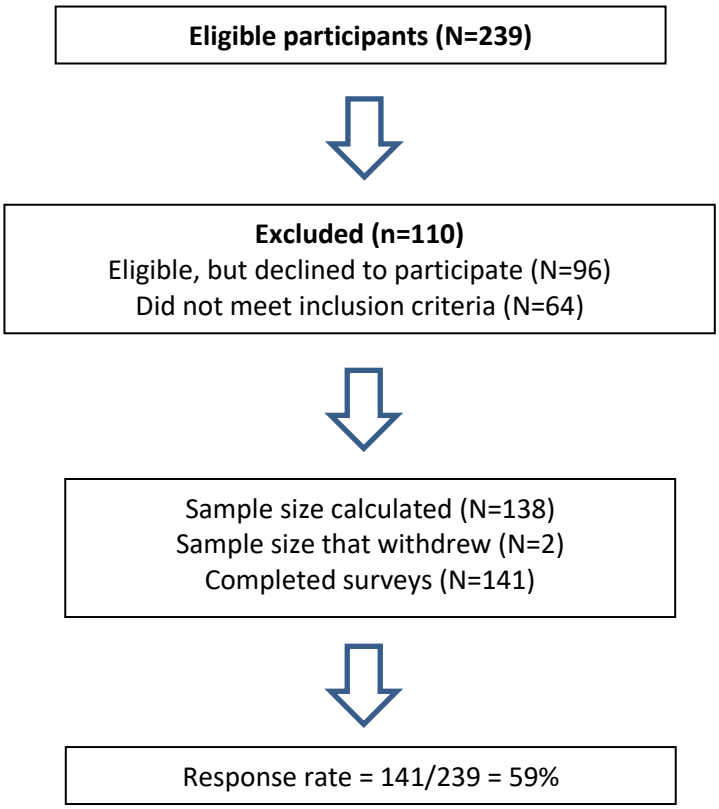


Figure 3: Process of patient sampling

4.2.1 PATIENT DEMOGRAPHICS AND CLINICAL PRESENTATION:

A total of 143 patients met the inclusion criteria and consented to participate in this study. However, two participants withdrew consent and left during the study to attend their doctor's appointments. The final patient sample size included for analyses was 141 patients (Figure 3). There were more Afrikaans first language speaking participants (68.8%) than first language English speaking participants (31.2%). None of the recruited participants at TBH and GSH were first language isiXhosa speaking. Patients from two vascular OPDs participated in this research; 32.6% were from GSH and 67.4% were from TBH. Of the 141 participants, there were 67 female (47.5%) and 74 (52.5%) male participants in the study.

The age of participants ranged from 27-87 years old and the mean age of patients presenting to the vascular departments was 60.5 years (SD =11.3). There was no significant difference (p=0.42) found for males and females regarding their age distribution. Figure 4 shows the frequency of patients' ages and the normal distribution curve.

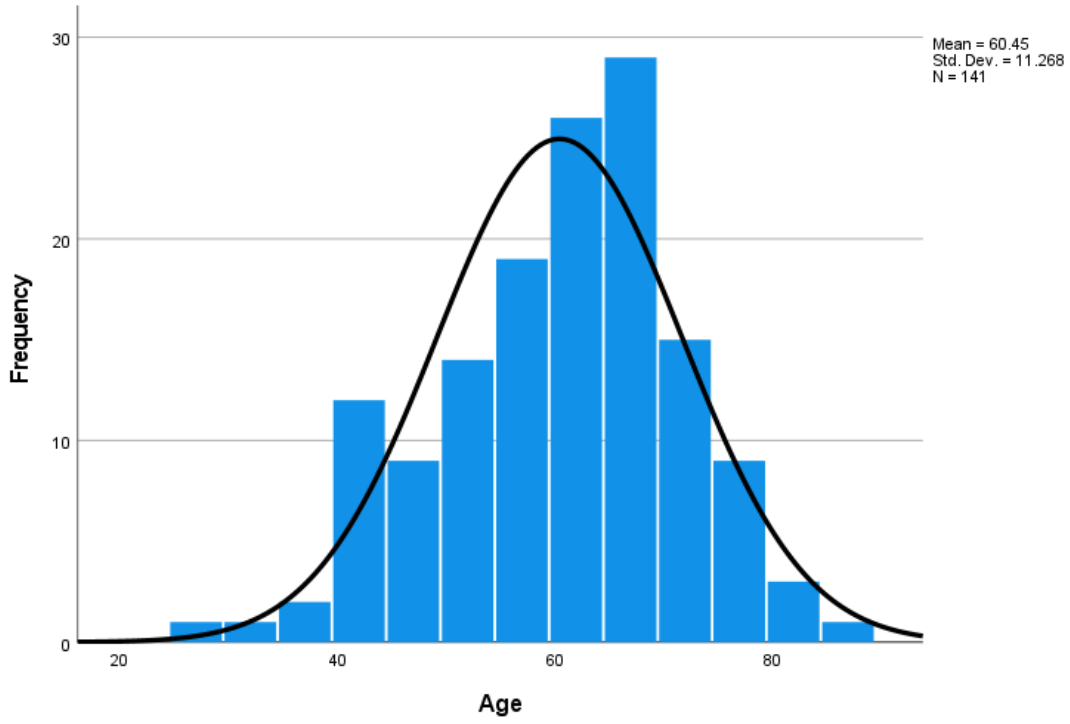


Figure 4: Histogram showing patient ages and distribution curve

The clinical presentation (Fontaine classification) of the patient participants was diverse. Nearly half of the patients presenting to the clinic (46.1%) presented with ischemic rest pain (as seen in Table 9).

Table 9: Fontaine classification of patients presenting to the TBH and GSH OPDs

Fontaine classification	**Description**	**Percentage of patients presenting % (n)**
I	Asymptomatic	8.5% (12)
IIa	Mild claudication	9.2% (13)
IIb	Moderate-severe claudication	29.8% (42)
III	Ischemic rest pain	46.1% (65)
IV	Ulceration or gangrene	6.4% (9)

(N = 141 patients, where N is the total number of patients and n is the number of patients)

4.2.2 PATIENT CO-MORBIDITIES:

Diabetes mellitus, hypertension, dyslipidemia and renal disease are known risk factors for peripheral artery disease. Nearly 75% of the participants had hypertension and nearly half had dyslipidemia. The majority of the participants (91.5%) reported that they had known co-morbidities, most of which are risk factors for peripheral artery disease. Table 10 lists the co-morbidities reported and Figure 5 lists the cardiac conditions reported by 11.2% of participants with peripheral artery disease. Diabetes Mellitus was statistically significant (p=0.01) for the presence of non-healing ulcers (Fontaine IV) with chi-square= 6.62 (df = 1)

Table 10: Frequency of co-morbidities among patient participants

Co-morbidities	**Frequency of participants % (n)**
Diabetes Mellitus	38.5% (55)
Hypertension	74.1% (106)
Dyslipidemia	49.7% (71)
Renal Disease	3.5% (5)
Cardiac events or medical conditions	11.2% (16)
Other known medical conditions	17.7% (25)

(N = 141 patients, where N is the total number of patients and n is the number of patients)

Figure 5 displays the proportion of cardiac conditions present amongst the 16 patients who reported diagnosis with types of cardiovascular diseases, events or conditions. Percentages displayed are representative of the 16 patients and not of the total sample size. However, Table 11 displays the percentages of cardiac conditions present in the entire sample of patient participants (141 patients).

Other known co-morbidities were reported by 17.7% of participants. With 8.5% of participants reported having arthritis, 1.4% with gout, 1.4% with asthma and 1.4% with stomach ulcers. Some conditions were only present in one participant (0.7%); HIV, hyperthyroidism, Lupus, Marfan syndrome, glaucoma, hyperthyroidism, incontinence, osteoporosis and frozen shoulder.

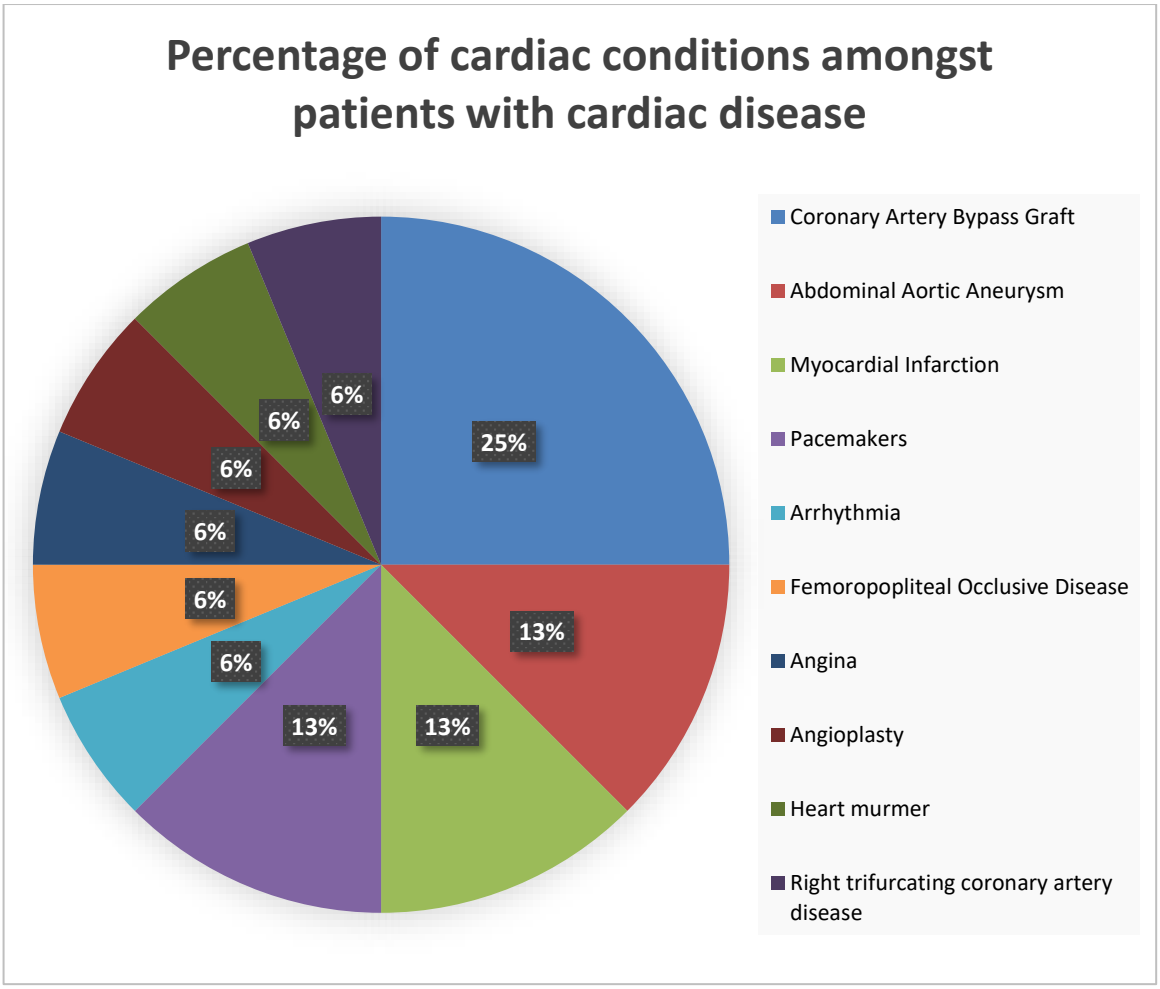


Figure 5: Graph of reported cardiac conditions among people with peripheral artery disease

Table 11: Cardiac conditions reported among people with peripheral artery disease

Cardiac condition	**Frequency of participants % (n)**
Coronary Artery Bypass Graft	2.8% (4)
Abdominal Aortic Aneurysm	1.4% (2)
Myocardial Infarction	1.4% (2)
Pacemaker	1.4% (2)
Femoropopliteal Occlusive Disease	0.7% (1)
Arrhythmia	0.7% (1)
Angina	0.7% (1)
Angioplasty	0.7% (1)
Heart murmer	0.7% (1)
Right trifurcating coronary artery disease	0.7% (1)

(N = 141 patients, where N is the total number of patients and n is the number of patients)

4.2.3 SMOKING HABITS OF PATIENTS:

Nearly half of the participants (46.8%, n=66) smoke cigarettes. Of the 53.2% (n=75) of participants who said that they do not smoke, 60% (n=45) reported that they were former smokers. A wide range of smoking cessation periods were reported. The reported time since patients had stopped smoking ranged from one week to 40 years ago. The smoking behaviours varied amongst the participants (see Table 12).

Table 12: Smoking behaviours of people with peripheral artery disease

Reported smoking behaviours	Percentage of patients % (n)
Never smoked	21.3% (30)
Currently smoke	46.8% (66)
Former smoker – less than a year ago	9.2% (13)
Former smoker – 1-5 years ago	6.4% (9)
Former smoker – 5-10 years ago	2.8% (4)
Former smoker – 10-15 years ago	3.5% (5)
Former smoker – more than 15 years ago	9.9% (14)

(N = 141 patients, where N is the total number of patients and n is the number of patients)

4.2.4 PATIENT HEALTH-RELATED QUALITY OF LIFE:

The EQ-5D 5L was used as a self-reporting tool to describe participants HRQoL, assessing mobility, self-care, usual activities, pain or discomfort and anxiety or depression. The majority of the participants (76,2%) indicated that they have problems with mobility. Of those with mobility problems 7.1% had extreme problems with mobility and 31.2% had slight problems with mobility (see Table 12). Self-care was reported as a problem for 23.4% of the participants and usual activities was a problem for 57.4% of the participants. In the pain/discomfort dimension about 90% of the participants indicated problems with pain. Of these participants, 41.1% reported severe pain and 15.6% reported extreme pain. Table 13 summarises the EQ-5D scores for mobility, self-care, usual activities, pain and anxiety. Statistical significance (chi-square = 12.57; df = 1 and p = 0.0004) was found when comparing males and females for feelings of anxiety or depression in the EQ-5D.

The second component of the EQ-5D assesses the participants perceived health state using a VAS scale ranging from 0-100 percent where 0 is the worst possible health state and 100 is the best possible perceived health state. The mean EQ-5D VAS score for perceived health state was 62.9% (SD±22.1; 0-100). The mean EQ-VAS for smokers and former smokers was 61.8 (SD±23), compared to patients who never smoked with a mean EQ-VAS of 67 (SD±18.9). The difference in health state VAS scores between smokers and non-smokers was not statistically significant (p=0.26). The mean EQ-VAS for females was 63.07 and 62.77 for males, which was not statistically significant (p=0.94).

Table 13: Self-reported HRQoL according to the EQ-5D

	None % (n	Slight % (n)	Moderate % (n)	Severe % (n)	Extreme % (n)
Mobility	23.8% (33)	31.2% (44)	19.9% (28)	18.4% (26)	7.1% (10)
Self-care	76.6% (108)	9.2% (13)	9.9% (14)	2.1% (3)	2.1% (3)
Usual activities	42.6% (60)	26.2% (37)	16.3% (23)	5.7% (8)	9.2% (13)
Pain	9.2% (13)	15.6% (22)	18.4% (26)	41.1% (58)	15.6% (22)
Anxiety	36.9% (52)	26.3% (37)	18.4% (26)	11.3% (16)	7.1% (10)

(N = 141 patients, where N is the total number of patients and n is the number of patients)

4.2.5 PATIENT SELF-EFFICACY:

The Self-Efficacy for Managing Chronic Diseases 6-item Scale was used to measure how confident people with peripheral artery disease are to perform certain activities. This is a tool from the Stanford Self-Management Resource Centre (Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001). The scale requires participants to rate their confidence on a scale of 1-10 with 1 being not confident at all and 10 being totally confident. Table 14 highlights that the lowest self-confidence was reported in managing peripheral artery disease to reduce their need to see a doctor (4.8) and without taking medication (4.7). The mean calculated score is 6.1 (SD± 3.3).

Table 14: Mean confidence scores for the self-efficacy for managing chronic diseases 6-item scale

Self-Efficacy in tasks	Mean ± SD
Confidence that you can keep other symptoms or health problems from interfering with the things you want to do	7.2 ± 3.0
Confidence that you can keep fatigue caused by peripheral artery disease from interfering with the things you want to do	7.1 ± 3.3
Confidence that you can keep emotional distress caused by peripheral artery disease from interfering with the things you want to do	6.6 ± 3.1
Confidence that you can keep physical discomfort or pain caused by peripheral artery disease from interfering with the things you want to do	6.1 ± 3.0
Confidence that you can do different tasks and activities to manage peripheral artery disease to reduce your need to see a doctor	4.8 ± 3.2
Confidence that you can do things other than just taking medication to reduce how much your illness affects your everyday life	4.7 ± 3.5

(N = 141 patients, where N is the total number of patients)

4.2.6 PATIENT PAIN:

The BPI-sf was used to describe patients experience of pain related to peripheral artery disease. The BPI-sf measures patients' pain severity rated 0 -10 with 0 being 'no pain' and 10 being 'pain as bad as you can imagine'. Pain interference was reported on patients' general activity, mood, walking ability, normal work, relations with other people, sleep and enjoyment of life.

Nearly three quarters of patients (74.4%) reported that they experienced pain on the researcher-administered survey date. Bilateral lower limb symptoms were experienced in 18.4% of patients. Pain in the right lower limb only was reported by 17.7% and 38.3% in the left lower limb only. Figure 6 demonstrates the percentage of pain reported by participants who were experiencing pain. The left foot was the area most commonly reported to be painful.

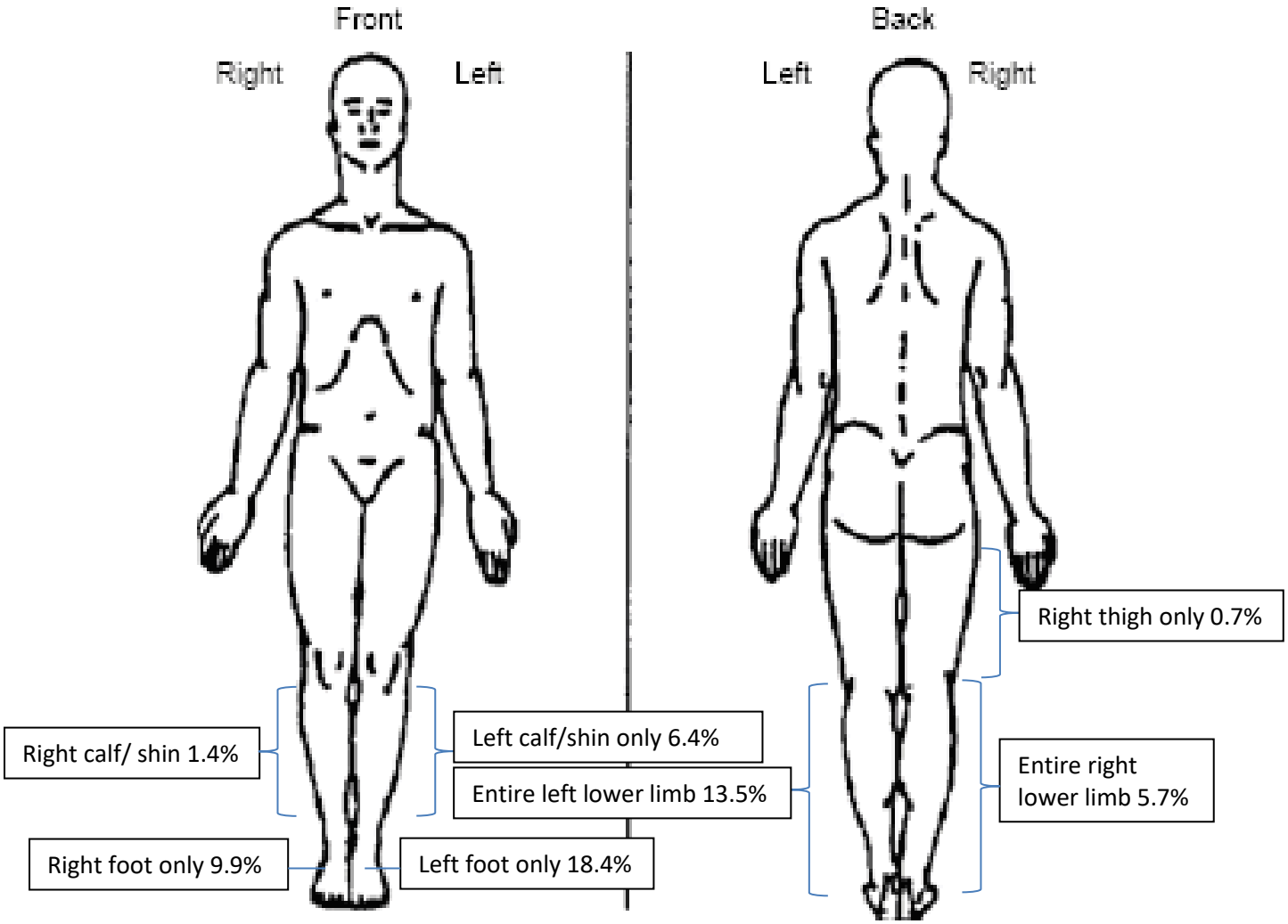


Figure 6: Brief Pain Inventory body chart percentage of participants with pain reported on body chart

Pain Severity:

Table 15 describes the mean pain severity scores at their worst, least, average and now. The mean average pain score was 5 which indicates moderate pain on the VAS scale. The overall mean pain severity score was 4.5 (SD± 3.6) out of 10 which indicates moderate level pain. Half of participants reported that, in the last 24 hours, when their symptoms were the least painful, the pain went away completely (rated zero on interference scale). Few (2.1%) participants reported that the pain is constant 'pain as bad as you can imagine'. At the time of survey, most participants had been sitting for a significant amount of time in the waiting area and 36.9% reported that they were currently experiencing 'no pain'.

There were significant gender differences identified when comparing pain scores for interference and severity. The reported pain severity at its least was 1.81 (SD±2.65) for males and 2.76 (SD±3.07) for females (p=0.05). Male and female mean reported pain severity at its worst was 5.81 (Lejay et al.) and 6.91 (Lejay et al.), respectively (p=0.03). This was statistically significant. When applying a t-test, there was no significant difference (p = 0.95) for the BPI-sf pain at its worst in the last 24 hours when smokers and former smokers were compared to patients who had never smoked.

Table 15: Descriptive statistics for the brief-pain inventory

Pain Severity in the last 24 hours	**Mean pain score ± SD**
Worst	6.3 ± 3.1
Least	2.3 ± 2.9
Average	5 ± 2.9
Now	3.4 ± 3.5
Mean pain severity score	4.5 ± 3.6

(N = 141 patients, where N is the total number of patients)

Pain Interference:

The overall mean pain interference score was 4.6 (SD± 0.9) out of 10. Walking ability had the greatest pain interference with moderate pain reported (5.6, SD±3.5). The least impeded sector was interference with relationships with other people, with mild pain reported and a mean of 2.7 (SD±3.5) amongst participants. Walking, normal work and general activity had the highest reported pain interference. The mean male and female pain interference scores were 5.14 and 6.09, respectively (p=0.11). A significant difference (p=0.01) was found for male and female pain interference with mood, with males at 3.66 and females at 5.24. Figure 7 describes the mean pain interference experienced by participants in the 24 hours before the survey.

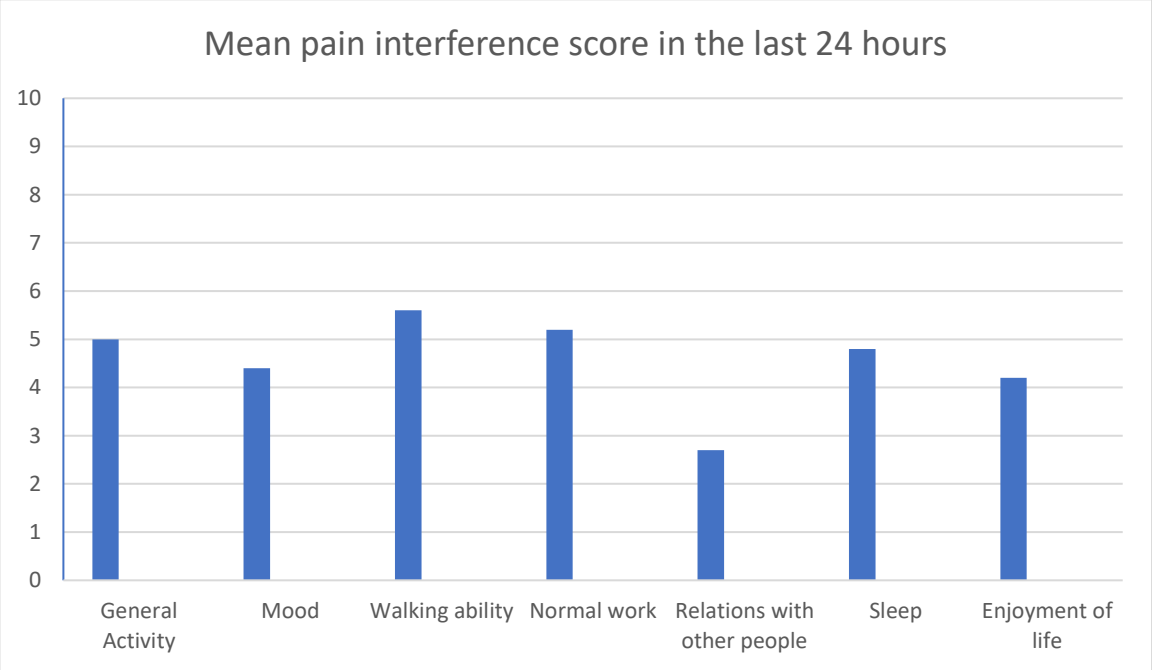


Figure 7: Graph of mean pain interference score in the last 24 hours

Pain Management:

Of the 141 participants, 87.2% (n=123) were receiving medication for pain relief with mean relief of 68.1% (SD±33.42). Some patients (12.8%, n=18) were not receiving any medication for pain management and of these less than half (n=8) had experienced pain in the previous 24 hours.

The most relief was reported by patients who received opioid analgesics such as tramadol with a mean relief of 80.9% (SD±29.1). The least relief reported was among participants using only non-steroidal anti-inflammatories (NSAIDs), with a mean relief of 38.9% (SD±35.86). Some (2.8%) patients receiving analgesic medication were unsure of the name but experienced 50% pain relief. Figure 8 describes the mean percentage of relief of each medication taken for pain management and Table 16 describes the medication that 123 people with peripheral artery disease used.

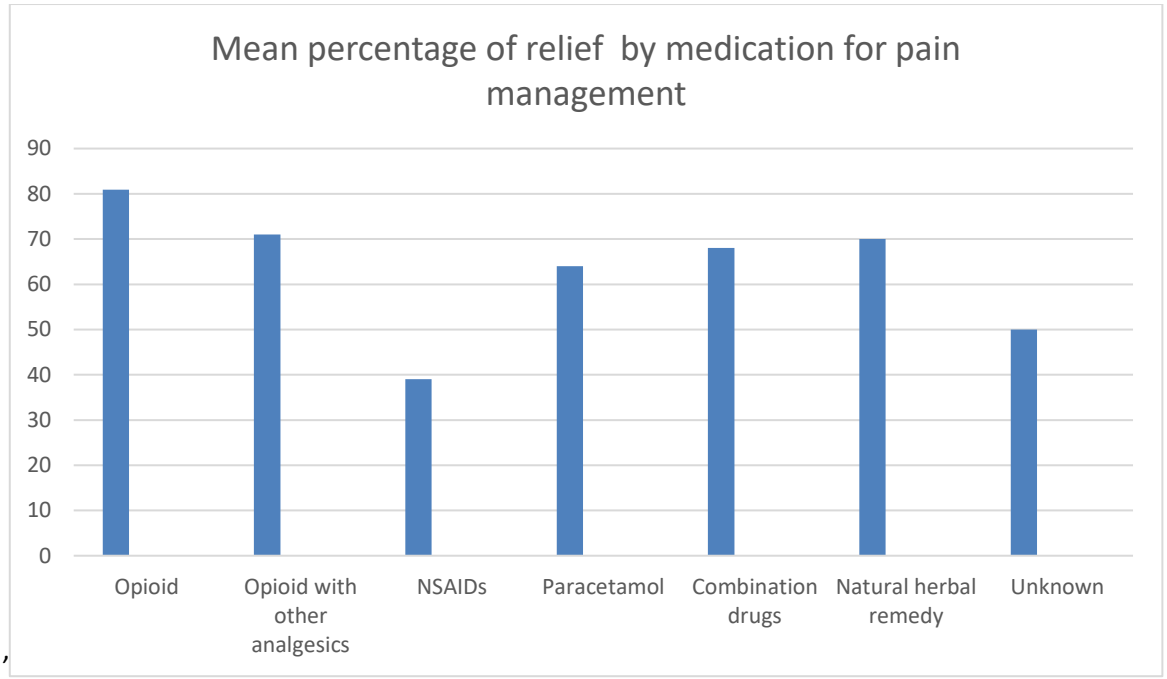


Figure 8: Percentage of pain relief by medication for pain medication

Table 16: Pain medication among people with peripheral artery disease

Type of medication	**Example**	**Percentage of patients % (n)**	**Percentage of relief %**
NSAIDs	Aspirin Brufen	6.4% (9)	38.9%
Opioid	Tramadol Morphine	22.7% (32)	80.9%
Opioid in combination with other analgesics	Tramadol in combination with Panado or Brufen or Stilpane or Pain Block	28.4% (40)	71%
Paracetamol	Panado	22% (31)	64.2%
Combination therapy drugs	Adcodol Stilpane Mypaid	4.3% (6)	68.3%
Natural herbal remedy	Cannabidioil	0.7% (1)	70%
Unknown	Unknown	2.8% (4)	50%

(N = 141 patients, where N is the total number of patients and n is the number of patients)
NSAID = Non-Steroidal Anti-Inflammatory Drug

4.2.7 PATIENT EXERCISE BEHAVIOURS:

Exercise behaviours were identified using the Stanford Self-Management Resource Centre Exercise Behaviours Scale. This tool reports on the time spent on aerobic (walking, swimming, bicycling) and anaerobic (stretching and strengthening) exercise in the past week. Table 17 describes the reported exercise behaviours of patients attending the TBH and GSH Vascular OPDs.

The majority of participants (77.3%) do not participate in stretching or strengthening exercises. The reported mean time in minutes spent on anaerobic exercise in the past week was 9.6 minutes. Most of the participants do not engage in swimming (96.5%), bicycling (92.9%) and other aerobic exercises (84.4%). The mean time (in minutes) reported spent on aerobic exercise in the past week was 53.8 minutes. Most of this time is accredited to walking for exercise. A third of participants reported walking for exercise for less than 30 minutes per week and 7.8% walk for exercise for more than three hours per week. The chi-squared test was used to assess the relationship between current smokers and non-smokers, regarding their exercise behaviours. There was no significant difference between smokers and non-smokers exercise behaviours, with chi-squared=3.6; df=1 and p=0.06. There was no significant difference between male and female exercise behaviours (p=0.39).

Table 17: Exercise behaviours in the past week

Exercise	**None (0 minutes) % (n)**	**Less than 30 minutes /week (15 minutes) % (n)**	**30-60 minutes /week (45 minutes) % (n)**	**1-3 Hours / week (120 minutes) % (n)**	**More than 3 hours /week (180 minutes) % (n)**	**Mean (time in minutes/ week)**
Stretching or strengthening	77.3% (109)	14.2% (20)	4.3% (6)	3.5% (5)	0.7% (1)	9.6
Walk for exercise	24.1% (34)	34% (48)	22.7% (32)	11.3% (16)	7.8% (11)	43
Swimming or aquatic exercise	96.5% (136)	2.8% (4)	0	0	0.7% (1)	1.7
Bicycling	92.9% (131)	2.8% (4)	2.1% (3)	1.4% (2)	0.7% (1)	3.5
Other aerobic equipment	84.4% (119)	9.2% (13)	5% (7)	1.4% (2)	0	5.3
Other aerobic exercise	99.3% (140)	0	0.7% (1)	0	0	0.3

(N = 141 patients, where N is the total number of patients and n is the number of patients)

The willingness of the participants to participate in an exercise programme is further described in Section 4.2.8 below.

4.2.8 KNOWLEDGE, ATTITUDES AND BELIEFS:

The patient participants' knowledge, attitudes and beliefs regarding peripheral artery disease was assessed using researcher-designed questions.

The participants' perceived knowledge of peripheral artery disease was investigated with three questions on a Likert scale with five possible responses. The response options ranged from no knowledge to excellent knowledge about the causes, complications and treatment options available to them for peripheral artery disease. Table 18 describes the perceived knowledge regarding peripheral artery disease of patients.

Table 18: Patient perceived knowledge of causes, complications and treatment options

	No knowledge % (n)	Poor % (n)	Fair % (n)	Good % (n)	Excellent % (n)
Causes	52.5% (74)	30.5% (43)	12.8% (18)	4.3% (6)	0
Complications	49.6% (70)	33.3% (47)	12.8% (18)	4.3% (6)	0
Treatment options	51.1% (72)	31.2% (44)	14.2% (20)	3.5% (5)	0

(N = 141 patients, where N is the total number of patients and n is the number of patients)

A section of the researcher-designed questionnaire was intended to identify barriers to participation in a supervised exercise programme at local clinics. Participants could report if they would or would not attend an exercise class. If they indicated that they would not attend, they were able to choose from a list of reasons why they would not engage in an exercise class or provide their own reason. If they indicated that they would attend, they would report how frequently they would be able to participate in an exercise class at their local clinic.

The majority of patients (80.1%, n=115) reported that they would attend an exercise class if it was offered at their local clinic. Some (4.3%) reported that they would be willing to attend, but that it would depend on work schedules and availability of transportation. A large portion (39%, n=55) reported that they would be willing to attend an exercise class once a week, 17.7% (n=25) reported twice a month, 7.8% (n=11) once a month and 9.2% (n=13) reported 2-3 times a week. One patient (0.7%) reported that only exercise classes scheduled on weekends would suit them due to work commitments and 1.4% reported that they would want to attend daily supervised exercise classes.

Of 141 participants, 80% of patients reporting positive attitudes towards supervised exercise therapy, whilst the remaining 19.9% reported that they would not want to attend a supervised exercise programme for varying reasons.

Table 19 summarises the factors that may influence participation in a group exercise class at local clinics. Seven (5%) reported that they would prefer to exercise on their own, 3.5% (n=5) reported that pain was limiting, 3.5% (n=5) reported not having enough time to attend and 2.1% (n=3) reported that they do not have transport to the clinic. A portion of participants (5%) reported negative attitudes such as personal reasons for not wanting to participate in a supervised exercise therapy programme. This included lack of motivation (1.4%), feeling too old (1.4%) or tired (1.4%) for exercise and not being medically healthy enough (0.7%) to exercise in a group.

Table 19: Factors influencing willingness to partake in a group exercise class

Factors	**Frequency % (n)**
Transport issues	4.3% (6)
Prefer to exercise on their own	5.0% (7)
Limiting pain	3.5% (5)
Insufficient time	3.5% (5)
Lack of motivation	1.4% (2)
Feeling too old	1.4% (2)
Feeling too tired	1.4% (2)
Feeling too ill	0.7% (1)

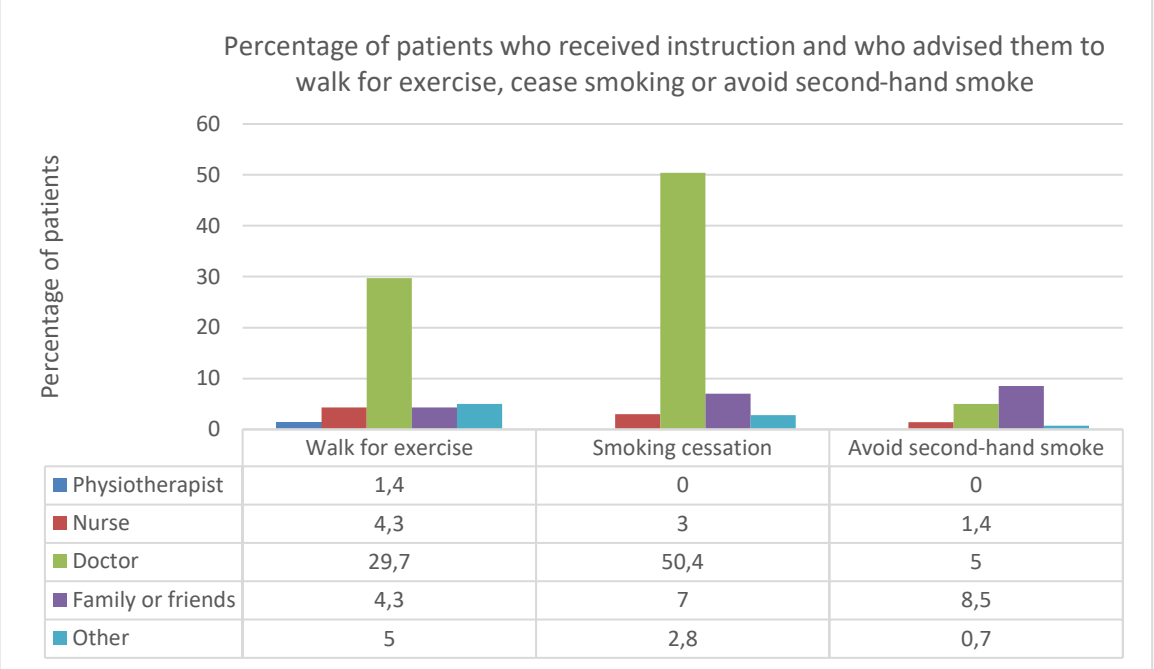
Due to the risk of the survey affecting participants' mood negatively (Labott, Johnson, Fendrich, & Feeny, 2013), post-survey counselling was offered by the researcher.

4.2.9 MANAGEMENT: INSTRUCTIONS BY A HEALTHCARE WORKER:

Only 36.2% (n=51) of participants received instruction from a health professional to walk as a form of exercise to manage peripheral artery disease and twelve received this advice in a different manner. The majority of these participants were instructed by a doctor (29.7%, n=42), 4.3% (n=6) by a nurse, 1.4% (n=2) by a physiotherapist, 0.7% (n=1) by a social worker, 4.3% (n=6) by family or friends, 2.1% (n=3) were informed via the internet and 2.1% (n=3) knew they should walk for exercise without being told by anyone.

Instruction or advice against smoking was reported by 62.4% (n=88) of participants. Half of the participants were instructed by doctors (50.4%, n=71) to stop smoking. Family members or friends instructed 7% (n=10), 2.1% (n=3) were instructed by a nurse, 0.7% (n=1) by their church group, 0.7% (n=1) by a dietician and 1.4% (n=2) decided to stop smoking of their own volition.

A few participants (15.6%, n=22) received instruction to avoid second-hand smoke. Family or friends instructed 8.5% of participants (n=12) to this effect, while 5% (n=7) received such instructions from a doctor, 1.4% (n=2) from a nurse and 0.7% (n=1) decided for themselves that they should avoid second-hand smoke. Figure 9 demonstrates the number of patients that received instructions or advice about smoking habits or walking for exercise.



	Walk for exercise	Smoking cessation	Avoid second-hand smoke
Physiotherapist	1,4	0	0
Nurse	4,3	3	1,4
Doctor	29,7	50,4	5
Family or friends	4,3	7	8,5
Other	5	2,8	0,7

Figure 9: Graph depicting the percentage of patients who received instruction for walking and smoking avoidance

4.3 SUMMARY OF RESULTS:

Physiotherapist Survey:

Seventy-one physiotherapists in the Western Cape responded as managing people with peripheral artery disease. There was no significant difference between physiotherapists who work in the public or private sector when it came to receiving referrals to manage people with peripheral artery disease. Among healthcare workers, doctors were reportedly the main driving force behind patient education regarding smoking habits and walking advice to exercise. Feedback indicated that the type of physiotherapeutic management of peripheral artery disease was varied amongst physiotherapist participants.

The majority of physiotherapists manage people with peripheral artery disease with education, general recommendations on physical activity, unsupervised home exercise programmes, pain management and structured supervised exercise programmes, contrary to established management programmes including treadmill walking. Referral to other healthcare providers is utilised by less than half of physiotherapists in the Western Cape. Majority of physiotherapists believe that physiotherapists should manage people with peripheral artery disease and believe they have not received sufficient training to manage peripheral artery disease.

Patient Survey:

One hundred and forty-one people with peripheral artery disease participated in this study. A large portion of people with peripheral artery disease were in their sixties, had hypertension, ischemic rest pain, gangrene or non-healing ulcers. There was no significant difference between the exercise behaviours of females and males.

No significant difference was found between smokers and non-smokers for exercise behaviours. Presence of non-healing ulcers or gangrene (Fontaine stage IV) was dependent on the prevalence of diabetes mellitus in people with peripheral artery disease. A significant difference was found between females and males for pain interference with mood and pain severity. Females reported more severe pain severity at their most and least painful symptoms and greater interference with their mood than males.

A large portion of patient participants reported no or slight difficulties with self-care and usual activities. Conversely, more than half reported severe to extreme problems with claudication pain (HRQoL). Yet in the brief pain inventory findings, patients reported moderate pain severity and interference. Very few patient participants partook in regular exercise over the last week and about a third received instruction from a healthcare worker to walk as a form of exercise.

No patients reporting having excellent knowledge of the causes, complications or treatment options available for peripheral artery disease. About half of all participants reported that they had no knowledge of these important factors and a third reported poor knowledge of peripheral artery disease. Patients had fair attitudes towards engaging in exercise groups, except for a small portion who said that they had limitations due to transport, not feeling well enough to exercise or lack of motivation.

CHAPTER 5: DISCUSSION:

Introduction:

The primary aim of this study was to describe the physiotherapy management of people with peripheral artery disease in the Western Cape, compared to local and international guidelines. This was realised by conducting an online physiotherapy survey. The secondary aim was to describe the profile of people with peripheral artery disease attending the GSH and TBH vascular clinics. This study successfully described the physiotherapy management of people with peripheral artery disease in the Western Cape province and provides a description of the patients diagnosed with peripheral artery disease attending two vascular out-patient clinics situated at tertiary hospitals within the Western Cape.

Physiotherapy Survey Responses:

The response to the electronic physiotherapist survey was poor, yielding an approximate response rate of 5% despite the survey being open for 6 months. This finding is similar to a poor response rate of 9.7% to an electronic survey with physiotherapists in Kwa-Zulu Natal, South Africa (Cobbing et al., 2017). Cobbing et al., 2017 conducted their study over ten weeks, with a reminder email sent out at eight weeks, utilising the same platform as this study, the SASP emailing list. Perhaps this had a better response rate because it applied to more of the members or because it was conducted before the COVID-19 pandemic.

A United Kingdom study, which employed the Chartered Society of Physiotherapist's website, was open for responses for just five weeks and received 302 responses — more than double the amount received for this study (Sarigiovannis, Foster, Jowett, & Saunders, 2022). A Canadian study open for two weeks received only a 1% response rate to their online survey regarding the physiotherapy management of musculoskeletal disorders compared to this study's open timeframe of six months (Desjardins-Charbonneau, Roy, Thibault, Ciccone, & Desmeules, 2016). A South African online survey investigating the use of smartphone applications amongst physiotherapists using Google Forms obtained a 21% response rate, having been sent to a special interest group of physiotherapists within the SASP. An important component was the inclusion of two email reminders two weeks apart after the initial invite to encourage greater response to the online survey (Rowe & Sauls, 2020).

The above-mentioned studies had pilot studies, used no incentives for participation and maintained anonymity, similarly to this study.

Perhaps there is better integration of participation in online surveys and digital platforms internationally and this may increase among South African healthcare worker's over time. It is possible that more participants were eligible to participate in these international studies because they met the inclusion criteria. Considering that peripheral artery disease is under-diagnosed, therefore there may not be as great a portion to yield such high response rates of working physiotherapists in South African studies that were managing peripheral artery disease (Mastracci, Anand, & Aday, 2022).

A systematic review observing worldwide response rates in health surveys found that the average response rate in African studies was 77.5% for healthcare workers and 88.1% for patients (Meyer, Benjamens, Moumni, Lange, & Pol, 2022). A study in Sheffield suggests that online surveys should be used in conjunction with alternative communication strategies such as postal letters since online response rates are typically low (Loban, Mandefield, Hind, & Bradburn, 2017). A 2016 South African study found it beneficial to utilise both emailed surveys and postal surveys, catering to a wider age demographic. However, online surveys were used more (59%) than postal surveys (Manana et al., 2018) as postal surveys are more expensive and labour intensive to administer, than online surveys. It is possible that incentives and increased reminders could potentially boost study participation (Edwards et al., 2009).

In this study, private sector physiotherapists were able to be contacted directly through their physiotherapy society's email chain, namely the SASP and PASA. Conversely, there was a substantial barrier communicating with physiotherapists working for the public sector (Western Cape Department of Health). Each facility manager at these public sector facilities had to be contacted individually once permission was granted from the NHRD to distribute the survey to their chief physiotherapist or head of physiotherapy department. This placed limitations on communication due to annual leave, managers being out of office or simply not responding. As such, it was difficult to follow up or know if the correct people received the survey invite and link. Reliance on facility managers and chief physiotherapists to relay the survey invite to physiotherapists at their clinic or hospital increased uncertainty about distribution accuracy.

The nature of an anonymous, online survey is that it limits certainty over which facilities have already partaken in the study or need to receive participation reminders.

During the COVID-19 pandemic, physiotherapists were operating in different capacities, as some out-patient departments were closed to reduce the spread of the virus and some hospital staff were working different rotations or hours to maintain staffing levels when other staff were on sick leave. This also negatively impacted the participation and engagement with an online survey, as physiotherapists much like all healthcare workers were experiencing burnout during the COVID-19 pandemic (Leo et al., 2021).

Overall, the main factor that was recommended in literature to propel survey participation was a mailed or emailed reminder, however it is not clear if all public hospitals received this information as the researcher had no direct contact with the physiotherapists in these departments or mailing systems with physiotherapy societies. While the use of online surveys is an efficient, cost effective and quick method of obtaining descriptive data amongst physiotherapists, it appears to have challenges with low response rates (Regmi, Waithaka, Paudyal, Simkhada, & van Teijlingen, 2016). Regular email reminders and the use of professional bodies to share the link assists with recruitment of participants. It is unknown what the ideal duration is for keeping a survey open. Future qualitative studies using focus groups or in-depth interviews may be useful to determine what other factors may influence physiotherapist participation in online surveys.

Patient Survey Responses:

Due to the potential risks associated with medico-legal stumbling blocks when attempting telehealth during the COVID-19 pandemic (Pillay, Govender, & Pillay, 2021), researcher-administered surveys with patients were still preferred. Despite piloting the questionnaire on a smaller sample, the participants in this study spent a longer time completing the questionnaire. This could highlight a lack of basic understanding or awareness of the terminology associated with peripheral artery disease — which people with peripheral artery disease echoed when reporting their perceived knowledge of peripheral artery disease. This is a common finding, even in Europe that there is poor health literacy among people living with peripheral artery disease (Striberger, Axelsson, Kumlien, & Zarrouk, 2022; Strijbos, Hinnen, van den Haak, Verhoeven, & Koning, 2018).

The researcher experienced that first-time referrals and even follow-up patients demonstrated a very poor level of understanding of peripheral artery disease and struggled to understand basic questions about their symptoms.

Although the four outcome measures had preset questions, the researcher-designed survey was intentionally made with no medical jargon and easy to understand questions. It would have been beneficial to have visual aids of more complex terms or phrases. The educational pamphlet was issued after the interview to clarify any uncertainty regarding peripheral artery disease.

The most time-consuming component of the survey was when the participants described their symptoms (pain and HRQoL) as many had questions before they could provide answers for these sections. Some questions were concerning their health, such as “will they have to cut off my foot?”, “how does this happen?” or “is there a cure?”. When trying to answer, “What treatments or medications are you receiving for your pain?”, participants may list all medication they are receiving without knowing which one is for pain and which may be related to other chronic diseases such as hypertension.

Other examples include patient participants needing clarification on what is meant by “aerobic exercise” in the exercise behaviours scale before they could answer the sixth question of the exercise behaviours scale. It is possible that the language and medical terms used were too complex for the patient population and this was not detected during the piloting of the survey using chosen outcome measures.

Level of education was not investigated in this study. However, poor health awareness may be further perpetuated by low education levels, which could be accounted for by high numbers of South Africans who never complete school, as reportedly only half of expected grade 12 learners reach matric (Weybright, Caldwell, Xie, Wegner, & Smith, 2017). Impoverished circumstances and lower levels of formal schooling have a greater relationship with the development of peripheral artery disease and cardiovascular complications (Subherwal et al., 2013). Lack of healthcare accessibility and presence of risk factors increases likelihood of people with peripheral artery disease being admitted into acute care (Vart et al., 2017). A study exploring patients’ knowledge of diabetes mellitus echoed other studies describing patient’s poor knowledge of their health condition and worse disease management, which highlights that lower levels of formal education impede disease management (Jia, Wang, & Cheng, 2022), as has been found in peripheral artery disease and other chronic conditions such as diabetes mellitus (Pande & Creager, 2014). Better health literacy is associated with greater HRQoL and self-efficacy for disease management (Striberger et al., 2022).

Most patient participants were recently diagnosed with peripheral artery disease and were attending the vascular clinic for the first time. These patients were referred from primary level care facilities and had not received any prior education on managing their condition. Further, they reported that they were fearful about losing mobility, needing surgery for limb amputation and were unsure of how they developed peripheral artery disease. Many patient participants required post-survey counselling and debriefing regarding their poor health state, since it may have been the first time that some of them were asked such in-depth questions about their condition and its impact on their function by a healthcare worker. It is frequent to identify symptoms of stress, anxiety and depression in over a third of people newly diagnosed with peripheral artery disease regarding their perceived health state (Thomas et al., 2020). The more survey questions the patient participants had to answer, the more questions these participants had, as it may not have occurred to them how their condition had affected their quality of life or activities of daily living. It is possible that patient participants were not familiar with questions that related to a biopsychosocial perspective, as they may be accustomed to a biomedical approach regarding their health.

5.1 PHYSIOTHERAPIST AND PATIENT DEMOGRAPHICS:

5.1.1 PHYSIOTHERAPIST DEMOGRAPHICS:

It is difficult to ascertain if this group of 71 physiotherapists are representative of the 1,288 physiotherapists that were currently registered with the SASP and PASA. More data is needed to quantify the number of people with peripheral artery disease in the Western Cape to understand if there are enough physiotherapists to meet this demand. With vast numbers of asymptomatic individuals, this further justifies screening in primary health care.

A study that was conducted among ICU specialised South African physiotherapists reported a similar average of 10.8 years of experience as a physiotherapist (Van Aswegen, Patman, Plani, & Hanekom, 2017). Due to the poor response rate of the electronic survey in this research study, interpretation cannot be generalised as it is unknown whether the responses of the physiotherapist participants are representative of the population in the Western Cape managing people with peripheral artery disease.

5.1.1.1 Training

The lack of training on peripheral artery disease could be due to several factors. Although the reasons for physiotherapists accessing training on peripheral artery disease was not specifically explored, it is possible that due to late presentation of symptoms, physiotherapists either don't identify disease signs and symptoms or patients with peripheral arterial disease mainly present to physiotherapists post-amputation, as was reported in this study. Most likely due to the largely asymptomatic presentation of peripheral artery disease, until it has advanced, condition will remain undiagnosed and therefore not managed (Mastracci et al., 2022). This is worsened by the lack of practical primary healthcare training in undergraduate courses, as most physiotherapy courses were preparing students to work in a tertiary healthcare environment (Mokwena & Phetlhe, 2015). This may be because most physiotherapists work in secondary and tertiary healthcare (Narain & Mathye, 2023). There are benefits to continuous professional development courses, but without practical application components, these can prove to be costly and unhelpful to clinical practice (Walton, 2020). Courses or training modules with practical application to exercise therapy would be beneficial to physiotherapists working with peripheral artery disease.

Lack of referral to physiotherapists also shifts clinical research or interest as physiotherapists in the Western Cape have not historically been sought out in a preventative capacity to manage this condition because the physiotherapist role is poorly understood (Narain & Mathye, 2023).

5.1.1.2 Private and public physiotherapist distribution

Private sector physiotherapists would also require medical aid providers to authorise billing codes for the physiotherapy management of peripheral artery disease. Lack of allocated medical aid funding in the private sector for physiotherapy sessions is a huge deterrent for patients to seek preventative measures as these seem less urgent, especially when medical savings funds are depleted and they may have mixed presentations or initially present asymptomatically (Maphumulo & Bhengu, 2019). Globally, financial barriers remain a hinderance to accessing healthcare, such as the United States of America where private sector physiotherapists have led research initiatives to request allocated health insurance pay-outs to manage people with peripheral artery disease in rehabilitation programmes (Jelani, Jhamnani, et al., 2020). Similarly, in Ghana 76.3% of people are limited by expenditure associated with accessing physiotherapy services (Nketia-Kyere, Aryeetey, Nonvignon, & Aikins, 2017).

A 2019 editorial reported that the 7,937 physiotherapists that were registered with the HPCSA were insufficient to meet the needs of the near 60 million South Africans (V. Stewart, 2019). In April 2021, the number of HPCSA registered physiotherapists was 8,343 (HPCSA, 2021). The SASP currently has 3,230 registered physiotherapists in the private sector and 170 in the public sector.

This may not be a true reflection of the number of physiotherapists employed by the Western Cape Department of Health (public), but it may be an indication of the uneven ratio of physiotherapists toward the private sector. A similar pattern can be seen with other healthcare workers in Western Cape rehabilitation services (George, Gow, & Bachoo, 2013).

The Western Cape echoes the South African dilemma of a disproportionate ratio of healthcare workers favouring the private sector. Poor staff retention, unfilled job posts and staff shortages further exacerbate the strain healthcare workers in the public sector face (Maphumulo & Bhengu, 2019).

A significant disparity exists between the insufficient number of physiotherapists servicing community health centres and hospitals where majority of the country seek access to healthcare. This is predominantly down to lack of posts available in the public sector for healthcare workers, which is ultimately a consequence of mismanagement of funds (Malakoane, Heunis, Chikobvu, Kigozi, & Kruger, 2020) and corruption in South African healthcare (Rispel, de Jager, & Fonn, 2015).

Conversely, the majority of physiotherapists are employed in the well-resourced private sector, catering to a minority of the South African population. With limited posts but noteworthy benefits associated with working for the public sector, physiotherapists are often older as they may be reluctant to move from the job security that government employment offers. These physiotherapists stay longer in the healthcare sector and may not have updated knowledge or skills on managing people with peripheral artery disease. Physiotherapists working in the public sector were the minority of participants in this study, which could be the possible reason for the younger physiotherapist participant demographic with less than five years of work experience.

5.1.2 PATIENT DEMOGRAPHICS:

The Western Cape province has two tertiary level hospitals for adults with vascular departments: Tygerberg hospital (TBH) in the Northern suburbs and Groote Schuur Hospital (GSH) in the Southern suburbs.

Tygerberg Hospital and GSH had very similar patient demographics, yet there were twice as many participants recruited at TBH, as at GSH. This may be the result of increased referral pathways between clinics and hospitals, greater capacity for patients or severity of cases. Groote Schuur Hospital had more than one vascular clinic day per week, which caters to new referrals, follow-ups and varicose vein speciality clinics. Overall, the demographics of patients attending either clinic were indistinguishable.

No first language Xhosa speaking patients participated in this study. This could be due to the researcher being English speaking. It is possible that patients attending this clinic did not feel comfortable participating in research or disclosing information to the researcher who did not speak the same home language as them. It may have been beneficial to have a research assistant who was fully trilingual (English, Afrikaans and Xhosa speaking).

In 2021, The major languages spoken in the Western Cape were Afrikaans (49.7%), isiXhosa (24.7%) and English (20.3%) (Alexander, 2021), compared to the rest of South Africa, where the most spoken language is Zulu (23.8%) and English only spoken by 9% of the country (Khoza-Shangase & Mophosho, 2021). Therefore, this study population may not be a true representation of the entire Western Cape, considering that patient participants were attending clinics in the City of Cape Town and none were included from the other five municipalities. Nevertheless, the data from these two tertiary hospitals proved to be in alignment with global research findings considering outcomes of pain, mobility and HRQoL.

5.1.2.1 Gender

Groote Schuur Hospital presented with more females (58.7%), while this was inverse for TBH with 57.9% males. This study's findings corresponded with existing literature from high-income countries which found that women are more likely to present to vascular clinics at older ages (prevalent among people with peripheral artery disease) than men (Brevetti et al., 2008), due to more common asymptomatic presentation (Fontaine stage I) among women than in men (Porras, Bots, Teraa, van Doorn, & Vernooij, 2022). The average ages of participants were similar at both facilities, with GSH mean age being 59 and TBH mean age being sixty years old. In this study, women reported higher levels of pain severity (5.2) at its least and a greater interference of pain on their mood than in men (3.9).

Feelings of anxiety or depression (EQ-5D) were significantly more reported by women than men, which was similar to the findings of other studies (Jelani, Mena-Hurtado, et al., 2020; G. Kim, Anderson, Brown, Powell, & Corriere, 2021).

Conversely, this study did not find that women tend to present with worse HRQoL (Schramm & Rochon, 2018) as women's average EQ-VAS score was reported as slightly higher than their male counterparts, although this was not statistically significant.

5.1.2.2 Clinical presentation

At GSH vascular clinic, it was compelling that no asymptomatic people with peripheral artery disease participated in this study, compared to the twelve that participated at TBH vascular clinic. The majority of people with peripheral artery disease do not display symptoms of peripheral artery disease or do not have typical symptoms of peripheral artery disease (Lin et al., 2022). Therefore, if routine screening is not conducted for those at risk, it is likely they will only be referred for further assessment when they have complications or develop symptoms. It is plausible that there is a lack of early screening in the GSH catchment area (local clinics) as well as disjointed referral patterns between facilities. Consequently, fewer asymptomatic patients are referred for early intervention. To the knowledge of the researcher, there were no established routine screening interventions taking place at TBH or local clinics in the Northern suburbs that influenced this difference. Future research could investigate the existing referral pathways and how these affect patient outcomes.

The impact of the COVID-19 pandemic may also have contributed to discouraging hospital attendance, as is seen with outbreaks of other infectious disease (Cho & Kwon, 2021). The need to prioritise patient management in times of crisis, may have further disadvantaged patients seeking non-urgent medical management at tertiary level hospitals.

Considering that South Africa has an overwhelmed public health sector, infamous for lengthened waiting times and staff shortages, this is probable (Maphumulo & Bhengu, 2019). Such conditions can delay diagnosis and be a contributing factor to the late referral of people with peripheral artery disease to the vascular OPD. Despite this, there were surprisingly fewer study participants referred to GSH that had severe ischemic ulcers or gangrene —only one, compared to the nine at TBH. This can be attributed to the TBH vascular clinic containing a mixture of new referrals and follow-up patients that may have had peripheral artery disease for longer, while the GSH vascular clinic presented only new referrals. Both hospitals contained a mixture of vascular-related cases.

Overall, it is important to acknowledge the stage of disease that patients are in at the time they are referred to vascular departments. Early detection and screening in primary healthcare are crucial as they could help avoid the need for surgical intervention.

The South African strategy to reduce cardiovascular disease is to promote screening and prevention through risk factor management at a primary healthcare level (Mphekgwana et al., 2022). Similarly, another Sub-Saharan study has highlighted the need for preventative screening and focus on risk factor control (Johnston et al., 2016). There exists a 49.7% prevalence of dyslipidaemia and 38.5% of diabetes mellitus among people with peripheral artery disease. Diabetes mellitus hastens the progression of peripheral artery disease.

5.1.2.3 Co-morbidities

This study confirms the prolific presence of multi-morbidity in the elderly with peripheral artery disease (Y. Park, Ryu, & Choi, 2022). Preventative strategies such as smoking cessation (Creager & Hamburg, 2022), participation in at least 150 minutes of moderate physically activity per week (Gerage et al., 2019) and medication adherence (Agha, Camm, Edison, & Browning, 2012) for co-morbidities should be prioritised to avoid negative outcomes for people with peripheral artery disease. Secondary complications can be spurred on by the presence of inequitable access to healthcare and difficulty with accessing medical care (McMaughan, Oloruntoba, & Smith, 2020). However, this patient population is already highly predisposed to atherosclerosis due to the aging process (J. Wang & Bennett, 2012). Lack of screening, poor diabetes mellitus control and the presence of multiple other co-morbidities places patients with diabetes mellitus and peripheral artery disease at higher risk of lower-limb amputations and cardiovascular related events (Thiruvoipati, Kielhorn, & Armstrong, 2015).

A high prevalence (74.1%) of patients with hypertension was reported, compared to other populations such as North America, where the prevalence of hypertension is 35-55% among other people with peripheral artery disease (Clement, De Buyzere, & Duprez, 2004).

Most notably, this study found that the presence of non-healing ulcers (Fontaine stage IV) was dependent on a diagnosis of diabetes mellitus among the 38.5% of patient participants with diabetes mellitus. Patients with diabetes mellitus in the Western Cape have demonstrated poor blood sugar level management in other studies (Biesman-Simons et al., 2019; Boake & Mash, 2022). For these reasons, it is important to acknowledge the crucial role of prompt primary health care services in monitoring and preventing avoidable lower extremity amputations due to non-healing ulcers (Minc et al., 2021). Afterall, diabetes screening in the community may reduce secondary complications associated with diabetes and reduce the financial implications on the healthcare system (Hill, Peer, et al., 2020).

Considering the high rates of mortality in individuals with both peripheral artery disease and diabetes mellitus (Vrsalovic, Vucur, Vrsalovic Presecki, Fabijanic, & Milosevic, 2017) as well as elevated disability adjusted life years due to peripheral artery disease in South Africa, blood glucose control should be emphasised (Ganta, Soherwadi, Hughes, & Gillum, 2018).

5.1.2.4 Smoking

The percentage of current smokers attending the vascular clinics at both TBH and GSH was nearly 50%. Smoking is known as the primary risk factor for peripheral artery disease (W. Wang et al., 2021) and it doubles the risk for developing peripheral artery disease (Creager & Hamburg, 2022). Tobacco smoke can be described as "prothrombotic and atherogenic" (Bullen, 2008), indicating advancement of clot formation (Gutowska, Formanowicz, & Formanowicz, 2019) and plaque development in arteries. Smoking therefore increases the chances of developing peripheral arterial disease, cerebrovascular accidents, myocardial infarction and aortic aneurysm, whilst smoking termination has the potential to normalise metabolism of lipids in cells (Gastaldelli, Folli, & Maffei, 2010). Yet, about 80% of people with peripheral artery disease smoke or used to smoke (Willigendael et al., 2005).

This study reported lower proportions of people with peripheral artery disease that smoke (46.8%) than other peripheral artery disease population groups of up to 90% (Kokkinidis et al., 2020). People with peripheral artery disease that are tobacco smokers are known to have increased risk of being hospitalised with greater medical costs (Creager & Hamburg, 2022). Smoking cessation is emphasised throughout literature (Bhagirath, Nash, Wan, & Anand, 2022), yet it was not reported by all patients as their received management thus far in this study. The City of Cape Town's goal is to "reach 95% compliance with the national smoke-free law in public buildings" to prevent the effects of second-hand smoke on the public and discourage smoking (Organization, 2022). This is especially important considering that over 10 years ago, the cost of diseases caused by smoking were debilitating the South African economy by over R1.2 billion (van Zyl-Smit et al., 2013).

This study found that it was not routine for patients with a peripheral artery disease diagnosis to have received advice to stop smoking or avoid second-hand smoke from a physiotherapist or healthcare professional. Regardless, the benefits of smoking cessation should be emphasised, particularly for those younger than 40 years of age, since it can increase their life span by 10 years (Hersi et al., 2019). Similarly, other studies report poor referral to proven smoking cessation programmes and most who do quit smoking, will relapse by one year post cessation onset (K. K. Patel et al., 2018).

Some participants (21.3%) reported that they have never smoked cigarettes but did not report if they were exposed to high levels of second-hand smoke. A study by Lu et.al (2013) found that greater levels of second-hand smoke (more than 40 hours a week) is associated with peripheral artery disease and a log-linear relationship was suggested. Despite no significant difference found between smokers' and non-smokers' exercise behaviours in this study, exercise should be promoted among smokers because of the established vascular benefits in physically active smokers (Anton et al., 2006). A wide range of smoking cessation periods were reported in this study, ranging from one week to 40 years. Smoking cessation greater than five years has been found to have lower incidence of cardiovascular disease in people with peripheral artery disease (Duncan et al., 2019).

Smoking cessation should be emphasised to reduce cardiac and vascular complications. In this study, nearly half of reported previous smokers ceased more than ten years ago. For former smokers after 10-15 years, studies have found that the risk of developing cardiovascular disease was no longer greater than those who never smoked (Duncan et al., 2019).

5.2 PHYSIOTHERAPIST AND PATIENT KNOWLEDGE, ATTITUDES AND BELIEFS:

5.2.1 PHYSIOTHERAPISTS KNOWLEDGE:

Overall, physiotherapist reported knowledge of necessary factors regarding management of peripheral artery disease was not sufficient and further training is advised for those managing peripheral artery disease. With large proportions of existing research focused on invasive approaches and limb salvation strategies, there are still no up-to-date exercise prescription guidelines for patients with advanced peripheral artery disease (Tran, 2021). Literature is still unclear on whether exercise can be regarded as safe for patients at this late stage (chronic limb-threatening ischemia) of peripheral artery disease (N. Naidoo et al., 2022). Further research should investigate the role of physiotherapists in the management of patients with chronic limb-threatening ischaemia without perpetuating further tissue damage. This describes the current dilemma: physiotherapists require validated exercise prescriptions for people with peripheral artery disease, however globally no safe exercise therapies have been established for advanced peripheral artery disease management. Furthermore, continuous professional development activities can be time consuming and expensive and may not always yield the desired practical outcomes for clinicians (Maharaj, 2013). Continuous professional development activities are however a part of the Health Professions Council of South Africa requirements for maintaining status as a practicing physiotherapist and are therefore mandatory. Short courses and online webinars focusing solely on peripheral artery disease management in the multi-disciplinary rehabilitation perspective would be beneficial and relevant in the clinical setting.

5.2.2 PHYSIOTHERAPISTS BELIEFS AND ATTITUDES:

Nearly all physiotherapists believe that physiotherapists should screen for peripheral artery disease, yet only 12.7% reported that they do screen patients for peripheral artery disease. These physiotherapists should be supported and trained to screen and refer patients onto vascular specialists. Strategies to reduce risks of peripheral artery disease should be promoted in collaboration with other healthcare workers specialised in vascular management (Al-Omran, 2007). Decreasing the risks associated with peripheral artery disease could include smoking cessation programmes and co-morbid disease management (Al-Omran, Verma, & Lindsay, 2011). The majority of physiotherapists believe that they have not received sufficient training to manage people with peripheral artery disease and 95.8% of them believe that they require further training to sufficiently manage people with peripheral artery disease.

This finding was similar to that reported in a systematic review evaluating the awareness of peripheral artery disease, which found that knowledge and disease awareness was poor amongst non-specialised healthcare professionals, medical students and the general public (Bridgwood, Nickinson, Houghton, Pepper, & Sayers, 2020).

Understandably, a large proportion of the physiotherapists were novice in career with under five years of clinical work experience. A study by Forbes et al. (2017) which compared the use of patient education interventions amongst novice and experienced physiotherapists in a range of different physiotherapy settings found that experienced physiotherapists had a greater frequency of using education-based interventions compared to novice physiotherapists. These findings may suggest that novice physiotherapists working in the Western Cape may benefit from training that improves their skills in facilitating patient education and improved self-management.

Physiotherapists' responses in the open feedback section highlighted the barriers that exist for health care workers. Even with the correct understanding of management, physiotherapists may be unable to carry out preventative interventions for people with peripheral artery disease in the community due to limitations beyond their control such as understaffing, transport to health facilities and need to prioritise patient appointments focusing on treatment post injury as there is limited capacity for prevention in the public sector. There is a need for training for physiotherapists to manage people with peripheral artery disease. Further studies exploring qualitative data on the management of people with peripheral artery disease in the Western Cape would add an important narrative for patient outcomes.

5.2.3 PATIENTS KNOWLEDGE:

It is well established that people with peripheral artery disease tend to have poor awareness and knowledge of their condition (Byskosh et al., 2022). This study had similar findings as majority of the patients had a poor understanding of peripheral artery disease causes and treatment options. Commonly, people with peripheral artery disease present with poor attitudes for conservative management and have unreasonable beliefs concerning invasive surgical interventions (Schorr & Mays, 2017). Due to the nature of co-morbid diseases of lifestyle, patients require holistic intervention and education to reduce combined effect of uncontrolled risk factors (Keelan et al., 2022). It is important to bridge the knowledge gaps when patients encounter healthcare providers and refer appropriately, especially when it comes to risk factor modification and secondary complications (Hirsch et al., 2007).

Health promotion and behaviour change interventions are encouraged throughout literature (Ayeed, Hussain, AlHamzah, & Al-Omran, 2017; El Morr, AlHamzah, Ng, Purewal, & Al-Omran, 2017). Smoking cessation and general lifestyle advice was emphasised for many participants after completing the survey. A study exploring both healthcare worker and patients with tuberculosis perspectives in Cape Town found that healthcare workers sought less insight for their patients' needs because they were limited by understaffing and high workloads as is highlighted throughout South African healthcare literature (Mumbauer et al., 2021).

The recommended approach emphasised the importance of patient-centered care to educate and involve patients in their management planning (Kallon, Colvin, & Trafford, 2022). Additional systemic barriers that increase the difficulty of patient-centered care include but are not limited to "poverty, language and missed appointments" (Bosire, Mendenhall, Norris, & Goudge, 2021).

Lack of specific instructions, guidelines, tools, support groups and supervised exercise programmes have reinforced patient reliance on doctors and pharmacological interventions for managing peripheral artery disease. No patient reported having excellent knowledge of peripheral artery disease and less than 5% reported that they had good knowledge of causes, complications and treatment options for peripheral artery disease. This emphasises the need for patient education and self-management interventions that empower people with peripheral artery disease. It should not be left up to the patient to inquire about disease but should become standard practice amongst healthcare professionals to initiate patient educational sessions. Otherwise, patients may withdraw if healthcare professionals assume an authoritarian role instead of using a collaborative approach to their management. A qualitative study performed in Sweden found that once patients were diagnosed with peripheral artery disease, they would demonstrate either "active or passive information-seeking behaviour" and required more thorough counselling to accept and take control of managing their condition (Wann-Hansson & Wennick, 2016). Techniques should be used to encourage people with peripheral artery disease to ask questions, research and empower themselves with stronger knowledge about their condition through health education campaigns (Byskosh et al., 2022).

The risks associated with peripheral artery disease are well established (Kengne & Echouffo-Tcheugui, 2019). In South Africa, the leading causes for amputation remain atherosclerosis and diabetes mellitus (M. Khan, Smith, Bruce, Kong, & Clarke, 2020).

A study conducted in the Western Cape highlighted the impact of impaired mobility due to unilateral amputation. The financial implications revealed 50% of patients were receiving government funding (disability grants or pension grants) and 28% were unemployed (Yu & Ennion, 2019). Furthermore, monetary constraints and transport costs are hurdles that South African amputees struggle to overcome to participate in rehabilitation programmes (U. Naidoo & Ennion, 2019).

5.2.4 PATIENTS ATTITUDES AND BELIEFS:

Most patients have positive attitudes towards complying to disease control measures, with more than 80% being willing to participate in an exercise programme in their local clinic. Interestingly, good self-efficacy was reported among people with peripheral artery disease, despite most participants reporting multiple co-morbidities, poor exercise behaviours and poor knowledge of the condition.

This juxtaposition may exist because the advantages of exercise or physical change may not be felt immediately, which could detract from ongoing participation in routine exercise (Neupert, Lachman, & Whitbourne, 2009). In the presence of pain due to claudication, one might have higher levels of self-efficacy, but it may be difficult to follow through with walking perceived as the cause of pain due to fear-avoidance beliefs (Neupert et al., 2009). This highlights the disparity between intention and implementation among this group of people with peripheral artery disease. More extensive qualitative research is required into attitudes and beliefs of people with peripheral artery disease to identify factors that will strengthen compliance to rehabilitation and improve patient outcomes. Perhaps lack of support, understanding and resources have previously denied patients the opportunity to obtain a more active role in managing peripheral artery disease (Menichetti, Libreri, Lozza, & Graffigna, 2016).

Overall, the physiotherapists and patients that participated in this study expressed that they had deficient knowledge about PAD. This could influence the patient's ability to make appropriate lifestyle modification and be compliant to exercise therapy. This could also influence physiotherapist's ability to issue advice regarding non-pharmaceutical management as they do not feel that they have enough knowledge.

5.3 PROFILE OF PEOPLE WITH PERIPHERAL ARTERY DISEASE:

5.3.1 PAIN:

The brief pain inventory scores indicated that the patient participants have moderate pain as indicated by the mean pain severity score (4.5) (Shi et al., 2017). In addition, the most reported anatomical site of pain was in the left lower limb, which is the typical presentation of intermittent claudication (Harwood et al., 2020). The moderate mean pain scores may also indicate that the patients in this study experienced good pain relief from pharmacological interventions. The brief pain inventory asks about what medication participants are using and the relief it provides.

It is limited to provide in-depth detail about analgesic type usage, frequency or length of usage and does not account for interactions with other drugs that participants may be taking which would affect their experience of claudication. Future South African studies could be beneficial to determine the efficacy of pharmacotherapy in conjunction with exercise. More than half of patients reported using opioids for pain relief and the opioids provided the most pain relief (80.9%), compared to other analgesics. This is homogenous with another study that warned against chronic opioid usage among patients with intermittent claudication and chronic-limb threatening ischaemia in the United States of America (Velazquez-Ramirez et al., 2022). Non-steroidal anti-inflammatory drugs such as Aspirin were not commonly used and produced the lowest reported pain relief (38.9%).

More than half of the patients reported severe to extreme pain or discomfort in the EQ-5D. This finding matches the clinical presentation of symptomatic peripheral artery disease (Rezvani, Pelt, Härter, & Dirmaier, 2022). Half the participants reported that when their pain was at its least severe, the pain goes away completely, which aligns with the characteristics of peripheral artery disease as a disease aggravated by exertion of the lower extremities (Gardner & Afaq, 2008). The moderate mean pain score is less than expected for patients presenting with claudication and severe walking impairment. This finding may be a reminder that pain intensity reporting is not necessarily equal to disease progression (McDermott et al., 2004), and should be considered bio-psychosocially (Coca-Martinez, Carli, & Gill, 2021; Gatchel, Peng, Peters, Fuchs, & Turk, 2007).

This study found that among people with peripheral artery disease, there was no significant difference between smokers and former smokers in comparison to patients who have never smoked with regards to their pain at its worst in the last 24 hours.

This finding is not typical of other studies where effects of smoking are established to predict more severe endothelial dysfunction and therefore worse pain (J. Lu & Creager, 2004).

Females reported experiencing worse pain severity at their least and worst symptoms in the last 24 hours and worse pain interference with their mood than males. This was statistically significant. It is a common finding that women with chronic pain tend to report more intense and severe pain than men, potentially due to established gender roles or emotional expectations from society (Stubbs et al., 2010). Considering that pain is a subjective experience, this intensity in women can be attributed to range of reasons, some include hormonal influence in relation to the central and peripheral nervous systems, gender specific coping strategies and being more voluntary in expressing painful experiences in self-reporting measures (Bartley & Fillingim, 2013).

Less than 10% of participants were asymptomatic, which is not necessarily aligned with findings in other studies, as the proportion of people with peripheral artery disease with no symptoms is thought to be between 30-60 percent in North American primary health care (McDermott, 2015).

However, patients presenting to a specialist vascular clinic will generally be more complex patients that cannot be managed at a primary health care or district level facility. Asymptomatic peripheral artery disease is also less likely to be diagnosed overall and thus, this small percentage identified in the clinic cannot advocate for the undiagnosed in the community who may have their symptoms mistaken, masked or misdiagnosed with other neurological or musculoskeletal conditions.

5.3.2 PATIENT HRQoL:

Participants in this study reported fairly high levels of HRQoL, despite having severe impairments with more than half presenting with ischemic rest pain or ulceration and gangrene. The mean EQ VAS (0-100) was 63% indicating fair to good perceived health (Jensen, Chen, & Brugger, 2003). This echoes the findings of a study performed in the Netherlands that reported an average EQ-VAS of 66% among 204 patients that had recently been diagnosed with intermittent claudication (Vaidya et al., 2018). This falls within the range of EQ-VAS scores of 37-89% identified in patients with cardiovascular disease (Dyer, Goldsmith, Sharples, & Buxton, 2010) and similarly another study with patients with diabetes mellitus with 66.8% (Grandy & Fox, 2008). Most patients experienced no issues with self-care, whilst most experienced moderate to extreme difficulty with pain.

More than half of patients reported in the EQ-5D-5L that they were experiencing extreme or severe pain, yet only 14.7% of patients reported having a HRQoL VAS below 50%. Notably, more than a third of patients reported not feeling anxious or depressed and only 7% were extremely anxious or depressed. Peripheral artery disease severely impacts the health state of patients and it is necessary to promote the benefits of conservative management such as smoking cessation and exercise therapy to reduce pain and improve function and quality of life (Raja, Spertus, Yeh, & Secemsky, 2021).

Most of the participants experienced severe to extreme difficulty with pain. Even though these patients had a high intensity of pain, only 14.7% of reported an EQ VAS below 50%. The average age of participants was sixty years old, and many patients did not engage in regular physical activity. Employment status may have been a worthwhile question to include in this study to ascertain functional requirements of participants. Considering the nature of peripheral artery disease, it may be possible that patient participants when mobilising do not frequently walk to the point of symptom exertion. This would mean that although they may experience intense pain due to advancing age, due to lower functional status, this may not impact their quality of life as significantly as their exertional requirements are far less. Patient participants may have adapted by evading tasks that induce symptoms.

Most patients experienced no difficulty with self-care, however, most of the participants had moderate pain severity and problems with walking and doing usual activities as reported in the BPI-sf. Self-care can be completed for most tasks seated or standing in a stationary position, which would not induce claudication symptoms. However, walking and usual activities might include tasks relate to higher functions which are more likely to induce ischaemia in the lower limbs.

This study found that the severe pain that people with peripheral artery disease experienced did not always affect their ability to perform their activities of daily living. This was seen as more than 75% of participants experienced no problems with self-care and nearly 70% of patient participants had no problems or slight problems with their usual activities. This is not a usual finding as most people with chronic pain are usually largely impacted in their usual activities and with their mental health. Chronic pain and depression are closely link and usually influence each other (Linton & Bergbom, 2011). Notably, more than a third of patients reported not feeling anxious or depressed and only 7% were extremely anxious or depressed. This may be linked to coping strategies associated with positive attitudes despite difficult situations because worse circumstances have been overcome in the past.

This is further explained in 5.3.4. It is therefore necessary to promote the benefits of conservative or non-pharmacological management such as smoking cessation and exercise therapy to reduce pain in the patient's lower limbs and improve their overall physical function and health related quality of life (Raja et al., 2021).

5.3.3 PATIENT EXERCISE BEHAVIOURS:

The VASSA recommends supervised exercise therapy for a minimum of three hours per week and support walking, swimming, upper limb and lower limb cycling as suitable forms of exercise to manage peripheral artery disease (N. Naidoo et al., 2022). The 2020 World Health Organisation guidelines on physical activity and sedentary behaviour recommend 150-300 minutes of moderate-intensity or 75-150 minutes of vigorous physical activity for adults per week (Bull et al., 2020). This is similar to the recommendations of AHA and VASSA guidelines for people with peripheral artery disease (Gerhard-Herman et al., 2017; N. Naidoo et al., 2022). The AHA and VASSA recommend supervised exercise therapy (Gerhard-Herman et al., 2017; N. Naidoo et al., 2022). In the South African context, it is feasible for people with peripheral artery disease to be referred for physiotherapy for non-pharmacological management strategies that are safe and effective in reducing symptoms and impairments (Hamburg & Balady, 2011). Supervised exercise therapy should be considered as principal management strategy for persons with peripheral artery disease, as it has shown to have long-lasting functional benefits and is less invasive than alternative interventions (Murphy et al., 2015).

It is globally understood that exercise is beneficial, however in the presence of pain, disease or disability, fear-avoidance behaviours may instinctively prevent people with peripheral artery disease from engaging in exercise for fear of further injury or pain response (Sharath, Kougias, & Barshes, 2017). In agreement with other studies (Abaraogu, Ezenwankwo, Dall, Tew, et al., 2018; Abaraogu, Ezenwankwo, Dall, & Seenan, 2018; de Sousa et al., 2019), this study found that exercise participation among people with peripheral artery disease is poor due to numerous personal and environmental barriers.

Trepidation regarding claudication symptoms causes uncertainty about whether they are doing more harm than good by walking (Sharath, Kougias, & Barshes, 2017) and patients will either evade or embrace this pain (Hanel et al., 2020). People with peripheral artery disease are less likely to participate in regular exercise when compared to patients with other longstanding co-morbidities (Sasaki et al., 2022).

This could be due to the presence of multiple co-morbidities, the age group affected is usually older with reduced exercise capacity and may be more stressed (McDermott et al., 2016). In this study, the exercise that most participants took part in was walking for exercise. This is very encouraging since VASSA recommends walking as the primary type of exercise for people with peripheral artery disease (N. Naidoo et al., 2022). However, just 11.3% of participants were achieving the World Health Organisation weekly physical activity recommendations of "at least 150 minutes of moderate-intensity aerobic physical activity" (Y. Yang, 2019).

Only 3.5% of patients reported swimming in the past week, potentially due to lack of access to a pool, unsuitable weather or inability to swim. Only 7% of patients reported bicycling in the past week, most likely due to not owning a bicycle or stationary exercise bike. It is recommended that future studies explore the barriers to participation in swimming, cycling and strengthening exercises amongst patients with peripheral artery disease in the Western Cape in greater detail. The average time spent on anaerobic exercise such as stretching or strengthening exercises in the past week was just under ten minutes, significantly less time compared to 40.1 minutes in the Stanford Chronic Disease Self-Management Study (Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001). Strengthening exercise is an important component of exercise prescription to maintain functional status in people with peripheral artery disease (McGuigan et al., 2001). The average time spent on aerobic exercise reported in the past week was just under an hour, significantly less than an hour and a half on average reported by other subjects with chronic diseases in the Stanford Chronic Disease Self-Management Study (Lorig et al., 2001).

Despite the many barriers that prevent people with peripheral artery disease from engaging in therapeutic exercise, just a fifth of participants reported that they would not participate in a supervised exercise programme.

Beyond pain or poor health, patients reported a lack of knowledge of exercise type, dosage and frequency that is safe to perform for their individual severity of peripheral artery disease. Participants provided reasons as to why they would not engage in a group exercise class. Many reasons revolved around social circumstances. These social circumstances included safety in their community, transport issues and work schedules, all of which pose a threat or barrier to exercise compliance.

This was found to be congruent with other studies, where concerns for security, laziness, lack of time and space to exercise hindered physical activity (Hill, Lavigne Delville, et al., 2020; Onagbiye, Moss, & Cameron, 2016). Most participants were eager to partake in supervised exercise classes. As recommended by the AHA, some participants may benefit from personalised home exercise programmes to improve functional outcomes (Gerhard-Herman et al., 2017), as 5% of participants reported that they would prefer to exercise on their own.

5.3.4 PATIENT SELF-EFFICACY:

Self-efficacy, termed by Albert Bandura in 1977, is the view that one has of their own capacity to manage different circumstances (Chan, 2021) and is an important determinant of chronic disease management (Belil, Alhani, Ebadi, & Kazemnejad, 2018). This is because poor self-efficacy translates to poor chronic disease management (Yazdi-Ravandi et al., 2013). Improving self-efficacy and empowering patients to adopt more healthy and active lifestyles may assist with better chronic disease management and improved health related quality of life.

The VASSA recommend supervised exercise therapy, acknowledging the huge reliance placed on patient's adherence of exercise regimes to result in successful or positive clinical outcomes (N. Naidoo et al., 2022). In this study, the lowest self-efficacy was reported for managing peripheral artery disease to avoid seeing a doctor and without taking medication. Patients are aware that they require medication to manage their condition, which is important for compliance. However, poor reported exercise behaviours demonstrate the need to improve self-efficacy and knowledge of exercise amongst people with peripheral artery disease. Although exercise compliance is multifactorial, higher levels of self-efficacy are associated with better uptake and participation in routine physical exercise (Pekmezi, Jennings, & Marcus, 2009). It was found that not enough patients reported receiving important lifestyle modification advice from healthcare providers. The mean self-efficacy was calculated at 6.1, which was higher than other studies of chronic diseases where the mean was 5.17 (Lorig et al., 2001). This moderate response may suggest that even without healthcare worker intervention or guidance, patients remain confident that they are able to manage peripheral artery disease. Further support is required to empower patients to feel more confident in managing peripheral artery disease.

Patients in this study seem to have adapted to living with multiple co-morbidities and poor HRQoL due to peripheral artery disease-associated pain.

Patient participants had reported moderate pain on the BPI-SF pain VAS scale, their walking behaviours were low, their self-efficacy in using non-pharmacological interventions to manage their peripheral artery disease was low and their overall HRQoL VAS scores were surprisingly higher than expected with a mean EQ-5D VAS score of 63%. This could be due to perseverance and fighting spirit as coping strategies that are fostered in people from low socio-economic environments, where, despite disease and disability, they believe they can overcome because they have had to manage previous difficulties (Van Wilder et al., 2021). Religion and faith may also be a contributing factor to overcoming negative feelings or behaviours associated with disease. A study in Nigeria found that religion was a powerful coping strategy in patients with depression and diabetes with a low occupational rank (Amadi et al., 2016).

Further research is necessary to explore the possible coping strategies that are utilised by patients in the Western Cape with peripheral arterial disease and associated pain. Religion was not objectively explored in this study, although it was frequently self-reported in between questions about pain or HRQoL. Patients would verbalise that "God is good" or express overall gratitude as general feedback, despite high pain responses. More qualitative data would be beneficial to explore faith as a facilitator in people with peripheral artery disease.

5.4 PHYSIOTHERAPY MANAGEMENT:

The extent to which physiotherapists are managing people with peripheral artery disease in the Western Cape is limited. Most physiotherapists reported managing people with peripheral artery disease once a week or less. The majority of physiotherapists manage patients once they have had an amputation relating to non-healing ulcers or gangrene. Other studies do not specifically isolate physiotherapists as the instructors in vascular rehabilitation since such rehabilitation can be carried out in any facility with specialist vascular healthcare professionals (Noumairi et al., 2021). However, a physiotherapy article provides great detail on the role of physiotherapists in management of patients with intermittent claudication (Spannbauer et al., 2019). The benefits of exercise in people with peripheral artery disease are well established to decrease inflammation and improved capillary density as well as endothelial function (Duscha et al., 2011).

Established effective frequency of exercise programmes are recommended for a minimum three times a week for at least three months (Casillas et al., 2011), yet in this study, only 11.2% of physiotherapists were managing patients more than three times per week. Further investigation would be required to ascertain how frequently each patient is managed.

However, from the answers about frequency of managing people with peripheral artery disease per week, it is apparent that patients are not receiving rehabilitation with their physiotherapist at least three times per week as recommended in literature to have supervised exercise therapy three times per week (Harwood et al., 2020).

It would be beneficial for future research to identify both the barriers that prevent patients from engaging in recommended exercise programmes and appropriate facilitators to lessen the effect of these barriers. Additionally, understaffing, lack of appropriate equipment and resources are well established barriers in the South African health care sector (de Villiers, 2021). Patients' availability of time, finances, transportation, scheduling and dependents also reduces access to physiotherapy services (Jack, McLean, Moffett, & Gardiner, 2010). Perhaps in settings with limited resources it could be beneficial for weekly supervised exercise groups to be held that include a home exercise programme for an additional two days.

A minor portion of patient participants received crucial information relating to managing peripheral artery disease. About a third of patients were instructed by healthcare workers to walk as a form of exercise to manage peripheral artery disease. With majority of patient participants being current or former smokers, it is unfortunate that only about half of them received instruction from healthcare workers (nurse, doctor or dietitian) to stop smoking and only a fraction of patients received instruction from a healthcare worker to avoid second-hand smoke. Considering that smoking cessation is one of the most effective interventions in the management of peripheral artery disease (Hobbs & Bradbury, 2003), this should be highlighted by all healthcare workers involved in the care of this patient group. In-depth smoking cessation programmes should be developed to discourage reliance on tobacco (Hennrikus et al., 2010). The damaging effects of smoking are well established (Conen et al., 2011) and patient education relating to lifestyle modification should be at the forefront of peripheral artery disease management (Lecouturier et al., 2019). Smoking cessation and advice to walk are essential to promote mobility and avoid fear-avoidance beliefs in people with peripheral artery disease (K. Patel et al., 2018).

Further investigation would be required from healthcare workers regarding the frequency that they advise patients about smoking cessation and or walking for exercise, as patients reported receiving a negligible amount of feedback from physiotherapists regarding peripheral artery disease. This could be due to the lack of referral or interaction with physiotherapists in the public sector as appointments with therapists are less frequent than that of medical staff such as doctors or nurses (Narain & Mathye, 2023). Furthermore, contact with any healthcare provider should include intentional empowerment and health promotion to prevent further complications. Emphasis of the ischemic nature of peripheral artery disease is understated in physiotherapy management and holistic collaboration should be promoted between disciplines to prevent further impairment to people with peripheral artery disease in the Western Cape.

The use of the ankle-brachial index has been identified as an effective screening method for peripheral artery disease (Tummala & Scherbel, 2018). In this study, most of the physiotherapists reported that they do not screen for people with peripheral artery disease and only 1.4% of reported that they use the ankle-brachial index for assessment as a screening tool. One of the key inhibitors to earlier detection and management of peripheral artery disease is the lack of routine ankle-brachial index testing present in local clinics (Pradhan, Aday, & Beckman, 2020).

While this study did not explore whether physiotherapists knew how to perform an ankle-brachial index test, the findings suggest that providing physiotherapists with ankle-brachial index training may be beneficial in screening patients, especially those with risk factors for peripheral artery disease. At the minimum, physiotherapists should have knowledge of signs and symptoms of peripheral artery disease to differentiate between other conditions affecting the lower limb to refer for accurate diagnosis and management. Earlier detection and screening may prompt timeous disease intervention and can ward off secondary complications such as major cardiovascular incidents or lower extremity amputation (Bartholomew & Bishop, 2020). The costs to the Department of Health associated with lower extremity amputation due to peripheral artery disease or amputation are enormous and mostly avoidable (Desai et al., 2021; Thompson et al., 2020). In South Africa, physiotherapists are first-line practitioners and with the appropriate training, can support the screening process in people with peripheral artery disease (Spannbauer et al., 2019).

The most frequently used modalities for the management of pain associated with peripheral artery disease included circulation drills (26.8%) and chronic pain management (23.9%).

Notably, 18.3% of physiotherapist participants reported that they do not treat pain in people with peripheral artery disease. This can be due to 16.9% of participants managing patients that are asymptomatic. It is possible that physiotherapists managing people with peripheral artery disease are unaware of the severity of claudication in people with peripheral artery disease pre-amputation. As was reported, physiotherapists have poor perceived knowledge of pharmaceutical and non-pharmaceutical management options for people with peripheral artery disease.

Considering the functional impact of peripheral artery disease, it was unexpected that a minority of physiotherapists treat decreased mobility, gait speed and gait endurance in people with peripheral artery disease. This may be attributed to the fact that 36.6% of participants are managing patients with severe ischaemia, ulcers or gangrene and that improving mobility may not be appropriate at this stage for those patients, as exercise for patients with chronic limb-threatening ischemia is currently contra-indicated due to lack of sufficient evidence to support safe exercise prescription (Conte et al., 2019). Gait endurance was the impairment that was most managed by physiotherapists in this study, which is in accordance with recommendations from local and international studies (Schieber et al., 2020). The AHA recommends supervised exercise therapy for claudicants prior to attempts at surgical intervention (Gerhard-Herman et al., 2017). In this study, other impairments such as HRQoL and pain in people with peripheral artery disease were mostly managed through modalities that have been less frequently studied and this differs from AHA guidelines. Physiotherapists in this study were mostly managing HRQoL with chronic pain management (22.5%), advice to walk (18.3%) and aerobic exercises (12.6%) and pain was mostly being managed by circulation drills (26.8%) and chronic pain management (23.9%). The AHA recommend supervised exercise therapy to improve HRQoL (Gerhard-Herman et al., 2017), yet nearly a third of physiotherapists reported that they do not treat HRQoL in people with peripheral artery disease. This could be a result of inadequate training or lack of fundamental understanding of peripheral artery disease. Many studies have been conducted on pain-free treadmill walking until the point of claudication (Treat-Jacobson et al., 2019). In literature, treadmill walking remains the main mode of recommended exercise prescription, but where this is not possible, home-based or community walking programmes have also been proven to effectively enhance mobility in people with peripheral artery disease (McDermott, 2018). In the context of the Western Cape, supervised and equipment-based home or facility exercise is not always feasible due to lack of finances, resources and access to healthcare services.

This justifies the use of aerobic exercises and lower limb strengthening for the management of mobility-related deficits in people with peripheral artery disease, where the use of equipment is certainly an aid but not a necessity. Among physiotherapists who do manage impaired mobility, a wide range of treatment modalities were reported, all of which may benefit people with peripheral artery disease.

Most physiotherapists in this study reported that they do manage impaired balance in people with peripheral artery disease, using lower limb strengthening exercises. This could be attributed to 83.1% of participants managing people with peripheral artery disease post-amputation relating to gangrene. The rehabilitation of amputees is well established in South Africa, despite many barriers faced in community re-integration and access to ongoing physiotherapy and occupational therapy services (Frederiks & Visagie, 2013; U. Naidoo & Ennion, 2019). Diabetes mellitus and diseases associated with atherosclerosis such as peripheral artery disease remains the leading cause for lower limb amputations in South Africa (Khan, Smith, Bruce, Kong, & Clarke, 2020). South Africa hosts a “double burden” of disease (Biney, Amoateng, & Ewemooje, 2020) in that infectious and chronic disease co-exist, further perpetuated by vast inequality for disadvantaged groups. Global literature on exercise rehabilitation for people with peripheral artery disease is skewed toward environments that may be safer, more accessible or more conducive to community walking.

A study exploring physical activity and diabetes revealed that the main exercise limitations in Cape Town were safety, costs and inaccessibility of exercise facilities (Hill, Lavigne Delville, et al., 2020). The Western Cape differs from Europe and North America, where access to treadmills, other exercise equipment and safer community walking is not always an option. Further research is required to promote cost-effective and accessible treatment modalities that can be sustained in an African setting.

Overall, further research is required to established safe parameters for exercise with advanced peripheral artery disease in an African setting, with dosages and frequency of type of exercise. Home based exercise can be promoted when accessing supervised exercise programmes is not feasible.

5.5 STUDY LIMITATIONS:

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines were used as a benchmark for evaluating study limitations. The guideline criteria are presented below in Table 20, indicating how these were addressed in the study.

Table 20: Study evaluation in relation to STROBE guidelines

Item	Item No	Recommendation	Section where this is addressed
Title and abstract	1	Indicate the study's design with a commonly used term in the title or the abstract Provide in the abstract an informative and balanced summary of what was done and what was found.	Abstract
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported.	Section 1.4
Objectives	3	State specific objectives, including any prespecified objectives.	Section 1.3
Methods			
Study Design	4	Present key elements of study design early in the paper.	Section 3.2
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.	Study setting is described in Section 1.5 Periods of recruitment and data collection are described in Sections 3.5 and 3.6
Participants	6	Give the eligibility criteria, and the sources and methods of selection of participants.	3.3 and 3.4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Section 3.7
Data sources/measurements	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group.	Section 3.7
Bias	9	Describe any efforts to address potential sources of bias.	3.9.3.1
Study size	10	Explain how the study size was arrived at.	3.5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why.	3.9.2
Statistical methods	12	Describe all statistical methods including those used to control for confounding.	3.9.2
		Describe any methods used to examine subgroups and interactions.	3.9.2
		Explain how missing data were addressed.	N/A
		If applicable, describe analytical methods taking account of sampling strategy.	N/A
		Describe any sensitivity analyses.	N/A

Item	Item No	Recommendation	Section where this is addressed
Results			
Participants	13*	Report numbers of individuals at each stage of study – e.g. numbers potentially eligible, examined for eligibility, confirmed eligible, included in study, completing follow-up, and analysed.	4.1 and 4.2
		Give reasons for non-participation at each stage.	4.2
		Consider use of a flow diagram.	4.1 and 4.2
Descriptive data	14*	Give characteristics of study participants (e.g. demographic, clinical, social) and information on exposures and potential confounders.	4.1.1 and 4.2.1
		Indicate number of participants with missing data for each variable of interest.	4.1 and 4.2
Outcome data	15*	Report numbers of outcome events or summary measures.	4.1 and 4.2
Main results	16	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g. 95% confidence interval). Make clear which confounders were adjusted for and why they were included.	N/A
		Reported category boundaries when continuous variables were categorised.	N/A
		If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period.	N/A
Other analyses	17	Report other analyses done – e.g. analyses of subgroups and interactions, and sensitivity analyses.	4.1 and 4.2
Discussion			
Key results	18	Summarise key results with reference to study objectives.	4.3
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	5.5
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from the similar studies, and other relevant evidence.	6
Generalisability	21	Discuss the generalisability (external validity) of the study results.	5.1
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based.	3.9.5

This study was conducted during the Covid-19 pandemic, which delayed research onset at multiple stages for recruitment and data collection. Reaching important stakeholders was difficult, with added delays in communication due to remote working. With fear associated with contracting the Covid-19 virus, many patients were also reluctant to participate, despite all safety measures being in place to prevent the spread of Covid-19.

This study describes patient outcomes for a group of patients accessing public facilities. However, most of the physiotherapists who participated are from private facilities. Data collection focused on public sector patients, as these represent the majority of South Africans and did not investigate the management of patients in the private sector. No first language Xhosa speaking patients participated in this study. It may have been beneficial to have a research assistant who was trilingual (English, Afrikaans and Xhosa speaking).

There was a poor response rate from physiotherapists in public sector, despite contacting facilities directly through the head of department and sending reminder emails. This may have been further limited by not having direct access to email chains, like SASP and PASA which are more associated with private sector physiotherapy registrations. Uncertainty regarding the number of physiotherapists currently managing people with peripheral artery disease produced a possibly exaggerated required sample size. A higher sample size was calculated based on the total number of physiotherapists currently working in the Western Cape and not the number working directly with people with peripheral artery disease. Even with accommodation for poor response rates to online surveys, the sample size was still over-estimated and was, therefore, not met. This could have been mitigated if in-person hospital research studies were possible at the time. However, during the Covid-19 pandemic, it was not an option to access facilities directly because of measures in place to prevent virus transmission. During this time, it was especially difficult to contact facilities, due to uncertainty with changing government policy, staff shortages, facilities being inundated with Covid-19 patients and researcher-administered surveys were discouraged. Public sector websites are not frequently updated, making it challenging to find specific information that may be required. Vascular specialist interest groups for physiotherapists or medical practitioner networks with referrals to physiotherapists would have been a useful base to work from.

5.6 RECOMMENDATIONS AND IMPLICATIONS:

This study is the first of its kind regarding the physiotherapy management of peripheral artery disease in South Africa. Future research should promote practical management guidelines, referral patterns and exercise prescription in an African context.

Future research could include qualitative data to further explore patient beliefs about peripheral artery disease. The following is recommended:

1. Training: Physiotherapists managing people with peripheral artery disease should receive further training to align treatments with the most up-to-date local and international guidelines. As well as self-management techniques to improve self-efficacy and chronic disease management.

2. Management: Physiotherapists who manage people with peripheral artery disease should promote walking to the point of claudication, then resting to prevent tissue injury. Physiotherapists can guide patients to rest until the pain has subsided, then begin walking again. Objective measures could be used to monitor progress relating to pain, maximum walking distance before onset of pain and the ankle-brachial index.

3. Management: People with peripheral artery disease should engage in regular exercise for a minimum of three times a week in a mode of exercise of their choice to strengthen and improve functional walking outcomes. People with peripheral artery disease should cease smoking and avoid second-hand smoke.

4. Management: Medical doctors should refer people with peripheral artery disease to physiotherapists as an adjunct to medical management. Collaborative efforts could be made before attempting surgical intervention, except for urgent cases when ensuring life or limb salvage.

5. Screening: Ankle-brachial index screening should be conducted at a primary healthcare level with routine check-ups and in hospital for patients at higher risk of developing peripheral artery disease.

6. Referral: The latest guidelines should be shared with physiotherapy societies and more efficient referral pathways should be set-up between primary healthcare and specialist vascular centre. In the public sector, these referrals should be sent to physiotherapists to issue home exercise programmes or develop group exercise facilities at local clinics. In the private sector, medical aid schemes should be approached to develop benefits and care plans that enable preventative therapies for people with peripheral artery disease diagnosis.

7. Health promotion: This study supports continued promotion of smoking cessation programmes at a primary healthcare level. People with peripheral artery disease who smoke should be given advice by healthcare workers to walk as a form of exercise, to stop smoking and avoid second-hand smoke.

Smoking cessation programmes and therapies should be provided, where possible and not just advice to stop smoking.

8. Research: Further studies should be conducted to establish medically safe exercise prescription for people with peripheral artery disease and chronic limb-threatening ischaemia in an African context. Further research is required to safely guide patients with chronic limb-threatening ischaemia, as often clinical goals are focused on preventing amputation or further loss of mobility.

5.7 WHAT THIS STUDY CONTRIBUTES:

Physiotherapists feel they have not been sufficiently trained to manage peripheral artery disease and require support with this through modules in undergraduate studies, available short-courses or CPD activities in clinical practice. Not enough physiotherapists receive referral specifically to manage people with peripheral artery disease and would benefit from increasing referral networks with vascular specialists and medical doctors. This may require greater awareness within the healthcare sector of the role of physiotherapists in exercise prescription, chronic pain management, improving mobility function and independence. Not all physiotherapists are fully utilizing their role for health promotion and screening. Strategies for screening and referral could support earlier medical management for people with peripheral artery disease. Physiotherapists can reduce functional deterioration and impairment of people with peripheral artery disease by providing supervised exercise therapy or home exercise therapies when it is not possible to have physiotherapy input three times a week.

People with peripheral artery disease present to physiotherapists in the Western Cape at an advanced stage of disease or once they have already undergone an a lower-limb amputation relating to non-healing ulcers or gangrene. Most patients presenting with peripheral artery disease, despite barriers, are willing to participate in supervised exercise therapy or a home exercise programme.

CHAPTER 6: CONCLUSION:

The majority of physiotherapists do not screen for peripheral artery disease in their patients, conduct health promotion talks or run group exercise classes at their facility. There was no difference between referrals requesting management of people with peripheral artery disease in the private or public health sector. Further, re-iterating that people with peripheral artery disease are widely poorly managed and supported to partake in evidence-based conservative management practices such as supervised exercise therapy.

A large majority of physiotherapists prescribe circulation drills and chronic pain management for managing pain in people with peripheral artery disease. There was no distinct set of exercise prescription or type of exercise modality used for any of the common deficits that's people with peripheral artery disease frequently report. This is a concern that physiotherapists may be managing people with peripheral artery disease in the Western Cape, without knowing what is safe, established and effective. Some physiotherapists do not manage decreased gait speed, decreased endurance or impaired HRQoL in people with peripheral artery disease which are well established deficits among these patients. Western Cape physiotherapists require training to develop a uniform management approach to people with peripheral artery disease in the private and public sector.

People with peripheral artery disease present with better-than-expected health state (HRQoL), pain severity and interference with function scores, despite most patient participants experiencing pain in the lower limb, which is common for claudicants. A large majority of patient participants presenting in this study smoke or are former smokers and had co-morbidities that are established risk factors for peripheral artery disease. Most patient participants had hypertension, half had dyslipidemia and a third had diabetes mellitus. The presence of non-healing ulcers or gangrene was dependent on a diagnosis of diabetes mellitus. Engagement in regular exercise was independent of smoking status or gender. The majority of patient participants had ischemic rest pain or moderate to severe claudication (Fontaine classification III or IIb).

Despite physical barriers such as moderate pain and advanced stage of peripheral artery disease, they remain confident that they can cope with their chronic disease. Patient participants remain mobile, able to participate in their activities of daily living and engage with friends and family.

With a growing burden of diseases of lifestyle, there is increasing need to choose preventative strategies such as exercise to reduce disability and improve quality of life and self-efficacy to enable people with peripheral artery disease to better manage their condition (Schiattarella et al., 2014).

A greater portion of people with peripheral arterial disease were using opioids for pain relief, with significant effect, enabling them to partake in their usual work and self-care. Most of the participants with peripheral arterial disease were not engaging in regular physical activity, but for those who do, walking is the most frequent form of exercise, despite only a third of people with peripheral arterial disease receiving advice to walk. Most patient participants have not received advice to cease smoking and even less have received advice to avoid second-hand smoke from healthcare providers.

Peripheral artery disease is burdensome and under-diagnosed (Olin & Sealove, 2010). There is a gap between recommended local guidelines for peripheral artery disease management and reported physiotherapy management of people with peripheral artery disease in the Western Cape. There is sufficient evidence to support home-based exercise programmes, although components may be inferior to supervised exercise therapy (Ehrman, Gardner, Salisbury, Lui, & Treat-Jacobson, 2023). Community programmes and home-based exercise programmes could be implemented in a local context to reduce barriers to exercise compliance (Treat-Jacobson et al., 2019).

Physiotherapists possess a unique skill set, that with the correct training could optimise management to improve HRQoL and physical function and reduce pain. Supervised exercise therapy has shown that it is effective conservative approach to improve patient outcomes yet remains under-utilised among people with peripheral artery disease and physiotherapists in the Western Cape.

REFERENCES:

Abaraogu, U., Abaraogu, O. D., Dall, P. M., Tew, G., Stuart, W., Brittenden, J., & Seenan, C. A. (2020). Exercise therapy in routine management of peripheral arterial disease and intermittent claudication: a scoping review. *Therapeutic advances in cardiovascular disease, 14*, 1753944720924270-1753944720924270. doi:10.1177/1753944720924270

Abaraogu, U., Ezenwankwo, E., Dall, P., Tew, G., Stuart, W., Brittenden, J., & Seenan, C. (2018). Barriers and enablers to walking in individuals with intermittent claudication: A systematic review to conceptualize a relevant and patient-centered program. *PLoS One, 13*(7), e0201095. doi:10.1371/journal.pone.0201095

Abaraogu, U., Ezenwankwo, E. F., Dall, P. M., & Seenan, C. A. (2018). Living a burdensome and demanding life: A qualitative systematic review of the patients experiences of peripheral arterial disease. *PLoS One, 13*(11), e0207456. doi:10.1371/journal.pone.0207456

Abdulhannan, P., Russell, D. A., & Homer-Vanniasinkam, S. (2012). Peripheral arterial disease: a literature review. *British Medical Bulletin, 104*(1), 21-39. doi:10.1093/bmb/lds027

AbuRahma, A., Adams, E., AbuRahma, J., Mata, L., Dean, L., Caron, C., & Sloan, J. (2020). Critical analysis and limitations of resting ankle-brachial index in the diagnosis of symptomatic peripheral arterial disease patients and the role of diabetes mellitus and chronic kidney disease. *J Vasc Surg, 71*(3), 937-945. doi:10.1016/j.jvs.2019.05.050

Achim, A., Stanek, A., Homorodean, C., Spinu, M., Onea, H. L., Lazăr, L., . . . Olinic, D. M. (2022). Approaches to Peripheral Artery Disease in Diabetes: Are There Any Differences? *Int J Environ Res Public Health, 19*(16). doi:10.3390/ijerph19169801

Aday, A. W., & Matsushita, K. (2021). Epidemiology of Peripheral Artery Disease and Polyvascular Disease. *Circulation research, 128*(12), 1818-1832. doi:10.1161/circresaha.121.318535

Afzal, N., Sohn, S., Scott, C. G., Liu, H., Kullo, I. J., & Arruda-Olson, A. M. (2017). Surveillance of Peripheral Arterial Disease Cases Using Natural Language Processing of Clinical Notes. *AMIA Joint Summits on Translational Science proceedings. AMIA Joint Summits on Translational Science, 2017*, 28-36. Retrieved from https://pubmed.ncbi.nlm.nih.gov/28815100 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5543345/

Agha, R., Camm, C., Edison, E., & Browning, N. (2012). Improving Compliance with Statins in Patients with Peripheral Arterial Disease: A Quality Improvement Study. *Annals of Medicine and Surgery, 1*, 30-33. doi:https://doi.org/10.1016/S2049-0801(12)70010-9

Agu, C. E., Uchendu, I. K., Nsonwu, A. C., Okwuosa, C. N., & Achukwu, P. U. (2019). Prevalence and associated risk factors of peripheral artery disease in virologically suppressed HIV-infected individuals on antiretroviral therapy in Kwara state, Nigeria: a cross sectional study. *BMC public health, 19*(1), 1143. doi:10.1186/s12889-019-7496-4

Akerman, A. P., Thomas, K. N., van Rij, A. M., Body, E. D., Alfadhel, M., & Cotter, J. D. (2019). Heat therapy vs. supervised exercise therapy for peripheral arterial disease: a 12-wk randomized, controlled trial. *Am J Physiol Heart Circ Physiol, 316*(6), H1495-h1506. doi:10.1152/ajpheart.00151.2019

Al-Omran, M. (2007). Knowledge and attitude of physicians in a major teaching hospital towards atherosclerotic risk reduction therapy in patients with peripheral arterial disease. *Vasc Health Risk Manag, 3*(6), 1019-1027.

Al-Omran, M., Verma, S., & Lindsay, T. F. (2011). Suboptimal use of risk reduction therapy in peripheral arterial disease patients at a major teaching hospital. *Ann Saudi Med, 31*(4), 371-375. doi:10.4103/0256-4947.83219

Al Wahbi, A. (2018). Autoamputation of diabetic toe with dry gangrene: a myth or a fact? *Diabetes Metab Syndr Obes, 11*, 255-264. doi:10.2147/dmso.S164199

Alexander, M. (2021). What languages are spoken in South Africa's nine provinces? Retrieved from https://southafrica-info.com/infographics/animation-languages-south-africas-provinces/#:~:text=Around%20half%20the%20people%20of,78.8%25)%2C%20Afrikaans%20(10.6%25)

Allwood, B. W., Koegelenberg, C. F., Irusen, E., Lalla, U., Davids, R., Chothia, Y., . . . Nyasulu, P. (2020). Clinical evolution, management and outcomes of patients with COVID-19 admitted at Tygerberg Hospital, Cape Town, South Africa: a research protocol. *BMJ Open, 10*(8), e039455. doi:10.1136/bmjopen-2020-039455

Alvim, R., Dias, F., Oliviera, C., Horimoto, A., Ulbrich, A., Krieger, J., & Pereira, A. (2018). Prevalence of Peripheral Artery Disease and Associated Risk Factors in a Brazilian Rural Population: The Baependi Heart Study. . *International Journal of Cardiovascular Sciences*.

Amadi, K. U., Uwakwe, R., Ndukuba, A. C., Odinka, P. C., Igwe, M. N., Obayi, N. K., & Ezeme, M. S. (2016). Relationship between religiosity, religious coping and socio-demographic variables among out-patients with depression or diabetes mellitus in Enugu, Nigeria. *Afr Health Sci, 16*(2), 497-506. doi:10.4314/ahs.v16i2.18

American Diabetes, A. (2010). Diagnosis and classification of diabetes mellitus. *Diabetes care, 33 Suppl 1*(Suppl 1), S62-S69. doi:10.2337/dc10-S062

Anton, M. M., Cortez-Cooper, M. Y., DeVan, A. E., Neidre, D. B., Cook, J. N., & Tanaka, H. (2006). Cigarette smoking, regular exercise, and peripheral blood flow. *Atherosclerosis, 185*(1), 201-205. doi:10.1016/j.atherosclerosis.2005.05.034

Apovian, C. M. (2016). Obesity: definition, comorbidities, causes, and burden. *Am J Manag Care, 22*(7 Suppl), s176-185.

Assocation, W. M. (2013). World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. *JAMA, 310*(20), 2191-2194. doi:10.1001/jama.2013.281053

Ayeed, S. B., Hussain, M. A., AlHamzah, M., & Al-Omran, M. (2017). Poor knowledge of peripheral arterial disease among the Saudi population: A cross-sectional study. *Vascular, 25*(1), 86-91. doi:10.1177/1708538116649801

Bartholomew, J., & Bishop, G. J. (2020). New treatments for peripheral artery disease. *Cleveland Clinic Journal of Medicine, 87*(5 suppl 1), 21-25. doi:10.3949/ccjm.87.s1.03

Bartley, E., & Fillingim, R. (2013). Sex differences in pain: a brief review of clinical and experimental findings. *British Journal of Anaesthesia, 111*(1), 52-58. doi:10.1093/bja/aet127

Bays, H. E., Toth, P. P., Kris-Etherton, P. M., Abate, N., Aronne, L. J., Brown, W. V., . . . Samuel, V. T. (2013). Obesity, adiposity, and dyslipidemia: a consensus statement from the National Lipid Association. *J Clin Lipidol, 7*(4), 304-383. doi:10.1016/j.jacl.2013.04.001

Bearne, L. M., Volkmer, B., Peacock, J., Sekhon, M., Fisher, G., Galea Holmes, M. N., . . . Bieles, J. (2022). Effect of a Home-Based, Walking Exercise Behavior Change Intervention vs Usual Care on Walking in Adults With Peripheral Artery Disease: The MOSAIC Randomized Clinical Trial. *JAMA, 327*(14), 1344-1355. doi:10.1001/jama.2022.3391

Beckman, J. A., Duncan, M. S., Alcorn, C. W., So-Armah, K., Butt, A. A., Goetz, M. B., . . . Freiberg, M. S. (2018). Association of Human Immunodeficiency Virus Infection and Risk of Peripheral Artery Disease. *Circulation, 138*(3), 255-265. doi:10.1161/CIRCULATIONAHA.117.032647

Belgrave, K., Shaikh, K., & Budoff, M. J. (2018). Risk of peripheral artery disease in human immunodeficiency virus infected individuals. *Annals of translational medicine, 6*(Suppl 1), S46-S46. doi:10.21037/atm.2018.10.08

Belil, F., Alhani, F., Ebadi, A., & Kazemnejad, A. (2018). Self-Efficacy of People with Chronic Conditions: A Qualitative Directed Content Analysis. *Journal of clinical medicine, 7*(11). doi:10.3390/jcm7110411

Besnier, F., Senard, J.-m., Grémeaux, V., Riédel, M., Garrigues, D., Guiraud, T., & Labrunee, M. (2017). The efficacy of transcutaneous electrical nerve stimulation on the improvement of walking distance in patients with peripheral arterial disease with intermittent claudication: Study protocol for a randomised controlled trial: The TENS-PAD study. *Trials, 18*. doi:10.1186/s13063-017-1997-1

Bhagirath, V. C., Nash, D., Wan, D., & Anand, S. S. (2022). Building Your Peripheral Artery Disease Toolkit: Medical Management of Peripheral Artery Disease in 2022. *Can J Cardiol, 38*(5), 634-644. doi:10.1016/j.cjca.2022.02.004

Biesman-Simons, T., Conradie, W. S., Nejthardt, M., Roodt, F., Davids, J., Pretorius, T., . . . Biccard, B. M. (2019). A multicentre prospective observational study of the prevalence and glycaemic control of diabetes mellitus in adult non-cardiac elective surgical patients in hospitals in Western Cape Province, South Africa. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde, 109*(10), 801-806. doi:10.7196/SAMJ.2019.v109i10.013898

Biney, E., Amoateng, A. Y., & Ewemooje, O. S. (2020). Inequalities in morbidity in South Africa: A family perspective. *SSM Popul Health, 12*, 100653. doi:10.1016/j.ssmph.2020.100653

Boake, M., & Mash, R. (2022). Diabetes in the Western Cape, South Africa: A secondary analysis of the diabetes cascade database 2015 - 2020. *Prim Care Diabetes, 16*(4), 555-561. doi:10.1016/j.pcd.2022.05.011

Bonaca, M. P., Hamburg, N. M., & Creager, M. A. (2021). Contemporary Medical Management of Peripheral Artery Disease. *Circulation research, 128*(12), 1868-1884. doi:doi:10.1161/CIRCRESAHA.121.318258

Bosire, E. N., Mendenhall, E., Norris, S. A., & Goudge, J. (2021). Patient-Centred Care for Patients With Diabetes and HIV at a Public Tertiary Hospital in South Africa: An Ethnographic Study. *Int J Health Policy Manag, 10*(9), 534-545. doi:10.34172/ijhpm.2020.65

Brevetti, G., Bucur, R., Balbarini, A., Melillo, E., Novo, S., Muratori, I., & Chiariello, M. (2008). Women and peripheral arterial disease: same disease, different issues. *J Cardiovasc Med (Hagerstown), 9*(4), 382-388. doi:10.2459/JCM.0b013e3282f03b90

Bridgwood, B. M., Nickinson, A. T., Houghton, J. S., Pepper, C. J., & Sayers, R. D. (2020). Knowledge of peripheral artery disease: What do the public, healthcare practitioners, and trainees know? *Vasc Med, 25*(3), 263-273. doi:10.1177/1358863x19893003

Brouwers, J., Willems, S., Goncalves, L., Hamming, J., & Schepers, A. (2022). Reliability of bedside tests for diagnosing peripheral arterial disease in patients prone to medial arterial calcification: A systematic review. *eClinicalMedicine, 50*, 101532. doi:https://doi.org/10.1016/j.eclinm.2022.101532

Brown, C. J., & Flood, K. L. (2013). Mobility limitation in the older patient: a clinical review. *JAMA, 310*(11), 1168-1177. doi:10.1001/jama.2013.276566

Bullen, C. (2008). Impact of tobacco smoking and smoking cessation on cardiovascular risk and disease. *Expert Rev Cardiovasc Ther, 6*(6), 883-895. doi:10.1586/14779072.6.6.883

Byskosh, N., Pamulapati, V., Xu, S., Vavra, A. K., Hoel, A. W., Tian, L., . . . Ho, K. J. (2022). Identifying gaps in disease knowledge among patients with peripheral artery disease. *Journal of Vascular Surgery, 75*(4), 1358-1368.e1355. doi:https://doi.org/10.1016/j.jvs.2021.11.036

Caldieraro-Bentley, A. J., & Andrews, J. O. (2013). An integrative review: application of self-efficacy instruments for walking in populations with peripheral arterial disease. *J Vasc Nurs, 31*(3), 118-130. doi:10.1016/j.jvn.2013.01.002

Casey, S., Lanting, S., Oldmeadow, C., & Chuter, V. (2019a). The reliability of the ankle brachial index: a systematic review. *J Foot Ankle Res, 12*, 39. doi:10.1186/s13047-019-0350-1

Casey, S., Lanting, S., Oldmeadow, C., & Chuter, V. (2019b). The reliability of the ankle brachial index: a systematic review. *Journal of Foot and Ankle Research, 12*(1), 39. doi:10.1186/s13047-019-0350-1

Casillas, J., Troisgros, O., Hannequin, A., Gremeaux, V., Ader, P., Rapin, A., & Laurent, Y. (2011). Rehabilitation in patients with peripheral arterial disease. *Ann Phys Rehabil Med, 54*(7), 443-461. doi:10.1016/j.rehab.2011.07.001

Celis, R., Pipinos, II, Scott-Pandorf, M. M., Myers, S. A., Stergiou, N., & Johanning, J. M. (2009). Peripheral arterial disease affects kinematics during walking. *J Vasc Surg, 49*(1), 127-132. doi:10.1016/j.jvs.2008.08.013

Chan, S. W. (2021). Chronic Disease Management, Self-Efficacy and Quality of Life. *J Nurs Res, 29*(1), e129. doi:10.1097/jnr.0000000000000422

Chang, C.-F., Chang, C.-C., & Chen, M.-Y. (2015). Effect of Buerger's Exercises on Improving Peripheral Circulation: A Systematic Review. *Open Journal of Nursing, 05*, 120-128. doi:10.4236/ojn.2015.52014

Chen, X., Stoner, J. A., Montgomery, P. S., Casanegra, A. I., Silva-Palacios, F., Chen, S., . . . Gardner, A. W. (2017). Prediction of 6-minute walk performance in patients with peripheral artery disease. *Journal of Vascular Surgery, 66*(4), 1202-1209. doi:10.1016/j.jvs.2017.03.438

Cheung, K., Ten Klooster, P., Smit, C., de Vries, H., & Pieterse, M. (2017). The impact of non-response bias due to sampling in public health studies: A comparison of voluntary versus mandatory recruitment in a Dutch national survey on adolescent health. *BMC public health, 17*(1), 276. doi:10.1186/s12889-017-4189-8

Chiwire, P., Beaudart, C., Evers, S. M., Mahomed, H., & Hiligsmann, M. (2022). Enhancing Public Participation in Public Health Offerings: Patient Preferences for Facilities in the Western Cape Province Using a Discrete Choice Experiment. *Int J Environ Res Public Health, 19*(1). doi:10.3390/ijerph19010590

Cho, H., & Kwon, J. (2021). Pandemic and hospital avoidance: Evidence from the 2015 Middle East respiratory syndrome outbreak in South Korea. *Econ Lett, 203*, 109852. doi:10.1016/j.econlet.2021.109852

Chongthawonsatid, S., & Dutsadeevettakul, S. (2017). Validity and reliability of the ankle-brachial index by oscillometric blood pressure and automated ankle-brachial index. *J Res Med Sci, 22*, 44. doi:10.4103/jrms.JRMS_728_16

Clement, D., De Buyzere, M., & Duprez, D. (2004). Hypertension in peripheral arterial disease. *Curr Pharm Des, 10*(29), 3615-3620. doi:10.2174/1381612043382819

Cobbing, S., Maddocks, S., Govender, S., Khan, S., Mbhele, M., Naidoo, K., . . . Weston, C. E. (2017). Physiotherapy postgraduate studies in South Africa: Facilitators and barriers. *2017, 73*(1). doi:10.4102/sajp.v73i1.335

Coca-Martinez, M., Carli, F., & Gill, H. L. (2021). Multimodal Prehabilitation to Improve Quality of Life and Functional Capacity in Peripheral Arterial Disease: A Case Series. *Arch Rehabil Res Clin Transl, 3*(3), 100139. doi:10.1016/j.arrct.2021.100139

Collins, T. C., Lunos, S., & Ahluwalia, J. S. (2010). Self-efficacy is associated with walking ability in persons with diabetes mellitus and peripheral arterial disease. *Vasc Med, 15*(3), 189-195. doi:10.1177/1358863x10362604

Conen, D., Everett, B. M., Kurth, T., Creager, M. A., Buring, J. E., Ridker, P. M., & Pradhan, A. D. (2011). Smoking, smoking cessation, [corrected] and risk for symptomatic peripheral artery disease in women: a cohort study. *Ann Intern Med, 154*(11), 719-726. doi:10.7326/0003-4819-154-11-201106070-00003

Conte, M. S., Bradbury, A. W., Kolh, P., White, J. V., Dick, F., Fitridge, R., . . . Wang, S. (2019). Global Vascular Guidelines on the Management of Chronic Limb-Threatening Ischemia. *Eur J Vasc Endovasc Surg, 58*(1s), S1-S109.e133. doi:10.1016/j.ejvs.2019.05.006

Crawford, F., Welch, K., Andras, A., & Chappell, F. M. (2016). Ankle brachial index for the diagnosis of lower limb peripheral arterial disease. *Cochrane Database Syst Rev, 9*, Cd010680. doi:10.1002/14651858.CD010680.pub2

Creager, M., & Hamburg, N. M. (2022). Smoking Cessation Improves Outcomes in Patients With Peripheral Artery Disease. *JAMA Cardiology, 7*(1), 15-16. doi:10.1001/jamacardio.2021.3987

Criqui, M. H., & Aboyans, V. (2015). Epidemiology of peripheral artery disease. *Circulation research, 116*(9), 1509-1526. doi:10.1161/CIRCRESAHA.116.303849

Cummins, P. (2002). Access to health care in the Western Cape. *The Lancet, 360*, s49-s50. doi:10.1016/S0140-6736(02)11820-4

Dave, J. A., Levitt, N. S., Ross, I. L., Lacerda, M., Maartens, G., & Blom, D. (2016). Anti-Retroviral Therapy Increases the Prevalence of Dyslipidemia in South African HIV-Infected Patients. *PLoS One, 11*(3), e0151911. doi:10.1371/journal.pone.0151911

de Sousa, A. S. A., Correia, M. A., Farah, B. Q., Saes, G., Zerati, A. E., Puech-Leao, P., . . . Ritti-Dias, R. M. (2019). Barriers and Levels of Physical Activity in Patients With Symptomatic Peripheral Artery Disease: Comparison Between Women and Men. *J Aging Phys Act, 27*(5), 719-724. doi:10.1123/japa.2018-0206

de Villiers, K. (2021). Bridging the health inequality gap: an examination of South Africa's social innovation in health landscape. *Infectious Diseases of Poverty, 10*(1), 19. doi:10.1186/s40249-021-00804-9

Desai, U., Kharat, A., Hess, C. N., Milentijevic, D., Laliberté, F., Zuckerman, P., . . . Bonaca, M. P. (2021). Healthcare resource utilization and costs of major atherothrombotic vascular events among patients with peripheral artery disease after revascularization. *J Med Econ, 24*(1), 402-409. doi:10.1080/13696998.2021.1891089

Desjardins-Charbonneau, A., Roy, J.-S., Thibault, J., Ciccone, V. T., & Desmeules, F. (2016). Acceptability of physiotherapists as primary care practitioners and advanced practice physiotherapists for care of patients with musculoskeletal disorders: a survey of a university community within the province of Quebec. *BMC Musculoskeletal Disorders, 17*(1), 400. doi:10.1186/s12891-016-1256-8

Dua, A., & Lee, C. J. (2016). Epidemiology of Peripheral Arterial Disease and Critical Limb Ischemia. *Tech Vasc Interv Radiol, 19*(2), 91-95. doi:10.1053/j.tvir.2016.04.001

Dumville, J. C., Lee, A. J., Smith, F. B., & Fowkes, F. G. (2004). The health-related quality of life of people with peripheral arterial disease in the community: the Edinburgh Artery Study. *Br J Gen Pract, 54*(508), 826-831.

Duncan, M. S., Freiberg, M. S., Greevy, R. A., Jr., Kundu, S., Vasan, R. S., & Tindle, H. A. (2019). Association of Smoking Cessation With Subsequent Risk of Cardiovascular Disease. *JAMA, 322*(7), 642-650. doi:10.1001/jama.2019.10298

Duscha, B. D., Robbins, J. L., Jones, W. S., Kraus, W. E., Lye, R. J., Sanders, J. M., . . . Annex, B. H. (2011). Angiogenesis in skeletal muscle precede improvements in peak oxygen uptake in peripheral artery disease patients. *Arteriosclerosis, thrombosis, and vascular biology, 31*(11), 2742-2748. doi:10.1161/atvbaha.111.230441

Dyer, M. T. D., Goldsmith, K. A., Sharples, L. S., & Buxton, M. J. (2010). A review of health utilities using the EQ-5D in studies of cardiovascular disease. *Health and quality of life outcomes, 8*(1), 13. doi:10.1186/1477-7525-8-13

Edwards, P. J., Roberts, I., Clarke, M. J., Diguiseppi, C., Wentz, R., Kwan, I., . . . Pratap, S. (2009). Methods to increase response to postal and electronic questionnaires. *Cochrane Database Syst Rev, 2009*(3), Mr000008. doi:10.1002/14651858.MR000008.pub4

Ehrman, J., Gardner, A., Salisbury, D., Lui, K., & Treat-Jacobson, D. (2023). Supervised Exercise Therapy for Symptomatic Peripheral Artery Disease: A REVIEW OF CURRENT EXPERIENCE AND PRACTICE-BASED RECOMMENDATIONS. *Journal of cardiopulmonary rehabilitation and prevention, 43*(1), 15-21. doi:10.1097/hcr.0000000000000723

Eid, M. A., Mehta, K., Barnes, J. A., Wanken, Z., Columbo, J., Stone, D. H., . . . Smith, M. M. (2021). Global Burden of Disease of Peripheral Artery Disease. *Journal of Vascular Surgery, 74*(4), e327. doi:10.1016/j.jvs.2021.07.078

El Morr, C., AlHamzah, M., Ng, P., Purewal, A., & Al-Omran, M. (2017). Knowledge of peripheral arterial disease: Results of an intervention to measure and improve PAD knowledge in Toronto. *Vascular, 25*(5), 479-487. doi:10.1177/1708538116689355

Elfghi, M., Jordan, F., Dunne, D., Gibson, I., Jones, J., Flaherty, G., . . . Tawfick, W. (2021). The effect of lifestyle and risk factor modification on occlusive peripheral arterial disease outcomes: standard healthcare vs structured programme—for a randomised controlled trial protocol. *Trials, 22*(1), 138. doi:10.1186/s13063-021-05087-x

Englund, E. K., Langham, M. C., Ratcliffe, S. J., Fanning, M. J., Wehrli, F. W., Mohler, E. R., 3rd, & Floyd, T. F. (2015). Multiparametric assessment of vascular function in peripheral artery disease: dynamic measurement of skeletal muscle perfusion, blood-oxygen-level dependent signal, and venous oxygen saturation. *Circ Cardiovasc Imaging, 8*(4). doi:10.1161/circimaging.114.002673

Erasmus, R., Soita, D., Hassan, M., Blanco-Blanco, E., Vergotine, Z., Kengne, A., & Matsha, T. (2012). High prevalence of diabetes mellitus and metabolic syndrome in a South African coloured population: Baseline data of a study in Bellville, Cape Town. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde, 102*, 841-844. doi:10.7196/samj.5670

Ferreira, A. P., Ramos, P. D. S., Dornelas, B. R., Ferreira, A. F., Ricardo, D. R., & Gomes Pereira, D. A. (2020). Challenges in recruitment and adherence to a randomized clinical trial in Brazil on the effects of transcutaneous nervous electrical stimulation on individuals with peripheral arterial disease: A feasibility study. *J Vasc Nurs, 38*(4), 164-170. doi:10.1016/j.jvn.2020.09.001

Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the Journal. *American journal of pharmaceutical education, 72*(2), 43-43. doi:10.5688/aj720243

Flack, J. M., & Adekola, B. (2020). Blood pressure and the new ACC/AHA hypertension guidelines. *Trends in Cardiovascular Medicine, 30*(3), 160-164. doi:https://doi.org/10.1016/j.tcm.2019.05.003

Fowkes, F. G., Rudan, D., Rudan, I., Aboyans, V., Denenberg, J. O., McDermott, M. M., . . . Criqui, M. H. (2013). Comparison of global estimates of prevalence and risk factors for peripheral artery disease in 2000 and 2010: a systematic review and analysis. *Lancet, 382*(9901), 1329-1340. doi:10.1016/s0140-6736(13)61249-0

Fowler, B., Jamrozik, K., Norman, P., & Allen, Y. (2002). Prevalence of peripheral arterial disease: persistence of excess risk in former smokers. *Aust N Z J Public Health, 26*(3), 219-224. doi:10.1111/j.1467-842x.2002.tb00677.x

Fudim, M., Hopley, C. W., Huang, Z., Kavanagh, S., Rockhold, F. W., Baumgartner, I., . . . Hiatt, W. R. (2020). Association of Hypertension and Arterial Blood Pressure on Limb and Cardiovascular Outcomes in Symptomatic Peripheral Artery Disease. *Circulation: Cardiovascular Quality and Outcomes, 13*(9), e006512. doi:doi:10.1161/CIRCOUTCOMES.120.006512

Fudim, M., & Jones, W. S. (2018). New Curveball for Hypertension Guidelines? *Circulation, 138*(17), 1815-1818. doi:doi:10.1161/CIRCULATIONAHA.118.036409

Galal, W., van Gestle, Y. R. B. M., & Hoeks, S. E. (2009). The Obesity Paradox in Patients With Peripheral Arterial Disease. *Journal of Vascular Surgery, 49*(4), 1084-1085. doi:10.1016/j.jvs.2009.02.027

Ganta, N., Soherwadi, S., Hughes, K., & Gillum, R. (2018). Burden of Peripheral Artery Disease in Sub-Saharan Africa and the Caribbean 1990 to 2015. *Vascular and Endovascular Surgery, 52*, 153857441878470. doi:10.1177/1538574418784709

Gardner, A. W., & Afaq, A. (2008). Management of lower extremity peripheral arterial disease. *Journal of cardiopulmonary rehabilitation and prevention, 28*(6), 349-357. doi:10.1097/HCR.0b013e31818c3b96

Garimella, P., Hart, P., O'Hare, A., DeLoach, S., Herzog, C., & Hirsch, A. (2012). Peripheral artery disease and CKD: a focus on peripheral artery disease as a critical component of CKD care. *Am J Kidney Dis, 60*(4), 641-654. doi:10.1053/j.ajkd.2012.02.340

Garofolo, L., Ferreira, S., & Miranda, F. (2014). Association between peripheral arterial disease and creactive protein in the japanese-brazilian population.

Gastaldelli, A., Folli, F., & Maffei, S. (2010). Impact of tobacco smoking on lipid metabolism, body weight and cardiometabolic risk. *Curr Pharm Des, 16*(23), 2526-2530. doi:10.2174/138161210792062858

Gatchel, R. J., Peng, Y. B., Peters, M. L., Fuchs, P. N., & Turk, D. C. (2007). The biopsychosocial approach to chronic pain: scientific advances and future directions. *Psychol Bull, 133*(4), 581-624. doi:10.1037/0033-2909.133.4.581

George, G., Gow, J., & Bachoo, S. (2013). Understanding the factors influencing health-worker employment decisions in South Africa. *Hum Resour Health, 11*, 15. doi:10.1186/1478-4491-11-15

Gerage, A., Correia, M., Oliveira, P., Palmeira, A., Domingues, W., Zeratti, A., . . . Cucato, G. (2019). Physical Activity Levels in Peripheral Artery Disease Patients. *Arq Bras Cardiol, 113*(3), 410-416. doi:10.5935/abc.20190142

Gerhard-Herman, M., Gornik, H. L., Barrett, C., Barshes, N. R., Corriere, M. A., Drachman, D. E., . . . Walsh, M. E. (2017). 2016 AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease: Executive Summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation, 135*(12), e686-e725. doi:doi:10.1161/CIR.0000000000000470

Golledge, J., Leicht, A. S., Yip, L., Rowbotham, S. E., Pinchbeck, J., Jenkins, J. S., . . . Burton, N. W. (2020). Relationship Between Disease Specific Quality of Life Measures, Physical Performance, and Activity in People with Intermittent Claudication Caused by Peripheral Artery Disease. *European Journal of Vascular and Endovascular Surgery, 59*(6), 957-964. doi:10.1016/j.ejvs.2020.02.006

Govender, K., Girdwood, S., Letswalo, D., Long, L., Meyer-Rath, G., & Miot, J. (2021). Primary healthcare seeking behaviour of low-income patients across the public and private health sectors in South Africa. *BMC public health, 21*(1), 1649. doi:10.1186/s12889-021-11678-9

Grandy, S., & Fox, K. M. (2008). EQ-5D visual analog scale and utility index values in individuals with diabetes and at risk for diabetes: Findings from the Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD). *Health and quality of life outcomes, 6*, 18. doi:10.1186/1477-7525-6-18

Grenon, S. M., Chong, K., Alley, H., Nosova, E., Gasper, W., Hiramoto, J., . . . Owens, C. D. (2014). Walking disability in patients with peripheral artery disease is associated with arterial endothelial function. *Journal of Vascular Surgery, 59*(4), 1025-1034. doi:https://doi.org/10.1016/j.jvs.2013.10.084

Grundlingh, N., Zewotir, T., Roberts, D., & Manda, S. (2022). Assessment of prevalence and risk factors of diabetes and pre-diabetes in South Africa. *Journal of Health, Population and Nutrition, 41*(1), 7. doi:10.1186/s41043-022-00281-2

Guidon, M., & McGee, H. (2010). Exercise-based interventions and health-related quality of life in intermittent claudication: a 20-year (1989-2008) review. *Eur J Cardiovasc Prev Rehabil, 17*(2), 140-154. doi:10.1097/HJR.0b013e3283377f08

Guirguis-Blake, J. M., Evans, C. V., Redmond, N., & Lin, J. S. (2018). Screening for Peripheral Artery Disease Using the Ankle-Brachial Index: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA, 320*(2), 184-196. doi:10.1001/jama.2018.4250

Gutierrez, J., Marshall, R., & Lazar, R. (2015). Indirect measures of arterial stiffness and cognitive performance in individuals without traditional vascular risk factors or disease. *JAMA neurology, 72*(3), 309-315. doi:10.1001/jamaneurol.2014.3873

Gutowska, K., Formanowicz, D., & Formanowicz, P. (2019). Selected Aspects of Tobacco-Induced Prothrombotic State, Inflammation and Oxidative Stress: Modeled and Analyzed Using Petri Nets. *Interdisciplinary Sciences: Computational Life Sciences, 11*(3), 373-386. doi:10.1007/s12539-018-0310-7

Haigh, K. J., Bingley, J., Golledge, J., & Walker, P. J. (2013). Barriers to screening and diagnosis of peripheral artery disease by general practitioners. *Vasc Med, 18*(6), 325-330. doi:10.1177/1358863x13505673

Hamburg, N. M., & Balady, G. J. (2011). Exercise rehabilitation in peripheral artery disease: functional impact and mechanisms of benefits. *Circulation, 123*(1), 87-97. doi:10.1161/circulationaha.109.881888

Hammond, M., Tian, L., Zhao, L., Zhang, D., & McDermott, M. (2021). One-Year Change in Walking Performance and Subsequent Mobility Loss and Mortality Rates in Peripheral Artery Disease: Longitudinal Data From the WALCS. *Journal of the American Heart Association, 10*(24), e021917. doi:doi:10.1161/JAHA.121.021917

Hanel, J., Owen, P. J., Held, S., Tagliaferri, S. D., Miller, C. T., Donath, L., & Belavy, D. L. (2020). Effects of Exercise Training on Fear-Avoidance in Pain and Pain-Free Populations: Systematic Review and Meta-analysis. *Sports Med, 50*(12), 2193-2207. doi:10.1007/s40279-020-01345-1

Hap, K., Biernat, K., & Konieczny, G. (2021). Patients with Diabetes Complicated by Peripheral Artery Disease: the Current State of Knowledge on Physiotherapy Interventions. *J Diabetes Res, 2021*, 5122494. doi:10.1155/2021/5122494

Harwood, A. E., Pymer, S., Ingle, L., Doherty, P., Chetter, I. C., Parmenter, B., . . . Tew, G. A. (2020). Exercise training for intermittent claudication: a narrative review and summary of guidelines for practitioners. *BMJ Open Sport & Exercise Medicine, 6*(1), e000897. doi:10.1136/bmjsem-2020-000897

Heffron, S., Dwivedi, A., Rockman, C., Xia, Y., Guo, Y., Zhong, J., & Berger, J. (2020). Body mass index and peripheral artery disease. *Atherosclerosis, 292*, 31-36. doi:10.1016/j.atherosclerosis.2019.10.017

Heikkilä, K., Pentti, J., Madsen, I., Lallukka, T., Virtanen, M., Alfredsson, L., . . . Kivimäki, M. (2020). Job Strain as a Risk Factor for Peripheral Artery Disease: A Multi-Cohort Study. *J Am Heart Assoc, 9*(9), e013538. doi:10.1161/jaha.119.013538

Hennrikus, D., Joseph, A. M., Lando, H. A., Duval, S., Ukestad, L., Kodl, M., & Hirsch, A. T. (2010). Effectiveness of a smoking cessation program for peripheral artery disease patients: a randomized controlled trial. *J Am Coll Cardiol, 56*(25), 2105-2112. doi:10.1016/j.jacc.2010.07.031

Hersi, M., Traversy, G., Thombs, B. D., Beck, A., Skidmore, B., Groulx, S., . . . Stevens, A. (2019). Effectiveness of stop smoking interventions among adults: protocol for an overview of systematic reviews and an updated systematic review. *Systematic Reviews, 8*(1), 28. doi:10.1186/s13643-018-0928-x

Hill, J., Lavigne Delville, C., Auorousseau, A. M., Jonathan, D., Peer, N., Oldenburg, B., & Kengne, A. P. (2020). Development of a Tool to Increase Physical Activity among People at Risk for Diabetes in Low-Resourced Communities in Cape Town. *Int J Environ Res Public Health, 17*(3). doi:10.3390/ijerph17030865

Hill, J., Peer, N., Jonathan, D., Mayige, M., Sobngwi, E., & Kengne, A. P. (2020). Findings from Community-Based Screenings for Type 2 Diabetes Mellitus in at Risk Communities in Cape Town, South Africa: A Pilot Study. *Int J Environ Res Public Health, 17*(8). doi:10.3390/ijerph17082876

Hirsch, A., Criqui, M., Treat-Jacobson, D., Regensteiner, J., Creager, M., Olin, J., . . . Hiatt, W. (2001). Peripheral arterial disease detection, awareness, and treatment in primary care. *JAMA, 286*(11), 1317-1324. doi:10.1001/jama.286.11.1317

Hirsch, A., Murphy, T., Lovell, M., Twillman, G., Treat-Jacobson, D., Harwood, E., . . . Criqui, M. (2007). Gaps in public knowledge of peripheral arterial disease: the first national PAD public awareness survey. *Circulation, 116*(18), 2086-2094. doi:10.1161/circulationaha.107.725101

Hobbs, S. D., & Bradbury, A. W. (2003). Smoking Cessation Strategies in Patients with Peripheral Arterial Disease: An Evidence-based Approach. *European Journal of Vascular and Endovascular Surgery, 26*(4), 341-347. doi:https://doi.org/10.1016/S1078-5884(03)00356-3

Hofman, K., & Madhi, S. (2020). The unanticipated costs of COVID-19 to South Africa's quadruple disease burden. *SAMJ: South African Medical Journal, 110*, 689-699. Retrieved from http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0256-95742020000800001&nrm=iso

Horváth, L., Németh, N., Fehér, G., Kívés, Z., Endrei, D., & Boncz, I. (2022). Epidemiology of Peripheral Artery Disease: Narrative Review. *Life (Basel), 12*(7). doi:10.3390/life12071041

Høyer, C., Sandermann, J., & Petersen, L. (2013). The toe-brachial index in the diagnosis of peripheral arterial disease. *J Vasc Surg, 58*(1), 231-238. doi:10.1016/j.jvs.2013.03.044

HPCSA. (2021). *Health Professions Council of South Africa Annual Report 2020/2021*. Retrieved from Pretoria: https://www.hpcsa.co.za/?contentId=257&actionName=Publications

Husein, S., Bougard, H., Naidoo, M., & Chu, K. (2021). Long-term mortality after lower extremity amputation in South Africa. *Pan African Medical Journal, 38*. doi:10.11604/pamj.2021.38.126.19625

Itoga, N. K., Tawfik, D. S., Lee, C. K., Maruyama, S., Leeper, N. J., & Chang, T. I. (2018). Association of Blood Pressure Measurements With Peripheral Artery Disease Events. *Circulation, 138*(17), 1805-1814. doi:doi:10.1161/CIRCULATIONAHA.118.033348

Ix, J. H., Biggs, M. L., Kizer, J. R., Mukamal, K. J., Djousse, L., Zieman, S. J., . . . Siscovick, D. S. (2011). Association of body mass index with peripheral arterial disease in older adults: the Cardiovascular Health Study. *Am J Epidemiol, 174*(9), 1036-1043. doi:10.1093/aje/kwr228

Jack, K., McLean, S. M., Moffett, J. K., & Gardiner, E. (2010). Barriers to treatment adherence in physiotherapy outpatient clinics: a systematic review. *Man Ther, 15*(3), 220-228. doi:10.1016/j.math.2009.12.004

Jelani, Q., Jhamnani, S., Spatz, E. S., Spertus, J., Smolderen, K. G., Wang, J., . . . Mena-Hurtado, C. (2020). Financial barriers in accessing medical care for peripheral artery disease are associated with delay of presentation and adverse health status outcomes in the United States. *Vasc Med, 25*(1), 13-24. doi:10.1177/1358863x19872542

Jelani, Q., Mena-Hurtado, C., Burg, M., Soufer, R., Gosch, K., Jones, P., . . . Smolderen, K. (2020). Relationship Between Depressive Symptoms and Health Status in Peripheral Artery Disease: Role of Sex Differences. *Journal of the American Heart Association, 9*(16), e014583. doi:doi:10.1161/JAHA.119.014583

Jelsma, J., & Ferguson, G. (2004). The determinants of self-reported health-related quality of life in a culturally and socially diverse South African community. *Bull World Health Organ, 82*(3), 206-212.

Jelsma, J., Mkoka, S., Amosun, L., & Nieuwveldt, J. (2004). The reliability and validity of the Xhosa version of the EQ-5D. *Disability and rehabilitation, 26*, 103-108. doi:10.1080/09638280310001629705

Jensen, M. P., Chen, C., & Brugger, A. M. (2003). Interpretation of visual analog scale ratings and change scores: a reanalysis of two clinical trials of postoperative pain. *J Pain, 4*(7), 407-414. doi:10.1016/s1526-5900(03)00716-8

Jia, H., Wang, X., & Cheng, J. (2022). Knowledge, Attitudes, and Practices Associated With Diabetic Foot Prevention Among Rural Adults With Diabetes in North China. *Front Public Health, 10*, 876105. doi:10.3389/fpubh.2022.876105

Johnston, L. E., Stewart, B. T., Yangni-Angate, H., Veller, M., Upchurch, G. R., Jr, Gyedu, A., & Kushner, A. L. (2016). Peripheral Arterial Disease in Sub-Saharan Africa: A Review. *JAMA Surgery, 151*(6), 564-572. doi:10.1001/jamasurg.2016.0446

Joyce, D. P., Gracias, C. S., Murphy, F., Tubassam, M., Walsh, S. R., & O'Hanlon, S. (2022). Potentially undiagnosed cognitive impairment in patients with peripheral arterial disease: A systematic review of the literature. *The Surgeon, 20*(4), e134-e143. doi:https://doi.org/10.1016/j.surge.2021.06.007

Kallon, II, Colvin, C. J., & Trafford, Z. (2022). A qualitative study of patients and healthcare workers' experiences and perceptions to inform a better understanding of gaps in care for pre-discharged tuberculosis patients in Cape Town, South Africa. *BMC Health Serv Res, 22*(1), 128. doi:10.1186/s12913-022-07540-2

Kamdem, F., Mapoure, Y., Hamadou, B., Souksouna, F., Doualla, M., Jingi, A., . . . Luma, H. (2018). Prevalence and risk factors of peripheral artery disease in black Africans with HIV infection: A cross-sectional hospital-based study. *Vascular Health and Risk Management, Volume 14*, 401-408. doi:10.2147/VHRM.S165960

Keelan, S., Foley, N., Healy, D., Kheirelseid, E., McHugh, S., Moneley, D., & Naughton, P. (2022). Poor patient awareness of peripheral arterial disease, it is time to optimize the clinical visit. *The Surgeon, 20*(3), 157-163. doi:https://doi.org/10.1016/j.surge.2021.03.009

Kengne, A. P., & Echouffo-Tcheugui, J. B. (2019). Differential burden of peripheral artery disease. *The Lancet Global Health, 7*(8), e980-e981. doi:10.1016/S2214-109X(19)30293-1

Khan, M., Smith, M., Bruce, J., Kong, V., & Clarke, D. (2020). Evolving Indications for Lower Limb Amputations in South Africa Offer Opportunities for Health System Improvement. *World J Surg, 44*(5), 1436-1443. doi:10.1007/s00268-019-05361-9

Khan, T., Farooqui, F., & Niazi, K. (2008). Critical review of the ankle brachial index. *Curr Cardiol Rev, 4*(2), 101-106. doi:10.2174/157340308784245810

Kharroubi, A. T., & Darwish, H. M. (2015). Diabetes mellitus: The epidemic of the century. *World J Diabetes, 6*(6), 850-867. doi:10.4239/wjd.v6.i6.850

Khoza-Shangase, K., & Mophosho, M. (2021). Language and culture in speech-language and hearing professions in South Africa: Re-imagining practice. *S Afr J Commun Disord, 68*(1), e1-e9. doi:10.4102/sajcd.v68i1.793

Kim, G., Anderson, M. S., Brown, C. S., Powell, C., & Corriere, M. A. (2021). Gender Disparities in Major Depression Among Patients With Peripheral Artery Disease and Associations With Mortality. *Journal of Vascular Surgery, 74*(3), e207-e208. doi:10.1016/j.jvs.2021.06.309

Kim, J., Chun, D. I., Kim, S., Yang, H. J., Kim, J. H., Cho, J. H., . . . Won, S. H. (2019). Trends in Lower Limb Amputation in Patients with Diabetic Foot Based on Vascular Intervention of Peripheral Arterial Disease in Korea: a Population-based Nationwide Study. *J Korean Med Sci, 34*(26), e178. doi:10.3346/jkms.2019.34.e178

Kim, T., Mena, C., & Sumpio, B. E. (2020). The Role of Lower Extremity Amputation in Chronic Limb-Threatening Ischemia. *The International journal of angiology : official publication of the International College of Angiology, Inc, 29*(3), 149-155. doi:10.1055/s-0040-1710075

Kokkinidis, D. G., Giannopoulos, S., Haider, M., Jordan, T., Sarkar, A., Singh, G. D., . . . Armstrong, E. J. (2020). Active smoking is associated with higher rates of incomplete wound healing after endovascular treatment of critical limb ischemia. *Vasc Med, 25*(5), 427-435. doi:10.1177/1358863x20916526

Koureas, A., Theodorou, M., & Samoutis, A. (2017). *The Impact of Peripheral Artery Disease on Health Related Quality of Life: Comparison with the Impact of Coronary Artery Disease.* (Vol. 2). Journal of Vascular and Endovascular Surgery.

Krishna, S., Moxon, J., & Golledge, J. (2015). A Review of the Pathophysiology and Potential Biomarkers for Peripheral Artery Disease. *International Journal of Molecular Sciences, 16*, 11294-11322. doi:10.3390/ijms160511294

Krishnan, M., Geevar, Z., Mohanan, P., Venugopal, K., & Devika, S. (2018). Prevalence of peripheral artery disease and risk factors in the elderly: A community based cross-sectional study from northern Kerala, India. *Indian Heart J, 70*(6), 808-815. doi:10.1016/j.ihj.2017.11.001

Kumar, A., Mash, B., & Rupesinghe, G. (2007). Peripheral arterial disease - high prevalence in rural black South Africans. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde, 97*(4), 285-288. Retrieved from https://pubmed.ncbi.nlm.nih.gov/17446954

Landry, G., Louie, D., Giraud, D., Ammi, A., & Kaul, S. (2021). Ultrasound therapy for treatment of lower extremity intermittent claudication. *Am J Surg, 221*(6), 1271-1275. doi:10.1016/j.amjsurg.2021.02.017

Lang, P. M., Schober, G. M., Rolke, R., Wagner, S., Hilge, R., Offenbächer, M., . . . Irnich, D. (2006). Sensory neuropathy and signs of central sensitization in patients with peripheral arterial disease. *Pain, 124*(1-2), 190-200. doi:10.1016/j.pain.2006.04.011

Lanzi, S., Fresa, M., Keller, S., Pedrazzoli, K., & Mazzolai, L. (2022). Physical therapy in vascular diseases. *Rev Med Suisse, 18*(807), 2327-2330. doi:10.53738/revmed.2022.18.807.2327

Lecouturier, J., Scott, J., Rousseau, N., Stansby, G., Sims, A., & Allen, J. (2019). Peripheral arterial disease diagnosis and management in primary care: a qualitative study. *BJGP Open, 3*(3). doi:10.3399/bjgpopen19X101659

Lejay, A., Laverny, G., Paradis, S., Schlagowski, A.-I., Charles, A.-L., Singh, F., . . . Geny, B. (2017). Moderate Exercise Allows for shorter Recovery Time in Critical Limb Ischemia. *Frontiers in physiology, 8*, 523-523. doi:10.3389/fphys.2017.00523

Leo, C., Sabina, S., Tumolo, M., Bodini, A., Ponzini, G., Sabato, E., & Mincarone, P. (2021). Burnout Among Healthcare Workers in the COVID 19 Era: A Review of the Existing Literature. *Frontiers in Public Health, 9*. doi:10.3389/fpubh.2021.750529

Li, J., Yu, S., Zhou, W., Zhu, L., Wang, T., Bao, H., . . . Cheng, X. (2021). U-Shaped Association of Body Mass Index with the Risk of Peripheral Arterial Disease in Chinese Hypertensive Population. *Int J Gen Med, 14*, 3627-3634. doi:10.2147/ijgm.S323769

Liles, D. R., Kallen, M. A., Petersen, L. A., & Bush, R. L. (2006). Quality of life and peripheral arterial disease. *J Surg Res, 136*(2), 294-301. doi:10.1016/j.jss.2006.06.008

Limakatso, K., Madden, V. J., Manie, S., & Parker, R. (2020). The effectiveness of graded motor imagery for reducing phantom limb pain in amputees: a randomised controlled trial. *Physiotherapy, 109*, 65-74. doi:10.1016/j.physio.2019.06.009

Lin, J., Chen, Y., Jiang, N., Li, Z., & Xu, S. (2022). Burden of Peripheral Artery Disease and Its Attributable Risk Factors in 204 Countries and Territories From 1990 to 2019. *Front Cardiovasc Med, 9*, 868370. doi:10.3389/fcvm.2022.868370

Lindgren, H. I., Pärsson, H., Gottsäter, A., & Bergman, S. (2017). Patients With Intermittent Claudication and Chronic Widespread Pain Improves in Health-Related Quality of Life After Invasive but Not After Noninvasive Treatment. *Clin Med Insights Cardiol, 11*, 1179546817747528. doi:10.1177/1179546817747528

Linton, S. J., & Bergbom, S. (2011). Understanding the link between depression and pain. *Scand J Pain, 2*(2), 47-54. doi:10.1016/j.sjpain.2011.01.005

Loban, A., Mandefield, L., Hind, D., & Bradburn, M. (2017). A randomized trial found online questionnaires supplemented by postal reminders generated a cost-effective and generalizable sample but don’t forget the reminders. *Journal of Clinical Epidemiology, 92*, 116-125. doi:10.1016/j.jclinepi.2017.08.003

Lorig, K., Sobel, D. S., Ritter, P. L., Laurent, D., & Hobbs, M. (2001). Effect of a self-management program on patients with chronic disease. *Eff Clin Pract, 4*(6), 256-262.

Lozano, F., Lobos, J. M., March, J. R., Carrasco, E., Barros, M. B., & González-Porras, J. R. (2016). Self-administered versus interview-based questionnaires among patients with intermittent claudication: Do they give different results? A cross-sectional study. *Sao Paulo Med J, 134*(1), 63-69. doi:10.1590/1516-3180.2015.01733009

Lu, J., & Creager, M. (2004). The relationship of cigarette smoking to peripheral arterial disease. *Rev Cardiovasc Med, 5*(4), 189-193.

Lu, L., Jiang, C., Mackay, D. F., Pell, J. P., Cheng, K. K., Lam, T. H., & Thomas, G. N. (2017). Exposure to secondhand smoke and risk of peripheral arterial disease in southern Chinese non-smokers: The Guangzhou Biobank Cohort Study-Cardiovascular Disease Sub-cohort. *Vascular, 25*(3), 283-289. doi:10.1177/1708538116673018

Ludhwani, D., & Wu, J. (2019). Obesity Paradox in Peripheral Arterial Disease: Results of a Propensity Match Analysis from the National Inpatient Sample. *Cureus, 11*(5), e4704. doi:10.7759/cureus.4704

Maharaj, S. (2013). Mandatory continuing professional development in South Africa: Rehabilitation therapists' perspective. *International Journal of Therapy and Rehabilitation, 20*, 343-351. doi:10.12968/ijtr.2013.20.7.343

Makris, G. C., Lattimer, C. R., Lavida, A., & Geroulakos, G. (2012). Availability of supervised exercise programs and the role of structured home-based exercise in peripheral arterial disease. *Eur J Vasc Endovasc Surg, 44*(6), 569-575; discussion 576. doi:10.1016/j.ejvs.2012.09.009

Malakoane, B., Heunis, J. C., Chikobvu, P., Kigozi, N. G., & Kruger, W. H. (2020). Public health system challenges in the Free State, South Africa: a situation appraisal to inform health system strengthening. *BMC Health Services Research, 20*(1), 58. doi:10.1186/s12913-019-4862-y

Manana, P. N., Kuonza, L., Musekiwa, A., Koornhof, H., Nanoo, A., & Ismail, N. (2018). Feasibility of using postal and web-based surveys to estimate the prevalence of tuberculosis among health care workers in South Africa. *PLoS One, 13*(5), e0197022. doi:10.1371/journal.pone.0197022

Maphumulo, W. T., & Bhengu, B. R. (2019). Challenges of quality improvement in the healthcare of South Africa post-apartheid: A critical review. *Curationis, 42*(1), e1-e9. doi:10.4102/curationis.v42i1.1901

Masilela, C., Adeniyi, O. V., & Benjeddou, M. (2022). Prevalence, patterns and determinants of dyslipidaemia among South African adults with comorbidities. *Scientific Reports, 12*(1), 337. doi:10.1038/s41598-021-04150-6

Mastracci, T., Anand, S., & Aday, A. (2022). Peripheral Artery Disease: A High-Risk Yet Understudied, Underdiagnosed, and Undertreated Condition-A Call to Action. *Can J Cardiol, 38*(5), 553-554. doi:10.1016/j.cjca.2022.03.016

Mays, R., Casserly, I., Kohrt, W., Ho, P., Hiatt, W., Nehler, M., & Regensteiner, J. (2011). Assessment of functional status and quality of life in claudication. *J Vasc Surg, 53*(5), 1410-1421. doi:10.1016/j.jvs.2010.11.092

Mays, R., Hiatt, W., Casserly, I., Rogers, R., Main, D., Kohrt, W., . . . Regensteiner, J. (2015). Community-based walking exercise for peripheral artery disease: An exploratory pilot study. *Vasc Med, 20*(4), 339-347. doi:10.1177/1358863x15572725

Mays, R., Rogers, R., Hiatt, W., & Regensteiner, J. (2013). Community walking programs for treatment of peripheral artery disease. *J Vasc Surg, 58*(6), 1678-1687. doi:10.1016/j.jvs.2013.08.034

McDermott, M. (2015). Lower extremity manifestations of peripheral artery disease: the pathophysiologic and functional implications of leg ischemia. *Circulation research, 116*(9), 1540-1550. doi:10.1161/circresaha.114.303517

McDermott, M. (2018). Exercise Rehabilitation for Peripheral Artery Disease: A REVIEW. *Journal of cardiopulmonary rehabilitation and prevention, 38*(2), 63-69. doi:10.1097/HCR.0000000000000343

McDermott, M., Dayanidhi, S., Kosmac, K., Saini, S., Slysz, J., Leeuwenburgh, C., . . . Ferrucci, L. (2021). Walking Exercise Therapy Effects on Lower Extremity Skeletal Muscle in Peripheral Artery Disease. *Circulation research, 128*(12), 1851-1867. doi:10.1161/circresaha.121.318242

McDermott, M., Guralnik, J. M., Tian, L., Kibbe, M. R., Ferrucci, L., Zhao, L., . . . Criqui, M. H. (2016). Incidence and Prognostic Significance of Depressive Symptoms in Peripheral Artery Disease. *J Am Heart Assoc, 5*(3), e002959. doi:10.1161/jaha.115.002959

McDermott, M., Guralnik, J. M., Tian, L., Zhao, L., Polonsky, T. S., Kibbe, M. R., . . . Ferrucci, L. (2020). Comparing 6-minute walk versus treadmill walking distance as outcomes in randomized trials of peripheral artery disease. *Journal of Vascular Surgery, 71*(3), 988-1001. doi:10.1016/j.jvs.2019.05.058

McDermott, M., Liu, K., Greenland, P., Guralnik, J. M., Criqui, M. H., Chan, C., . . . Clark, E. (2004). Functional decline in peripheral arterial disease: associations with the ankle brachial index and leg symptoms. *JAMA, 292*(4), 453-461. doi:10.1001/jama.292.4.453

McDermott, M., Liu, K., Guralnik, J. M., Criqui, M. H., Spring, B., Tian, L., . . . Rejeski, W. J. (2013). Home-based walking exercise intervention in peripheral artery disease: a randomized clinical trial. *JAMA, 310*(1), 57-65. doi:10.1001/jama.2013.7231

McGuigan, M. R. M., Bronks, R., Newton, R. U., Sharman, M. J., Graham, J. C., Cody, D. V., & Kraemer, W. J. (2001). Resistance Training in Patients With Peripheral Arterial Disease: Effects on Myosin Isoforms, Fiber Type Distribution, and Capillary Supply to Skeletal Muscle. *The Journals of Gerontology: Series A, 56*(7), B302-B310. doi:10.1093/gerona/56.7.B302

McLaren, Z. M., Ardington, C., & Leibbrandt, M. (2014). Distance decay and persistent health care disparities in South Africa. *BMC Health Serv Res, 14*, 541. doi:10.1186/s12913-014-0541-1

McMaughan, D. J., Oloruntoba, O., & Smith, M. (2020). Socioeconomic Status and Access to Healthcare: Interrelated Drivers for Healthy Aging. *Frontiers in Public Health, 8*. doi:10.3389/fpubh.2020.00231

Meffen, A., Pepper, C. J., Sayers, R. D., & Gray, L. J. (2020). Epidemiology of major lower limb amputation using routinely collected electronic health data in the UK: a systematic review protocol. *BMJ Open, 10*(6), e037053. doi:10.1136/bmjopen-2020-037053

Menichetti, J., Libreri, C., Lozza, E., & Graffigna, G. (2016). Giving patients a starring role in their own care: a bibliometric analysis of the on-going literature debate. *Health Expect, 19*(3), 516-526. doi:10.1111/hex.12299

Meyer, V. M., Benjamens, S., Moumni, M. E., Lange, J. F. M., & Pol, R. A. (2022). Global Overview of Response Rates in Patient and Health Care Professional Surveys in Surgery: A Systematic Review. *Ann Surg, 275*(1), e75-e81. doi:10.1097/sla.0000000000004078

Meyers, A. M. (2015). Chronic kidney disease. *SAMJ: South African Medical Journal, 105*, 232-232. Retrieved from http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0256-95742015000400027&nrm=iso

Minc, S., Budi, S., Thibault, D., Misra, R., Armstrong, D. G., Stephen Smith, G., & Marone, L. (2021). Opportunities for diabetes and peripheral artery disease-related lower limb amputation prevention in an Appalachian state: A longitudinal analysis. *Prev Med Rep, 23*, 101505. doi:10.1016/j.pmedr.2021.101505

Mkoka, S., Vaughan, J., Wylie, T., Yelland, H., & Jelsma, J. (2003). The pitfalls of translation--a case study based on the translation of the EQ-5D into Xhosa. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde, 93*(4), 265-266.

Mofokeng, T. R. P., Ndlovu, K. C. Z., Beshyah, S. A., & Ross, I. L. (2020). Tiered healthcare in South Africa exposes deficiencies in management and more patients with infectious etiology of primary adrenal insufficiency. *PLoS One, 15*(11), e0241845. doi:10.1371/journal.pone.0241845

Mokwena, K., & Phetlhe, K. (2015). Assessment of health promotion content in undergraduate physiotherapy curricula. *S Afr J Physiother, 71*(1), 242. doi:10.4102/sajp.v71i1.242

Morris, L. D., Grimmer, K. A., Twizeyemariya, A., Coetzee, M., Leibbrandt, D. C., & Louw, Q. A. (2021). Health system challenges affecting rehabilitation services in South Africa. *Disabil Rehabil, 43*(6), 877-883. doi:10.1080/09638288.2019.1641851

Mosca, S., Araújo, G., Costa, V., Correia, J., Bandeira, A., Martins, E., . . . Coelho, M. P. (2022). Dyslipidemia Diagnosis and Treatment: Risk Stratification in Children and Adolescents. *J Nutr Metab, 2022*, 4782344. doi:10.1155/2022/4782344

Mourad, J.-J., Cacoub, P., Collet, J.-P., Becker, F., Pinel, J.-F., Huet, D., . . . Priollet, P. (2009). Screening of unrecognized peripheral arterial disease (PAD) using ankle-brachial index in high cardiovascular risk patients free from symptomatic PAD. *Journal of Vascular Surgery, 50*(3), 572-580. doi:https://doi.org/10.1016/j.jvs.2009.04.055

Mphekgwana, P., Monyeki, K., Mothiba, T., Makgahlela, M., Kgatla, N., Malema, R., & Sodi, T. (2022). Screening and Interventions for Cardiovascular Disease Prevention in the Limpopo Province, South Africa: Use of the Community Action Model. *Metabolites, 12*(11). doi:10.3390/metabo12111067

Muller, M. D., Reed, A. B., Leuenberger, U. A., & Sinoway, L. I. (2013). Physiology in medicine: peripheral arterial disease. *Journal of applied physiology (Bethesda, Md. : 1985), 115*(9), 1219-1226. doi:10.1152/japplphysiol.00885.2013

Mumbauer, A., Strauss, M., George, G., Ngwepe, P., Bezuidenhout, C., de Vos, L., & Medina-Marino, A. (2021). Employment preferences of healthcare workers in South Africa: Findings from a discrete choice experiment. *PLoS One, 16*(4), e0250652. doi:10.1371/journal.pone.0250652

Murphy, T. P., Cutlip, D. E., Regensteiner, J. G., Mohler, E. R., Cohen, D. J., Reynolds, M. R., . . . Hirsch, A. T. (2015). Supervised Exercise, Stent Revascularization, or Medical Therapy for Claudication Due to Aortoiliac Peripheral Artery Disease: The CLEVER Study. *Journal of the American College of Cardiology, 65*(10), 999-1009. doi:https://doi.org/10.1016/j.jacc.2014.12.043

Naicker, S. (2009). End-stage renal disease in sub-Saharan Africa. *Ethn Dis, 19*(1 Suppl 1), S1-13-15.

Naidoo, N., Veller, M., Mulaudzi, T., Pillay, B., Mistry, P. H., D, L., . . . Cassimjee, I. (2022). Vascular Society of southern Africa (VASSA) 2020 clinical practice guidelines on the management of peripheral arterial disease. *South African Medical Journal, 112*. doi:10.7196/SAMJ.2022.v112i2b.15559

Naidoo, U., & Ennion, L. (2019). Barriers and facilitators to utilisation of rehabilitation services amongst persons with lower-limb amputations in a rural community in South Africa. *Prosthet Orthot Int, 43*(1), 95-103. doi:10.1177/0309364618789457

Narain, S., & Mathye, D. (2023). Strategies to integrate physiotherapists into primary health care in South Africa. *S Afr J Physiother, 79*(1), 1796. doi:10.4102/sajp.v79i1.1796

Nawaz, S., Walker, R. D., Wilkinson, C. H., Saxton, J. M., Pockley, A. G., & Wood, R. F. (2001). The inflammatory response to upper and lower limb exercise and the effects of exercise training in patients with claudication. *J Vasc Surg, 33*(2), 392-399. doi:10.1067/mva.2001.111988

Neupert, S., Lachman, M., & Whitbourne, S. (2009). Exercise self-efficacy and control beliefs: effects on exercise behavior after an exercise intervention for older adults. *J Aging Phys Act, 17*(1), 1-16. doi:10.1123/japa.17.1.1

Nie, F., He, J., Cao, H., & Hu, X. (2021). Predictive value of abnormal ankle-brachial index in patients with diabetes: A meta-analysis. *Diabetes Res Clin Pract, 174*, 108723. doi:10.1016/j.diabres.2021.108723

Nketia-Kyere, M., Aryeetey, G. C., Nonvignon, J., & Aikins, M. (2017). Exploring barriers to accessing physiotherapy services for stroke patients at Tema general hospital, Ghana. *Archives of Physiotherapy, 7*(1), 8. doi:10.1186/s40945-017-0037-5

Noumairi, M., Bouallala, A., El Mir, S., Allam, A., & El Oumri, A. A. (2021). Rehabilitation of patients with peripheral arterial disease. *Annals of medicine and surgery (2012), 70*, 102864. doi:10.1016/j.amsu.2021.102864

Ntusi, N. (2018). Dyslipidaemia in South Africa. *South African Medical Journal, 108*, 256. doi:10.7196/SAMJ.2018.v108i4.13265

Obsa, M. S., Ataro, G., Awoke, N., Jemal, B., Tilahun, T., Ayalew, N., . . . Haji, Y. (2022). Determinants of Dyslipidemia in Africa: A Systematic Review and Meta-Analysis. *Frontiers in Cardiovascular Medicine, 8*. doi:10.3389/fcvm.2021.778891

Oka, R. K., Szuba, A., Giacomini, J. C., & Cooke, J. P. (2003). Gender differences in perception of PAD: a pilot study. *Vasc Med, 8*(2), 89-94. doi:10.1191/1358863x03vm479oa

Olin, J. W., & Sealove, B. A. (2010). Peripheral artery disease: current insight into the disease and its diagnosis and management. *Mayo Clinic proceedings, 85*(7), 678-692. doi:10.4065/mcp.2010.0133

Onagbiye, S., Moss, S., & Cameron, M. (2016). Managing Noncommunicable Diseases in an African Community: Effects, Compliance, and Barriers to Participation in a 4-Week Exercise Intervention. *International quarterly of community health education, 36*. doi:10.1177/0272684X16647357

Oparil, S., Acelajado, M. C., Bakris, G. L., Berlowitz, D. R., Cífková, R., Dominiczak, A. F., . . . Whelton, P. K. (2018). Hypertension. *Nat Rev Dis Primers, 4*, 18014. doi:10.1038/nrdp.2018.14

Organization, W. H. (2022). A cleaner, healthier city: Expanding smoke-free spaces in Cape Town. Retrieved from https://www.who.int/news-room/feature-stories/detail/a-cleaner--healthier-city---expanding-smoke-free-spaces-in-cape-town

Pabon, M., Cheng, S., Altin, E., Sethi, S. S., Nelson, M. D., Moreau, K. L., . . . Hess, C. N. (2022). Sex Differences in Peripheral Artery Disease. *Circulation research, 130*(4), 496-511. doi:doi:10.1161/CIRCRESAHA.121.320702

Padilla, J., & Fadel, P. J. (2017). Prolonged sitting leg vasculopathy: contributing factors and clinical implications. *American journal of physiology. Heart and circulatory physiology, 313*(4), H722-H728. doi:10.1152/ajpheart.00326.2017

Pande, R. L., & Creager, M. A. (2014). Socioeconomic inequality and peripheral artery disease prevalence in US adults. *Circ Cardiovasc Qual Outcomes, 7*(4), 532-539. doi:10.1161/circoutcomes.113.000618

Panzavolta, C., Zalunardo, B., Irsara, S., Ferretto, L., & Visonà, A. (2021). Peripheral artery disease, the 'lost syndrome' during lockdown for COVID-19: A report of three cases. *Med Int, 1*(5), 15. doi:10.3892/mi.2021.15

Park, J., Moon, J., Kim, H., Kong, M., & Oh, Y. (2020). Sedentary Lifestyle: Overview of Updated Evidence of Potential Health Risks. *Korean journal of family medicine, 41*(6), 365-373. doi:10.4082/kjfm.20.0165

Park, S., Kwak, Y., & Pekas, E. (2019). Impacts of aquatic walking on arterial stiffness, exercise tolerance, and physical function in patients with peripheral artery disease: a randomized clinical trial. *Journal of applied physiology (Bethesda, Md. : 1985), 127*(4), 940-949. doi:10.1152/japplphysiol.00209.2019

Park, Y., Ryu, G., & Choi, M. (2022). Multiple metabolic comorbidities and their consequences among patients with peripheral arterial disease. *PLoS One, 17*(5), e0268201. doi:10.1371/journal.pone.0268201

Parmenter, B. J., Dieberg, G., Phipps, G., & Smart, N. A. (2015). Exercise training for health-related quality of life in peripheral artery disease: a systematic review and meta-analysis. *Vasc Med, 20*(1), 30-40. doi:10.1177/1358863x14559092

Parmenter, B. J., Dieberg, G., & Smart, N. A. (2015). Exercise training for management of peripheral arterial disease: a systematic review and meta-analysis. *Sports Med, 45*(2), 231-244. doi:10.1007/s40279-014-0261-z

Parr, B. M., Noakes, T. D., & Derman, E. W. (2009). Peripheral arterial disease and intermittent claudication: efficacy of short-term upper body strength training, dynamic exercise training, and advice to exercise at home. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde, 99*(11), 800-804.

Patel, K., Jones, P., Ellerbeck, E., Buchanan, D., Chan, P., Pacheco, C., . . . Smolderen, K. (2018). Underutilization of Evidence-Based Smoking Cessation Support Strategies Despite High Smoking Addiction Burden in Peripheral Artery Disease Specialty Care: Insights from the International PORTRAIT Registry. *J Am Heart Assoc, 7*(20), e010076. doi:10.1161/jaha.118.010076

Patel, K. K., Jones, P. G., Ellerbeck, E. F., Buchanan, D. M., Chan, P. S., Pacheco, C. M., . . . Smolderen, K. G. (2018). Underutilization of Evidence‐Based Smoking Cessation Support Strategies Despite High Smoking Addiction Burden in Peripheral Artery Disease Specialty Care: Insights from the International PORTRAIT Registry. *Journal of the American Heart Association, 7*(20), e010076. doi:doi:10.1161/JAHA.118.010076

Pekmezi, D., Jennings, E., & Marcus, B. (2009). EVALUATING AND ENHANCING SELF-EFFICACY FOR PHYSICAL ACTIVITY. *ACSMs Health Fit J, 13*(2), 16-21. doi:10.1249/FIT.0b013e3181996571

Pellinger, T., Pearce, C. B., & Simmons, G. H. (2017). Influence of Transcutaneous Electrical Nerve Stimulation on Clinical Measures and Functional Capacity in Patients with Peripheral Artery Disease. *The FASEB Journal, 31*(1_supplement), 1015.1035-1015.1035.

Peñín-Grandes, S., Martín-Hernández, J., Valenzuela, P., López-Ortiz, S., Pinto-Fraga, J., Solá, L., ... (2022). Exercise and the hallmarks of peripheral arterial disease. *Atherosclerosis, 350*, 41-50. doi:https://doi.org/10.1016/j.atherosclerosis.2022.04.025

Pillay, L., Govender, R., & Pillay, S. (2021). Doctor-perceived-barriers to telephone clinics at KwaZulu-Natal hospitals during the COVID-19 pandemic. *S Afr Fam Pract (2004), 63*(1), e1-e6. doi:10.4102/safp.v63i1.5334

Pipinos, I., Judge, A., Selsby, J., Zhu, Z., Swanson, S., Nella, A., & Dodd, S. (2008). The myopathy of peripheral arterial occlusive disease: Part 2. Oxidative stress, neuropathy, and shift in muscle fiber type. *Vasc Endovascular Surg, 42*(2), 101-112. doi:10.1177/1538574408315995

Pohlman, F., Ford, C., Weissler, E., Smerek, M., Hardy, N., Narcisse, D., . . . Jones, W. (2022). Impact of risk factor control on peripheral artery disease outcomes and health disparities. *Vasc Med*, 1358863x221084360. doi:10.1177/1358863x221084360

Porras, C. P., Bots, M. L., Teraa, M., van Doorn, S., & Vernooij, R. W. M. (2022). Differences in Symptom Presentation in Women and Men with Confirmed Lower Limb Peripheral Artery Disease: A Systematic Review and Meta-Analysis. *European Journal of Vascular and Endovascular Surgery, 63*(4), 602-612. doi:https://doi.org/10.1016/j.ejvs.2021.12.039

Price, J. F., McDowell, S., Whiteman, M. C., Deary, I. J., Stewart, M. C., & Fowkes, F. G. (2006). Ankle brachial index as a predictor of cognitive impairment in the general population: ten-year follow-up of the Edinburgh Artery Study. *J Am Geriatr Soc, 54*(5), 763-769. doi:10.1111/j.1532-5415.2006.00702.x

Rafnsson, S., Deary, I. J., & Fowkes, F. G. (2009). Peripheral arterial disease and cognitive function. *Vasc Med, 14*(1), 51-61. doi:10.1177/1358863x08095027

Rafnsson, S., & Fowkes, G. (2020). Positive and negative well-being of older adults with symptomatic peripheral artery disease: A population-based investigation. *JRSM Cardiovascular Disease, 9*, 2048004020961717. doi:10.1177/2048004020961717

Raja, A., Spertus, J., Yeh, R. W., & Secemsky, E. A. (2021). Assessing health-related quality of life among patients with peripheral artery disease: A review of the literature and focus on patient-reported outcome measures. *Vasc Med, 26*(3), 317-325. doi:10.1177/1358863x20977016

Rammos, C., Steinmetz, M., Lortz, J., Mahabadi, A. A., Petrikhovich, O., Kirsch, K., . . . Rassaf, T. (2021). Peripheral artery disease in Germany (2009–2018): Prevalence, frequency of specialized ambulatory care and use of guideline-recommended therapy – A population-based study. *The Lancet Regional Health – Europe, 5*. doi:10.1016/j.lanepe.2021.100113

Regensteiner, J. G., Hiatt, W. R., Coll, J. R., Criqui, M. H., Treat-Jacobson, D., McDermott, M. M., & Hirsch, A. T. (2008). The impact of peripheral arterial disease on health-related quality of life in the Peripheral Arterial Disease Awareness, Risk, and Treatment: New Resources for Survival (PARTNERS) Program. *Vascular Medicine, 13*(1), 15-24. doi:10.1177/1358863x07084911

Regmi, P., Waithaka, E., Paudyal, A., Simkhada, P., & van Teijlingen, E. (2016). Guide to the design and application of online questionnaire surveys. *Nepal J Epidemiol, 6*(4), 640-644. doi:10.3126/nje.v6i4.17258

Rezvani, F., Pelt, M., Härter, M., & Dirmaier, J. (2022). Effects of walking impairment on mental health burden, health risk behavior and quality of life in patients with intermittent claudication: A cross-sectional path analysis. *PLoS One, 17*(9), e0273747. doi:10.1371/journal.pone.0273747

Rispel, L. C., de Jager, P., & Fonn, S. (2015). Exploring corruption in the South African health sector. *Health Policy and Planning, 31*(2), 239-249. doi:10.1093/heapol/czv047

Rowe, M., & Sauls, B. (2020). The use of smartphone apps in clinical practice: A survey of South African physiotherapists. *S Afr J Physiother, 76*(1), 1327. doi:10.4102/sajp.v76i1.1327

Rüger, L. J., Irnich, D., Abahji, T. N., Crispin, A., Hoffmann, U., & Lang, P. M. (2008). Characteristics of chronic ischemic pain in patients with peripheral arterial disease. *Pain, 139*(1), 201-208. doi:10.1016/j.pain.2008.03.027

Sahadew, N., & Singaram, V. (2019). *A diabetes profile of the eight districts in the public health sector, Eastern Cape Province, South Africa* South African Medical Journal.

Sanderson, B., Askew, C., Stewart, I., Walker, P., Gibbs, H., & Green, S. (2006). Short-term effects of cycle and treadmill training on exercise tolerance in peripheral arterial disease. *Journal of Vascular Surgery, 44*(1), 119-127. doi:https://doi.org/10.1016/j.jvs.2006.03.037

Sapra, A., & Bhandari, P. (2022). Diabetes Mellitus. In *StatPearls*. Treasure Island (FL): StatPearls Publishing

Sarigiovannis, P., Foster, N. E., Jowett, S., & Saunders, B. (2022). Delegation of workload from musculoskeletal physiotherapists to physiotherapy assistants/support workers: A UK online survey. *Musculoskeletal Science and Practice, 62*, 102631. doi:10.1016/j.msksp.2022.102631

Savji, N., Rockman, C. B., Skolnick, A. H., Guo, Y., Adelman, M. A., Riles, T., & Berger, J. S. (2013). Association between advanced age and vascular disease in different arterial territories: a population database of over 3.6 million subjects. *J Am Coll Cardiol, 61*(16), 1736-1743. doi:10.1016/j.jacc.2013.01.054

Schiattarella, G. G., Perrino, C., Magliulo, F., Carbone, A., Bruno, A. G., De Paulis, M., . . . Esposito, G. (2014). Physical activity in the prevention of peripheral artery disease in the elderly. *Frontiers in physiology, 5*, 12-12. doi:10.3389/fphys.2014.00012

Schieber, M. N., Pipinos, I. I., Johanning, J. M., Casale, G. P., Williams, M. A., DeSpiegelaere, H. K., . . . Myers, S. A. (2020). Supervised walking exercise therapy improves gait biomechanics in patients with peripheral artery disease. *Journal of Vascular Surgery, 71*(2), 575-583. doi:https://doi.org/10.1016/j.jvs.2019.05.044

Schramm, K., & Rochon, P. J. (2018). Gender Differences in Peripheral Vascular Disease. *Seminars in interventional radiology, 35*(1), 9-16. doi:10.1055/s-0038-1636515

Schuivens, P. M. E., Buijs, M., Boonman-de Winter, L., Veen, E. J., de Groot, H. G. W., Buimer, T. G., . . . van der Laan, L. (2020). Impact of the COVID-19 Lockdown Strategy on Vascular Surgery Practice: More Major Amputations than Usual. *Ann Vasc Surg, 69*, 74-79. doi:10.1016/j.avsg.2020.07.025

Seenan, C., McSwiggan, S., Roche, P. A., Tan, C. W., Mercer, T., & Belch, J. J. (2016). Transcutaneous Electrical Nerve Stimulation Improves Walking Performance in Patients With Intermittent Claudication. *J Cardiovasc Nurs, 31*(4), 323-330. doi:10.1097/jcn.0000000000000258

Seretny, M., & Colvin, L. A. (2016). Pain management in patients with vascular disease. *BJA: British Journal of Anaesthesia, 117*(suppl_2), ii95-ii106. doi:10.1093/bja/aew212

Sethi, A., & Arora, R. R. (2008). Medical management and cardiovascular risk reduction in peripheral arterial disease. *Exp Clin Cardiol, 13*(3), 113-119.

Shankar, A., Li, J., Nieto, F. J., Klein, B. E., & Klein, R. (2007). Association between C-reactive protein level and peripheral arterial disease among US adults without cardiovascular disease, diabetes, or hypertension. *Am Heart J, 154*(3), 495-501. doi:10.1016/j.ahj.2007.04.060

Sharath, S., Kougias, P., & Barshes, N. R. (2017). The influence of pain-related beliefs on physical activity and health attitudes in patients with claudication: A pilot study. *Vasc Med, 22*(5), 378-384. doi:10.1177/1358863x17709944

Shi, Q., Mendoza, T. R., Dueck, A. C., Ma, H., Zhang, J., Qian, Y., . . . Cleeland, C. S. (2017). Determination of mild, moderate, and severe pain interference in patients with cancer. *Pain, 158*(6), 1108-1112. doi:10.1097/j.pain.0000000000000890

Shu, J., & Santulli, G. (2018). Update on peripheral artery disease: Epidemiology and evidence-based facts. *Atherosclerosis, 275*, 379-381. doi:10.1016/j.atherosclerosis.2018.05.033

Signorelli, S. S., Fiore, V., & Malaponte, G. (2014). Inflammation and peripheral arterial disease: The value of circulating biomarkers (Review). *Int J Mol Med, 33*(4), 777-783. doi:10.3892/ijmm.2014.1657

Skilton, M. R., Chin-Dusting, J. P., Dart, A. M., Brazionis, L., Lantieri, O., O'Dea, K., . . . Group, D. S. (2011). Metabolic health, obesity and 9-year incidence of peripheral arterial disease: the DESIR study. *Atherosclerosis, 216*(2), 471-476.

Smith, M., Witte, M., Rocha, S., & Basner, M. (2019). Effectiveness of incentives and follow-up on increasing survey response rates and participation in field studies. *BMC Med Res Methodol, 19*(1), 230. doi:10.1186/s12874-019-0868-8

Sol, B. G., van der Graaf, Y., van Petersen, R., & Visseren, F. L. (2011). The effect of self-efficacy on cardiovascular lifestyle. *Eur J Cardiovasc Nurs, 10*(3), 180-186. doi:10.1016/j.ejcnurse.2010.06.005

Spannbauer, A., Chwała, M., Ridan, T., Berwecki, A., Mika, P., Kulik, A., . . . Szewczyk, M. T. (2019). Intermittent Claudication in Physiotherapists' Practice. *BioMed Research International, 2019*, 2470801. doi:10.1155/2019/2470801

Stanhope, J. (2016). Brief Pain Inventory review. *Occupational Medicine, 66*(6), 496-497. doi:10.1093/occmed/kqw041

Statistics South Africa. (2012). *Census 2011: Census in brief*. (03-01-41). Retrieved from http://www.statssa.gov.za/census/census_2011/census_products/Census_2011_Census_in_brief.pdf

Steffen, L. M., Duprez, D. A., Boucher, J. L., Ershow, A. G., & Hirsch, A. T. (2008). Management of Peripheral Arterial Disease. *Diabetes Spectrum, 21*(3), 171-177. doi:10.2337/diaspect.21.3.171

Stein, R. A., Rockman, C. B., Guo, Y., Adelman, M. A., Riles, T., Hiatt, W. R., & Berger, J. S. (2015). Association Between Physical Activity and Peripheral Artery Disease and Carotid Artery Stenosis in a Self-Referred Population of 3 Million Adults. *Arteriosclerosis, thrombosis, and vascular biology, 35*(1), 206-212. doi:doi:10.1161/ATVBAHA.114.304161

Steunenberg, S. L., de Vries, J., Raats, J. W., Thijsse, W. J., Verbogt, N., Lodder, P., . . . van der Laan, L. (2018). Quality of Life and Mortality after Endovascular, Surgical, or Conservative Treatment of Elderly Patients Suffering from Critical Limb Ischemia. *Ann Vasc Surg, 51*, 95-105. doi:10.1016/j.avsg.2018.02.044

Stewart, J., Manmathan, G., & Wilkinson, P. (2017). Primary prevention of cardiovascular disease: A review of contemporary guidance and literature. *JRSM Cardiovasc Dis, 6*, 2048004016687211. doi:10.1177/2048004016687211

Stewart, V. (2019). Editorial: South African Journal of Physiotherapy 2019. *2019, 75*(1). doi:10.4102/sajp.v75i1.1372

Striberger, R., Axelsson, M., Kumlien, C., & Zarrouk, M. (2022). Health literacy in patients with intermittent claudication in relation to clinical characteristics, demographics, self-efficacy and quality of life – A cross-sectional study. *Journal of Vascular Nursing, 40*(3), 121-127. doi:https://doi.org/10.1016/j.jvn.2022.09.001

Strijbos, R., Hinnen, J., van den Haak, R., Verhoeven, B., & Koning, O. (2018). Inadequate Health Literacy in Patients with Arterial Vascular Disease. *Eur J Vasc Endovasc Surg, 56*(2), 239-245. doi:10.1016/j.ejvs.2018.04.015

Stubbs, D., Krebs, E., Bair, M., Damush, T., Wu, J., Sutherland, J., & Kroenke, K. (2010). Sex Differences in Pain and Pain-Related Disability among Primary Care Patients with Chronic Musculoskeletal Pain. *Pain Medicine, 11*(2), 232-239. doi:10.1111/j.1526-4637.2009.00760.x

Subherwal, S., Patel, M. R., Tang, F., Smolderen, K. G., Jones, W. S., Tsai, T. T., . . . Chan, P. S. (2013). Socioeconomic disparities in the use of cardioprotective medications among patients with peripheral artery disease: an analysis of the American College of Cardiology's NCDR PINNACLE Registry. *J Am Coll Cardiol, 62*(1), 51-57. doi:10.1016/j.jacc.2013.04.018

Sujarwoto, S., Holipah, H., & Maharani, A. (2022). A Cross-Sectional Study of Knowledge, Attitudes, and Practices concerning COVID-19 Outbreaks in the General Population in Malang District, Indonesia. *Int J Environ Res Public Health, 19*(7). doi:10.3390/ijerph19074287

Sundström, J., Bodegard, J., Bollmann, A., Vervloet, M. G., Mark, P. B., Karasik, A., . . . Tangri, N. (2022). Prevalence, outcomes, and cost of chronic kidney disease in a contemporary population of 2·4 million patients from 11 countries: The CaReMe CKD study. *The Lancet Regional Health – Europe, 20*. doi:10.1016/j.lanepe.2022.100438

Sunner, S. S., Welsh, R. C., & Bainey, K. R. (2021). Medical Management of Peripheral Arterial Disease: Deciphering the Intricacies of Therapeutic Options. *CJC Open, 3*(7), 936-949. doi:10.1016/j.cjco.2021.03.005

Sutherns, T., & Olivier, J. (2022). Mapping the Multiple Health System Responsiveness Mechanisms in One Local Health System: A Scoping Review of the Western Cape Provincial Health System of South Africa. *Int J Health Policy Manag, 11*(1), 67-79. doi:10.34172/ijhpm.2021.85

Thiruvoipati, T., Kielhorn, C. E., & Armstrong, E. J. (2015). Peripheral artery disease in patients with diabetes: Epidemiology, mechanisms, and outcomes. *World J Diabetes, 6*(7), 961-969. doi:10.4239/wjd.v6.i7.961

Thomas, M., Patel, K., Gosch, K., Labrosciano, C., Mena-Hurtado, C., Fitridge, R., . . . Smolderen, K. (2020). Mental health concerns in patients with symptomatic peripheral artery disease: Insights from the PORTRAIT registry. *J Psychosom Res, 131*, 109963. doi:10.1016/j.jpsychores.2020.109963

Thompson, A. T., Bruce, J. L., Kong, V. Y., Clarke, D. L., & Aldous, C. (2020). Counting the cost of preventable diabetes-related lower limb amputations at a single district hospital in KwaZulu-Natal: what does this mean, what can be done? *Journal of Endocrinology, Metabolism and Diabetes of South Africa, 25*(2), 44-50. doi:10.1080/16089677.2020.1782007

Thukkani, A. K., & Kinlay, S. (2015). Endovascular intervention for peripheral artery disease. *Circulation research, 116*(9), 1599-1613. doi:10.1161/circresaha.116.303503

Tran, B. (2021). Assessment and management of peripheral arterial disease: what every cardiologist should know. *Heart, 107*(22), 1835. doi:10.1136/heartjnl-2019-316164

Treat-Jacobson, D., McDermott, M. M., Bronas, U. G., Campia, U., Collins, T. C., Criqui, M. H., . . . Rich, K. (2019). Optimal Exercise Programs for Patients With Peripheral Artery Disease: A Scientific Statement From the American Heart Association. *Circulation, 139*(4), e10-e33. doi:doi:10.1161/CIR.0000000000000623

Tremblay, M. S., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., . . . Chinapaw, M. J. M. (2017). Sedentary Behavior Research Network (SBRN) - Terminology Consensus Project process and outcome. *Int J Behav Nutr Phys Act, 14*(1), 75. doi:10.1186/s12966-017-0525-8

Tummala, S., & Scherbel, D. (2018). Clinical Assessment of Peripheral Arterial Disease in the Office: What Do the Guidelines Say? *Seminars in interventional radiology, 35*(5), 365-377. doi:10.1055/s-0038-1676453

Uccioli, L., Meloni, M., Izzo, V., Giurato, L., Merolla, S., & Gandini, R. (2018). Critical limb ischemia: current challenges and future prospects. *Vascular Health and Risk Management, 14*, 63-74. doi:10.2147/VHRM.S125065

Unnikrishnan, R., Pradeepa, R., Joshi, S. R., & Mohan, V. (2017). Type 2 Diabetes: Demystifying the Global Epidemic. *Diabetes, 66*(6), 1432-1442. doi:10.2337/db16-0766

Vaidya, A., Kleinegris, M. C., Severens, J. L., Ramaekers, B. L., Ten Cate-Hoek, A. J., Ten Cate, H., & Joore, M. A. (2018). Comparison of EQ-5D and SF-36 in untreated patients with symptoms of intermittent claudication. *J Comp Eff Res, 7*(6), 535-548. doi:10.2217/cer-2017-0029

Vainas, T., Stassen, F., de Graaf, R., Twiss, E., Herngreen, S., Welten, R., . . . Kitslaar, P. (2005). C-reactive protein in peripheral arterial disease: relation to severity of the disease and to future cardiovascular events. *J Vasc Surg, 42*(2), 243-251. doi:10.1016/j.jvs.2005.03.060

Van Aswegen, H., Patman, S., Plani, N., & Hanekom, S. (2017). Developing minimum clinical standards for physiotherapy in South African ICUs: A qualitative study. *Journal of evaluation in clinical practice, 23*. doi:10.1111/jep.12774

van Schalkwyk, C., Dorrington, R. E., Seatlhodi, T., Velasquez, C., Feizzadeh, A., & Johnson, L. F. (2021). Modelling of HIV prevention and treatment progress in five South African metropolitan districts. *Scientific Reports, 11*(1), 5652-5652. doi:10.1038/s41598-021-85154-0

Van Wilder, L., Pype, P., Mertens, F., Rammant, E., Clays, E., Devleesschauwer, B., . . . De Smedt, D. (2021). Living with a chronic disease: insights from patients with a low socioeconomic status. *BMC Family Practice, 22*(1), 233. doi:10.1186/s12875-021-01578-7

van Zyl-Smit, R., Allwood, B., Stickells, D., Symons, G., Abdool-Gaffar, S., Murphy, K., . . . Richards, G. (2013). South African tobacco smoking cessation clinical practice guideline. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde, 103*(11), 869-876. doi:10.7196/samj.7484

Vart, P., Coresh, J., Kwak, L., Ballew, S. H., Heiss, G., & Matsushita, K. (2017). Socioeconomic Status and Incidence of Hospitalization With Lower-Extremity Peripheral Artery Disease: Atherosclerosis Risk in Communities Study. *J Am Heart Assoc, 6*(8). doi:10.1161/jaha.116.004995

Velazquez-Ramirez, G., Krebs, J., Stafford, J. M., Ur, R., Craven, T. E., Stutsrim, A. E., . . . Edwards, M. S. (2022). Prevalence of chronic opioid use in patients with peripheral arterial disease undergoing revascularization. *J Vasc Surg, 75*(1), 186-194. doi:10.1016/j.jvs.2021.07.236

Velescu, A., Clara, A., Peñafiel, J., Grau, M., Degano, I. R., Martí, R., . . . Elosua, R. (2016). Peripheral Arterial Disease Incidence and Associated Risk Factors in a Mediterranean Population-based Cohort. The REGICOR Study. *European Journal of Vascular and Endovascular Surgery, 51*(5), 696-705. doi:10.1016/j.ejvs.2015.12.045

Vrsalovic, M., Vucur, K., Vrsalovic Presecki, A., Fabijanic, D., & Milosevic, M. (2017). Impact of diabetes on mortality in peripheral artery disease: a meta-analysis. *Clin Cardiol, 40*(5), 287-291. doi:10.1002/clc.22657

Walsworth, M., de Bie, R., Figoni, S., & O'Connell, J. (2017). Peripheral Artery Disease: What You Need to Know. *Journal of Orthopaedic & Sports Physical Therapy, 47*(12), 957-964. doi:10.2519/jospt.2017.7442

Walton, D. (2020). Physiotherapists' Perspectives on the Threats Posed to Their Profession in the Areas of Training, Education, and Knowledge Exchange: A Pan-Canadian Perspective from the Physio Moves Canada Project, Part 1. *Physiother Can, 72*(1), 26-33. doi:10.3138/ptc-2018-0059

Wang, J., & Bennett, M. (2012). Aging and Atherosclerosis. *Circulation research, 111*(2), 245-259. doi:doi:10.1161/CIRCRESAHA.111.261388

Wang, W., Zhao, T., Geng, K., Yuan, G., Chen, Y., & Xu, Y. (2021). Smoking and the Pathophysiology of Peripheral Artery Disease. *Front Cardiovasc Med, 8*, 704106. doi:10.3389/fcvm.2021.704106

Wann-Hansson, C., & Wennick, A. (2016). How do patients with peripheral arterial disease communicate their knowledge about their illness and treatments? A qualitative descriptive study. *BMC Nurs, 15*, 29. doi:10.1186/s12912-016-0151-9

Weragoda, J., Seneviratne, R., Weerasinghe, M. C., Wijeyaratne, M., & Samaranayaka, A. (2015). A cross-sectional study on peripheral arterial disease in a district of Sri Lanka: prevalence and associated factors. *BMC public health, 15*(1), 829. doi:10.1186/s12889-015-2174-7

Weybright, E. H., Caldwell, L. L., Xie, H. J., Wegner, L., & Smith, E. A. (2017). Predicting secondary school dropout among South African adolescents: A survival analysis approach. *S Afr J Educ, 37*(2). doi:10.15700/saje.v37n2a1353

Willigendael, E. M., Teijink, J. A., Bartelink, M. L., Peters, R. J., Büller, H. R., & Prins, M. H. (2005). Smoking and the patency of lower extremity bypass grafts: a meta-analysis. *J Vasc Surg, 42*(1), 67-74. doi:10.1016/j.jvs.2005.03.024

Yang, B., Cui, Z., Zhu, X., Deng, M., Pan, Y., Li, R., . . . Li, F. (2020). Clinical pain management by a multidisciplinary palliative care team: Experience from a tertiary cancer center in China. *Medicine, 99*(48), e23312. doi:10.1097/md.0000000000023312

Yang, Y. (2019). An Overview of Current Physical Activity Recommendations in Primary Care. *Korean journal of family medicine, 40*(3), 135-142. doi:10.4082/kjfm.19.0038

Yathish, R., Annamallai, N., & Shankar, V. . (2010). Intermittent claudication among smokers. *Journal of Institute of Medicine Nepal*(31), 21–26. Retrieved from https://doi.org/10.3126/jiom.v31i3.2991

Yazdi-Ravandi, S., Taslimi, Z., Jamshidian, N., Saberi, H., Shams, J., & Haghparast, A. (2013). Prediction of Quality of life by Self-Efficacy, Pain Intensity and Pain Duration in Patient with Pain Disorders. *Basic Clin Neurosci, 4*(2), 117-124.

Yeom, H. A., Keller, C., & Fleury, J. (2009). Interventions for promoting mobility in community-dwelling older adults. *J Am Acad Nurse Pract, 21*(2), 95-100. doi:10.1111/j.1745-7599.2008.00390.x

Yu, T., & Ennion, L. (2019). Participation restrictions and vocational rehabilitation needs experienced by persons with a unilateral lower limb amputation in the Western Cape, South Africa. *African Journal of Disability, 8*. doi:10.4102/ajod.v8i0.456

Zemaitis, M. R., Boll, J. M., & Dreyer, M. A. (2021). Peripheral Arterial Disease. In *StatPearls*. Treasure Island (FL): StatPearls Publishing Copyright © 2021, StatPearls Publishing LLC.

Ziegler, L., Hedin, U., & Gottsäter, A. (2022). Circulating Biomarkers in Lower Extremity Artery Disease. *Eur Cardiol, 17*, e09. doi:10.15420/ecr.2021.58

APPENDIX LIST

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APPENDIX A

ENGLISH

Survey - Physiotherapists

Physiotherapy management of people with peripheral artery disease in the Western Cape

My name is Lisa Abrahams and I am studying towards a Master of Science in Physiotherapy degree at the University of Cape Town, Faculty of Health Sciences.

Study Information:

This Masters study has been approved by the Human Research Ethics Committee of the University of Cape Town (Ethics reference number 207/2021). The study aims to describe the physiotherapy management of people with peripheral artery disease (Padilla & Fadel) in the Western Cape. This component of the study is an online survey which takes approximately 10-15 minutes to complete. Themes of the survey include perceived knowledge, attitudes and beliefs regarding PAD and physiotherapy management of patients with PAD.

You have been invited to participate in this research study because the knowledge regarding physiotherapy management of patients with PAD is not well established in the Western Cape.

Eligibility criteria:

Health Professions Council of South Africa registered physiotherapists currently practicing in the Western Cape are eligible to participatein the study. Participants must manage patients with PAD. Internet connection is needed to complete the survey.

Risks and Benefits:

There are no risks associated with participation in this study. There are no benefits associated with participation in this study, however the data collected from this study may benefit the physiotherapy profession in the future. Internationally, it is well established that patients with PAD are being managed by multidisciplinary teams including physiotherapists. In South Africa, little is known about the extent, if any, of physiotherapy involvement in the management of patients with PAD.

Ethical considerations:

Participation in this study is entirely voluntary and participants may withdraw at any time. There is no remuneration for participating in this study. Participants will be allocated a number and all data collected for publication will not include your name, email address or any information that may identify you. Participant confidentiality will be maintained throughout the research. All data collected will be used for the sole purpose of this study but will be shared with study supervisors and may be used in future studies.

For any further information regarding this study, you may contact the following persons:

Primary researcher Lisa Abrahams at lisa.abrahams13@gmail.com. Alternatively, you can also contact the UCT Human Resource Ethics Committee via email hrec-enquiries@uct.ac.za or telephone 021 650 1236 in case you have any ethical concerns or questions about your rights or welfare as a participant in this research study. Research supervisors Naila Edries at naila.edries@uct.ac.za or

Candice Hendricks at candice.hendricks@uct.ac.za.

Kind regards,

Lisa Abrahams

University of Cape Town

☐ I have read the terms and conditions of this survey and voluntarily consent to participate in this study.

☐ I confirm that I am a HPCSA physiotherapist currently working in the Western Cape and managing patients with PAD.

Thank you for providing consent and for participating in this online survey!

AFRIKAANS

Opname – Fisioterapeute

Fisioterapeutiese behandelig van pasiënte met Perifere Arteriële Siekte in die Wes Kaap

My naam is Lisa Abrahams. Ek is tans besig met my Meestersgraad in Fisioterapie aan die Universiteit van Kaapstad se Fakulteit Geneeskunde en Gesondheidswetenskappe

Navorsingstudie Inligting

Hierdie Meesters Navorsingstudie is goedgekeur deur die Navorsingsetiekkomitee van die Universiteit Kaapstad (Etiek verwysingsnommer XYZ). Die doel van die navorsingstudie is om die fisioterapeutiese behandeling van pasiënte met Perifere Arteriële Siekte (Mourad et al.) in die Wes Kaap te beskryf. Hierdie deel van die navorsingstudie is ‘n aanlyn opname wat min of meer 10-15-minute neem om te voltooi. Die temas van die opname sluit in: waarneming, indruk en oortuigings oor PAS en fisioterapeutiese behandeling van pasiënte met PAS.

U word genooi om deel te neem aan hierdie navorsingstudie omdat kennis aangaande fisioterapeutiese behandeling van pasiënte met PAS nie goed gevestig is in die Wes-Kaap nie.

Fisioterapeute wat by die Suid-Afrikaanse Raad vir Gesondheidsberoepe geregistreer is en wat tans in die Wes-Kaap praktiseer, mag aan hierdie navorsingstudie deelneem. Deelnemers moet pasiënte met PAS behandel. ‘n Internet konneksie is nodig om die opname te kan voltooi.

Risikos en Voordele

Daar is geen voordele of risikos verbonde met deelname aan hierdie navorsingstudie nie. Die data wat vir hierdie navorsingstudie versamel word, mag in die toekoms vir die fisioterapie beroep ‘n voordeel inhou. Dit is internasionaal goed gevestig dat pasiënte met PAS deur multidissiplinêre spanne wat fisioterapeute insluit, behandel word. In Suid Afrika is min bekend oor die omvang van fisioterapeute se betrokkenheid in die behandeling van pasiënte met PAS.

Etiese oorwegings

Deelname aan hierdie navorsingstudie is heeltemal vrywillig en deelnemers mag enige tyd onttrek. Daar is geen vergoeding aangebied vir deelname aan hierdie navorsingstudie nie. Deelnemers sal ‘n nommer toegeken word en data wat vir publikasie versamel word, sal nie u naam, epos adres of enige identifiserende inligting bevat nie. Deelnemers se name of epos adresse sal deur die primêre navorser

gehou word. Enige data wat hierdie inligting bevat, sal deur middel van ‘n wagwoordbeskermde toestel aanlyn gestoor word. Deelnemers se persoonlike inligting sal as vertroulik beskou word. Alle data wat versamel word sal slegs vir die doel van hierdie navorsingstudie gebruik word. Die data sal gedeel word met navorsingstudie toesighouers en mag in die toekoms in navorsingstudies gebruik word.

Vir meer inligting oor hierdie navorsingstudie mag u die volgende persone kontak:

Primêre navorser, Lisa Abrahams op lisa.abrahams13@gmail.com Of u kan die Navorsingsetiekkomitee via epos kontak hrec-enquiries@uct.ac.za of bel op 0216501236 as u enige etiese bekommernisse of vraë oor u regte of u welstand as ‘n deelneemer in hierdie navorsingstudie het.

Navorsingstudie toesighouer, Naila Edries naila.edries@uct.ac.za of Candice Hendricks candice.hendricks@uct.ac.za

☐ Ek het die bepalings en voorwaardes van hierdie opname deurgelees en verstaan. Ek gee vrywilliglik toestemming om aan hierdie navorsingstudie deel te neem.

☐ Ek bevestig dat ek 'n HPCSA fisioterapeut is en ook dat ek tans in die Wes-Kaap werk en pasiënte met PAS behandel.

Dankie dat u toestemming gegee het en vir u deelname aan hierdie aanlyn opname!

XHOSA

Uphando – Umzimba wonyango

Ulawulo lomzimba wonyango kwizigulana ezinesifo somthambo onomda eNtshona Koloni

Igama lam nguLisa Abrahams kwaye ndifundela ukubamba isidanga seMasters kwiNzululwazi yonyango womzimba kwi Yunivesithi yaseKapa.

Inkcukacha zophando:

Olu phando lonzulu lweMasters lwamkelwe yiKomiti yeMigaqo yempatho yabantu abaphandwayo kwiYunivesithi yaseKapa. (inombolo yesalathiso XYZ). Injongo yoluphando kukuchaza ulawulo olwenziwa ngabanyangi bomzimba kwizigulana ezinesifo somthambo onomda eNtshona Koloni. Eli candelo lwophando luphando olwenziwa kwi-intanethi oluthatha malunga imizuzu elishumi ukuya kwimizuzu elishumi elinesihlanu ukuba uligqibe. Imixholo yoluphando ibandakanya ukuqonda, isimo sengqondo kwaye iinkolelo malunga esisifo nolawulo lomzimba wonyango kwizigulana ezinesisifo somthambo onomda.

Umenyiwe ukuba uthathe inxaxheba koluphando lunzulu ngokuba ulwazi malunga ulawulo lonyango womzimba kwizigulana ezinesifo somthambo onomda alusekwanga kakuhle eNtshona Koloni.

Ikhrayitheriya yokufaneleka:

Umnyangi womzimba obhalisiweyo nebhunga yeengcali yezempilo eMzantsi Afrika ephangela eNtshona koloni bafanelekile ukuthatha inxaxheba kwesisifundo. Abathathi-nxaxheba kunyanzelekile balawule izigulana ezinesifo somthambo onomda. Uqhagamshelo lwe-intanethi luyadingeka ukuze ugqibe oluphando.

Imingcipheko nezibonelelo:

Akukho mingcipheko edityaniswa nokuthatha inxaxheba kwesisifundo. Akukho zibonelelo ezidityaniswa nokuthatha inxaxheba kwesisifundo, nangona kunjalo, idata eqokelelwe kwesisifundo singanaso isibonelelo kwingcali yabanyangi bomzimba kwikamva esijongene nalo. Kwilizwe jikelele, kusekiwe kakuhle into yokuba izigulana ezinesifo somthambo onomda zilawulwa liqela leendlela ezahlukeneyo ezibandakanya abanyangi bomzimba. kwelaseMzantsi Afrika, kukho ufifi, ukuba lukhona kwalona, malunga lokubandakanyeka lwabanyangi bomzimba kulawulo lwezigulana ezinesifo somthambo onomda.

Ingqwalaselo kwimigaqo yendlela yokuphathwa kwabantu:

Inxaxheba kwesisifundo kukuzithandela ngokupheleleyo kwaye abathathi-nxaxheba bangarhoxisa nanini na. Akukho mvuzo ngokuthatha inxaxheba kwesisifundo. Abathathi-nxaxheba bazakunikwa inombolo kwaye yonke idata eqokelelweyo ukuba ushicelelwe ayizokulibandakanya igama, i-emayili okanye ezinye iinkcukacha ezinothi zikubonakalise. Amagama okanye idilesi ye-imayili yabathathi-nxaxheba izogcinwa ngumphandi ophambili kwaye yonke idata enezinkcukacha izogcina kwisixhobo esikhuselwe ngenombolo yokuvula kwaye izophinda ingcinwe kugcino olukwi-intanethi. Imfihlo yomthathi-nxaxheba luzokugcinwa kulo lonke oluphando. Yonke idata eqokelelweyo izosetyenziselwa injongo yesisifundo qha kodwa kuzokwabelwana ngayo kubaphathi bezifundo kwaye ingasetyenziswa kwizifundo ezizayo.

Ukuba ufuna iinkcukacha ezithe vetshe malunga esisifundo, ungaqhagamshelana ababantu balandelayo:

Umphandi ophambili: Lisa Abrahams ku lisa.abrahams13@gmail.com okanye ungaqhagamshelana neKomiti yemiGaqo kwiziXhobo zaBantu nge emayili hrec-enquiries@uct.ac.za okanye emxebeni ku-021 650 1236

Abaphathi bophando uNaila Edries ku naila.edries@uct.ac.za okanye;

uCandice Hendricks ku Candice.hendricks@uct.ac.za

Ozithobileyo, Lisa Abrahams

Yunivesithi yaseKapa

- Ndiyifundile imimiselo nemiqathango yoluphando kwaye ngokuzithandela ndinika imvume yokuthatha inxaxheba kwesisifundo
- Ndiyangqina ukuba ndingumnyangi womzimba obhaliswe neHPCSA ophangela eNtshona Koloni kwaye ndilawula izigulana ezinesifo somthambo onomda.

Enkosi ngokunikeza ngemvume yakho nokuthatha inxaxheba koluphando olukwi-intanethi!

PARTICIPANT PROFILE

Participant number e.g. PT001 (randomly allocated to maintain anonymity of participants)

1. Which municipality do you mainly work in? (select option from list below)

- ☐ Cape Winelands District Municipality
- ☐ Central Karoo District Municipality
- ☐ Garden Route District Municipality
- ☐ Overberg District Municipality
- ☐ West Coast District Municipality
- ☐ City of Cape Town District Municipality

2. What type of facility do you work in? If applicable, please tick more than one.

- ☐ Private Hospital
- ☐ Government Tertiary Hospital
- ☐ Government Secondary Hospital
- ☐ Private Outpatient Practice
- ☐ Community Health Centre
- ☐ Home Based Care
- ☐ School
- ☐ Other – Please specify

3. How many years of clinical experience do you have following your BSc Physiotherapy qualification (including community service)?

- ☐ Less than one year
- ☐ 1 – 5 years
- ☐ 5 – 10 years
- ☐ 10 – 15 years
- ☐ More than 15 years

KNOWLEDGE, ATTITUDES AND BELIEFS

4. How would you describe your knowledge about the following regarding PAD?

	No knowledge	Poor	Fair	Good	Excellent Knowledge
Pathophysiology					
Causes					
Risk factors					
Clinical characteristics					
Stages of disease					
Complications					
Pharmacological management options					
Non-pharmacological management options					

5. Do you receive referrals for patients specifically to manage PAD?

- ☐ Yes
- ☐ No

6. At which stage do you manage patients with PAD? If applicable, tick more than one.

- ☐ Fontaine stage I – Asymptomatic PAD
- ☐ Fontaine stage IIa – Mild claudication (Claudication >200m)
- ☐ Fontaine stage IIb – Moderate-severe claudication (Claudication <200m)
- ☐ Fontaine stage III – Pain at rest
- ☐ Fontaine stage IV – chronic limb-threatening ischemia, gangrene or severe non-healing and ischemic ulcers
- ☐ Post-amputation relating to gangrene or non-healing ulcer

7. On average, how many times in a week do you see a patient with PAD?

8. What is your highest level of training regarding PAD?

- ☐ Doctoral degree
- ☐ Master's degree
- ☐ BSc degree
- ☐ CPD accredited course
- ☐ Other

9. Do you conduct screening for patients at risk of PAD?

- ☐ Yes
- ☐ No

10. If yes to 9, what type of screening do you conduct?

- ☐ Symptom- based questions
- ☐ Physical assessment
- ☐ Ankle-Brachial Index testing
- ☐ Referral for medical screening

11. Do you conduct any promotional talks or prevention education for PAD at your facility?

- ☐ Yes
- ☐ No

12. Do you manage any exercise groups at your facility for Vascular related conditions such as PAD?

- ☐ Yes
- ☐ No

13. What tools do you make use of for patient education around management of PAD? Ifapplicable, please tick more than one:

- ☐ Flyers or pamphlets
- ☐ Posters
- ☐ Group promotional talks
- ☐ Video clip
- ☐ One on one patient education
- ☐ None
- ☐ Other – Please specify

14. How do you manage patients with PAD? If applicable, please tick more than one:

- ☐ I refer them to other health care professionals
- ☐ General physical activity recommendations
- ☐ Structured supervised exercise programme
- ☐ Home exercise programme (unsupervised)
- ☐ Education (i.e. smoking cessation, lifestyle changes)
- ☐ Pain management
- ☐ Other - Please specify

15. What are the most common problems that you have managed in your PAD patients? If applicable, tick more than one.

- ☐ Pain
- ☐ Decreased mobility
- ☐ Decreased gait speed
- ☐ Decreased gait endurance
- ☐ Decreased health-related quality of life
- ☐ Poor standing balance
- ☐ Other – Please specify

16. What treatment techniques do you use to manage a) pain b) decreased mobility c) decreased gait speed d) decreased gait endurance e) decreased health-related quality of life f) poor standing balance in patients with PAD?

- ☐ Chronic pain management
- ☐ Deep breathing exercises
- ☐ Stretching
- ☐ Treadmill walking
- ☐ Stationary bike cycling
- ☐ Advice to walk
- ☐ Lower limb strengthening
- ☐ Upper limb strengthening
- ☐ Circulation drills
- ☐ Aerobic exercises
- ☐ Electrotherapy
- ☐ Heat
- ☐ Other – Please specify

17. If you were unable to manage a patient with PAD, who would you refer them to? If applicable, tick more than one:

- ☐ Another physiotherapist
- ☐ General Practitioner
- ☐ Vascular surgeon or specialist
- ☐ I don't know
- ☐ Other – Please specify

18. Do you manage patients with intermittent claudication?

- ☐ Yes
- ☐ No

19. Do you manage patients with asymptomatic PAD?

- ☐ Yes
- ☐ No

20. Do you manage patients for their chronic limb-threatening ischemia?

- ☐ Yes
- ☐ No

21. Do you believe that physiotherapists should screen patients for PAD?

- ☐ Yes
- ☐ No

22. Do you believe that physiotherapists should manage patients for chronic limb-threatening ischemia?

- ☐ Yes
- ☐ No

Thank you for participating in this survey. Please provide any feedback or comments regarding the survey here.

Please find educational links to American Heart Association and Vascular Society of Southern Africa links to guidelines on management of Peripheral Artery Disease.

AHA: https://www.ahajournals.org/doi/epub/10.1161/CIR.0000000000000470

VASSA: http://www.vascularsociety.co.za/wp-content/uploads/2015/08/Peripheral-Arterial-Disease-VASSA- practice-guidelines-2012.pdf

END

APPENDIX B

ENGLISH

Survey - Patients attending the Vascular OPD Participant number……..

Date and time: ……..

Physiotherapy management of people with peripheral artery disease in the Western Cape

My name is Lisa Abrahams and I am studying towards a Master of Science in Physiotherapy degree at the University of Cape Town, Faculty of Health Sciences.

Study Information:

This Masters study has been approved by the Human Research Ethics Committee of the University of Cape Town (Ethics reference number 207/2021) and the Western Cape Department of Health. This study aims to describe the current physiotherapy management of people with peripheral artery disease in the Western Cape.

You have been invited to participate in this research study because you have peripheral artery disease. Your experience with this condition will help physiotherapists to understand the impact of the condition on your function and quality of life.

Your spot in the line will be kept for you.

Before starting, your folder will be read to confirm your diagnosis.

The first part of the study is a survey. The researcher will ask you about the management you have received for peripheral artery disease.

The survey will include questions on your:

- Personal profile
- Your understanding of your condition

The second part is completing four tests about your:

- Health-related quality of life
- Pain

- Self-efficacy (motivation)
- Exercise behaviours

This should take approximately 20 minutes to complete.

Eligibility criteria:

Patients with PAD currently attending the GSH or TBH Vascular OPD between (insert dates). Participants may not have had a previous limb amputation. Participants need to be able to read and write in either English, Afrikaans or isiXhosa.

Risks and Benefits:

There are no risks or benefits from participating in this study. The data collected from this study may benefit people with peripheral artery disease in the future. Discussing your diagnosis and experience of living with PAD with the researcher may be very difficult and upsetting for some participants. Should you require emotional support or counselling during or post completion of the survey, immediate counseling will be provided by the trained researcher. Should you require additional and ongoing counseling and emotional support, you will be referred to the psychologist at your local clinic or health facility. All participants will receive a PAD educational pamphlet from the researcher.

Ethical considerations:

- Participation in this study is entirely voluntary.
- You may withdraw at any time.
- Your medical or health management received by the hospital will not be affected by your participation in the study or by your decision to not participate or to withdraw from the study.
- There is no payment for participating in this study.
- You will be allocated a participant number and all information documented in the study write-up or for publication will not include your identity.
- Your identity will be kept by the primary researcher and all data with these details will be kept on a password-protected device and online storage for back up.
- Your confidentiality will be kept during the research.
- All data collected will be used only for this study but will be shared with study supervisors and may be used in future studies.

For any further information regarding this study, you may contact the primary researcher, Lisa Abrahams

at lisa.abrahams13@gmail.com. Alternatively, you can also contact the research supervisors Naila Edries at naila.edries@uct.ac.za or Candice Hendricks at candice.hendricks@uct.ac.za

The Human Research Ethics Committee chairperson can be contacted via email on hrec-enquiries@uct.ac.za or telephone 021 650 1236 in case you have any ethical concerns or questions about your rights or welfare as a participant in this research study.

Kind regards,
Lisa Abrahams
University of Cape Town

☐ I have read and understand the terms and conditions of this survey.

☐ I voluntarily consent to participate in this study.

☐ I give permission for my patient file to be checked to confirm my diagnosis

☐ I confirm that I am a patient at the Vascular OPD of …… Hospital with folder number_____.

Full name of participant:

Signature:

AFRIKAANS

Pasiënt opname

Fisioterapeutiese behandelig van pasiënte met Perifere Arteriële Siekte in die Wes Kaap

My naam is Lisa Abrahams. Ek is tans besig met my Meestersgraad in Fisioterapie aan die Universiteit van Kaapstad se Fakulteit Geneeskunde en Gesondheidswetenskappe.

Navorsingstudie Inligting

Hierdie Meesters Navorsingstudie is goedgekeur deur die Navorsingsetiekkomitee van die Universiteit Kaapstad (Etiek verwysingsnommer XYZ). Die doel van die navorsingstudie is om die fisioterapeutiese behandeling van pasiënte met Perifere Arteriële Siekte (Mourad et al.) in die Wes Kaap te beskryf.

U word genooi om deel te neem aan hierdie navorsingstudie omdat u Perifere Arteriële Siekte het. Perifere Arteriële Siekte is veroorsaak deur plaak wat in die slagare op bou en die siekte beïnvloed meestal die bene. U ervaring van die toestand sal van groot waarde wees vir fisioterapeute sodat hulle die gevolge wat hierdie toestand op pasiënte se funksie en lewensgehalte het, beter kan verstaan. Sodoende kan hulle ander pasiënte met PAS beter behandel.

U plek in die ry sal gehou word terwyl u in hierdie navorsingstudie deelneem.

Voor die opname begin sal u lêer gelees word om u diagnose met PAS te bevestig . Die eerste deel van die navorsingstudie is ‘n opname. Die navorser sal u oor die behandeling wat u ontvang het vir PAS vra. Die opname sluit in vraë oor:

- u patiënteprofiel,
- u kennis van u se toestand

Die tweede deel is om vier toetse te voltooi. Die toetse gaan oor:

- gesondheidsverwante lewensgehalte
- pyn
- selfdoeltreffendheid
- oefen gedrag

Dit behoort omtrent 20-minute neem om te voltooi.

Geskiktheidskriteria

Pasiënte met PAS wat tans die GSH Vascular OPD tussen (datums) bywoon.

Deelnemers mag nie ‘n vorige ledemate-amputasie gehad het nie.

Deelnemers moet in Engels, Afrikaans of Xhosa kan lees en skryf.

Risikos en Voordele

Daar is geen voordele of risikos geassosieer met deelname aan hierdie navorsingstudie nie. Die data wat vir hierdie navorsingstudie versamel word mag in die toekoms vir PAS pasiënte ‘n voordeel inhou. As u enige emosionele ondersteuning oor u diagnose met PAS nogig het kan u na u plaaslike sielkundige verwys word. U sal ook 'n inligting pamflet van die navorser ontvang.

Etiese oorwegings

Deelname aan hierdie navorsingstudie is heeltemal vrywillig. U mag enige tyd onttrek. Daar is geen betaling vir deelname aan hierdie navorsingstudie nie. U sal ‘n nommer kry en enige inligting wat in die navorsingstudie se verslag of vir publikasie verskyn sal nie u identiteit insluit nie. U identiteit sal deur die primêre navorser gehou word. Enige data wat u persoonlike inligting bevat sal op ‘n wagwoordbeskermde toestel en aanlyn gestoor word. U persoonlike inligting sal as vertroulik beskou word. Alle data wat versamel word sal slegs vir die doel van hierdie navorsingstudie gebruik word. Die data sal gedeel word met navorsingstudie toesighouers en mag in die toekoms in navorsingstudies gebruik word.

Vir meer inligting oor hierdie navorsingstudie mag u die primêre navorser, Lisa Abrahams via epos kontak op lisa.abrahams13@gmail.com. U kan ook die navorsingstudie toesighouers, Naila Edries op naila.edries@uct.ac.za of Candice Hendricks op candice.hendricks@uct.ac.za kontak. Die voorsitter van die Navorsingsetiekkomitee kan via epos kontak word op hrec-enquiries@uct.ac.za of u kan 0216501236 bel as u enige etiese bekommernisse of vraë oor u regte of u welstand as ‘n deelneemer in hierdie navorsingstudie het.

Beste Wense,
Lisa Abrahams
Universiteit Kaapstad

☐ Ek het die bepalings en voorwaardes van hierdie opname deurgelees en verstaan. Ek gee vrywilliglik toestemming om aan hierdie navorsingstudie deel te neem.

☐ Ek gee toestemming dat my pasiënte lêer geraadpleeg word om my diagnose te bevestig.

☐ Ek bevestig dat ek ‘n pasiënt by ……..

Hospitaal met vouernommer _____.

XHOSA

Uphando – Izigulana ezimasa GSH Vascular OPD

Inombolo yomthathi-nxaxheba 001

Usuku nexesha:

Ulawulo lomzimba wonyango kwizigulana ezinesifo somthambo onomda eNtshona Koloni

Igama lam nguLisa Abrahams kwaye ndifundela ukubamba isidanga seMasters kwiNzululwazi yonyango womzimba kwi Yunivesithi yaseKapa, iFakhalthi yeNzululwazi yezeMpilo

Inkcukacha zophando:

Olu phando lonzulu lweMasters lwamkelwe yiKomiti yeMigaqo yempatho yabantu abaphandwayo kwiYunivesithi yaseKapa. (inombolo yesalathiso XYZ). Injongo yoluphando kukuchaza ulawulo olwenziwa ngabanyangi bomzimba kwizigulana ezinesifo somthambo onomda eNtshona Koloni.

Umenyiwe ukuba uthathe inxaxheba koluphando lunzulu lwesifundo ngokuba unesifo somthambo onomda. Isifo semithambo enomda sisifo esibangelwa kukuminxeka kwemithambo, esichaphazela imilenze kakhulu ngenxa yemicwecwe eyakhekayo. Amava okuphila nesisifo luzokunceda abanyangi bomzimba ukuba babenokuqonda kangcono ifuthe lwesisigulo kwindlela yokusebenza nomgangatho wobomi wezigulana, ukuze bakwazi ukulawula ezinye izigulana ezinesisifo somthambo onomda.

Isihlalo sakho emgceni sizokugcinwa malunga elixesha othatha inxaxheba kwesisifundo

Ngaphambi kokuba uqale oluphando, incwadi yakho izokufundwa ukuze kugqinwe ukuxilongwa kwakho nesifo somthambo onomda. Icandelo lokuqala lwesisifundo luphando (ozothi uliphendule ngokuthetha) malunga ulawulo othe walufumana kwesisifo. Imixholo yoluphando ibandakanya inkangeleko yesigulana, ukuqonda, isimo sengqondo kwaye iinkolelo malunga esisifo nolawulo nololongwa lomzimba wonyango kwizigulana ezinesisifo somthambo onomda. Icandelo lesibini kukugqiba imilinganiselo yeziphumo ezine (ephepheni) ephathelene nomgangatho wempilo edibene nempilo yakho (EQ-5D), intlungu (BPI-sf), ukuzimela ngokukuko (SEMCD6) nesimilo lokulolonga (Isikali sokuziphatha xa uzilolonga). Oku kungathatha malunga imizuzu engamashumi amabini (20) ukuyigqiba.

Ikhrayitheriya yokufaneleka:

Izigulana ezinesifo somthambo onomda abahamba e-GSH Vascular OPD phakathi (dates).

Abathathi-nxaxheba abangekabinakunqunyulwa lelungu lomzimba ngaphambili.

Abathathi-nxaxheba kufuneka bakwazi ukufunda nokubhala ngesiNgesi, isiBhulu okanye isiXhosa.

Imingcipheko nezibonelelo:

Akukho mingcipheko edityaniswa nokuthatha inxaxheba kwesisifundo. Akukho zibonelelo ezidityaniswa nokuthatha inxaxheba kwesisifundo, nangona kunjalo, idata eqokelelwe kwesisifundo inganaso isibonelelo kwizigulana ezinesisifo somthambo onomda kwikamva esijongene nalo. Uba ufuna inkxaso yemvakalelo okanye iingcebiso malunga nokuxilongela isifo semithambo, ungaya kugqirha wengqondo okufutshane nawe nalapho uyawutsho ufumane incwadana ngemfundiso ebhalwe ziingcali nabaphandi ngesisifo.

Ingqwalaselo kwimigaqo yendlela yokuphathwa kwabantu:

Inxaxheba kwesisifundo kukuzithandela ngokupheleleyo kwaye abathathi-nxaxheba bangarhoxisa nanini na. Akukho mvuzo ngokuthatha inxaxheba kwesisifundo. Abathathi-nxaxheba bazakunikwa inombolo kwaye yonke idata eqokelelweyo ukuba ibhalwe okanye ushicelelwe ayizokulibandakanya igama, i-emayili okanye ezinye iinkcukacha ezinothi zikubonakalise. Amagama abathathi-nxaxheba azogcinwa ngumphandi ophambili kwaye yonke idata enezinkcukacha izogcinwa kwisixhobo esikhuselwe ngenombolo yokuvula kwaye izophinda ingcinwe kugcino olukwi-intanethi. Imfihlo yomthathi-nxaxheba luzokugcinwa kulo lonke oluphando. Yonke idata eqokelelweyo izosetyenziselwa injongo yesisifundo qha kodwa kuzokwabelwana ngayo kubaphathi bezifundo kwaye ingasetyenziswa kwizifundo ezizayo.

Ukuba ufuna iinkcukacha ezithe vetshe malunga esisifundo, ungaqhagamshelana ababantu balandelayo:

Umphandi ophambili: Lisa Abrahams ku lisa.abrahams13@gmail.com okanye ungaqhagamshelana neKomiti yemiGaqo kwiziXhobo zaBantu nge emayili hrec-enquiries@uct.ac.za okanye emxebeni ku-021 650 1236
Abaphathi bophando uNaila Edries ku naila.edries@uct.ac.za okanye;
uCandice Hendricks ku Candice.hendricks@uct.ac.za

Ozithobileyo, Lisa Abrahams

Yunivesithi yaseKapa

- Ndiyifundile imimiselo nemiqathango yoluphando kwaye ngokuzithandela ndinika imvume yokuthatha inxaxheba kwesisifundo
- Ndiyifundile kwaye ndiyayilandela imithetho nemigaqo yoluvavanyo
- Ndiyazigqatsa ukuba ndibengomnye wabathath'inxaxheba koluphando
- Ndiyagunyazis'uba ifayile ngengulo yam ingajongwa ukuqinisekisa oluvavanyo
- Ndiyavuma ukuba ndisisigulane kwicandelo yemithamb'oluvo kwisibhedlele i…… inombolo yefayile yam ……..

  Amagam'am apheleleyo

  Intsayino-gama:

Enkosi ngokunikeza ngemvume yakho nokuthatha inxaxheba koluphando

PATIENT PROFILE

1. How old are you?

2. Gender

- ☐ Male
- ☐ Female
- ☐ Other

3. Do you experience any pain in your lower limbs due to peripheral artery disease?

(Fontaine stage -asked based on symptoms):

- ☐ No symptoms (Asymptomatic)
- ☐ Pain with walking more than 200m (Mild claudication >200m)
- ☐ Pain with walking less than 200m (Moderate-severe claudication <200m)
- ☐ Pain at rest (ischemic rest pain)
- ☐ Necrosis and or gangrene of the limb

4. Do you have any of the following conditions?

- ☐ High blood pressure
- ☐ Diabetes Mellitus
- ☐ Kidney disease
- ☐ High cholesterol
- ☐ Do you have any other medical conditions – Please specify

5. Do you smoke?

- ☐ Yes
- ☐ No
- ☐ Former smoker - How many years ago?

KNOWLEDGE, ATTITUDES AND BELIEFS

6. How would you describe your knowledge about the following regarding Peripheral Artery Disease (Padilla & Fadel)?

	No knowledge	Poor	Fair	Good	Excellent Knowledge
What causes PAD?					
The complications associated with this condition?					
The treatment or management options available to you?					

MANAGEMENT

7. Have you been advised to stop smoking or to avoid second-hand smoke?

- ☐ Yes
- ☐ No

8. If yes, by whom?

- ☐ Doctor
- ☐ Nurse
- ☐ Physiotherapist
- ☐ Other – Please specify

9. Have you been advised to walk as a form of exercise to manage your condition?

- ☐ Yes
- ☐ No

10. If yes, by whom?

- ☐ Doctor
- ☐ Nurse
- ☐ Physiotherapist
- ☐ Other – Please specify

11. If yes, how frequently were you instructed to walk?

- ☐ < 30 mins a week
- ☐ 30-60 mins a week
- ☐ 60-90 mins a week
- ☐ 90+ mins a week
- ☐ I don't know about dosage or intensity

12. If offered, would you attend a 45-minute exercise class with others with your specific condition at your local clinic? (Skip logic question)

- ☐ Yes
- ☐ No

13. If yes, how frequently would you be able to attend a group exercise class?

- ☐ Once a week
- ☐ Bimonthly
- ☐ Monthly
- ☐ Other - Please specify

14. If no, why not?

- ☐ I don't have the time
- ☐ I don't have transport
- ☐ I have pain
- ☐ I would prefer to exercise on my own at home
- ☐ I would prefer to walk in my community on my own
- ☐ Other (explain):

Once you have finished the questionnaire, please complete the following outcome measures:

- ☐ Self-Efficacy for Managing Chronic Disease 6 item scale
- ☐ EQ-5D
- ☐ BPI-sf
- ☐ Exercise Behaviours Scale

Additional comments:

Thank you for participating in this study!

END

APPENDIX C

Sample size calculations:

	Physiotherapist sample size	Patient sample size
Population size	1452 (1322 SASP + 130 PASA)	240 (40 x3 months x2 facilities)
Hypothesized % frequency outcome factor in the population	30% due to low response rate to emailed survey (Fincham, 2008)	70% as about 10 patients attend each clinic each week, with approximately 70% of these having peripheral artery disease. As is seen in Johnston et al (2016), 70% of PVD cases were traumatic among other vascular cases presenting to the clinic (Johnston et al., 2016).
Confidence limits	5%	5%
Design effect	1	1
Equation	Sample size n = [DEFF*Np(1-p)]/ [(d^2/$Z^2_{1-\alpha/2}$*(N-1)+p*(1-p)]	Sample size n = [DEFF*Np(1-p)]/ [(d^2/$Z^2_{1-\alpha/2}$*(N-1)+p*(1-p)]
Confidence level	95%	95%
Sample size	265	138

Physiotherapist survey:

Number of respondents you need X100

Expected % response rate

= 265 x 100

30

= 883 invites

Patient survey:

Number of respondents you need X100

Expected % response rate

= 138 x 100

70

= 197 invites

APPENDIX D

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room G50- Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6492
Email: hrec-submissions@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

22 June 2021

HREC REF: 207/2021

Ms N Edries
Division of Physiotherapy
F-45 OMB
Email: naila.edries@uct.ac.za
Student: lisa.abrahams13@gmail.com

Dear Ms Edries

PROJECT TITLE: PHYSIOTHERAPY MANAGEMENT OF PATIENTS WITH PERIPHERAL ARTERY-DISEASE IN THE WESTERN CAPE-MSC CANDIDATE-MISS LISA ABRAHAMS

Thank you for your response letter, addressing the issues raised by the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

This approval is subject to strict adherence to the HREC recommendations regarding research involving human participants during COVID -19, dated 17 March 2020 & 06 July 2020.

Approval is granted for one year until the 30 June 2022.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

The HREC acknowledge that the student: Miss Lisa Abrahams will also be involved in this study.

Please quote the HREC REF 207/2021 in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

APPENDIX E

Permission letter to the Western Cape Department of Health and to GSH/TBH executive management

(date)

To whom it may concern

RE: Requesting permission to conduct a research study

I, Lisa Abrahams, am currently doing my MSc in Physiotherapy at the Department of Health and Rehabilitation Sciences at the University of Cape Town (UCT). I would like to request permission to conduct my research study with patients attending the Tygerberg Hospital and Groote Schuur Hospital Vascular Out-Patient Departments (OPD).

The study has been granted ethical approval from the Human Research Ethics Committee, Faculty of Health Sciences, UCT (reference number 207/2021).

Background:

Peripheral Artery Disease (Padilla & Fadel), defined as the partial or complete obstruction of the peripheral arteries, continues to be a growing public health burden, affecting more than 200 million people worldwide. A study exploring the physiotherapy management of patients with PAD has not yet been explored in the Western Cape or South Africa.

This research study will focus on:
"Physiotherapy management of people with peripheral artery disease in the Western Cape"

Process:

The primary aim of this study is to describe the current physiotherapy management of patients with PAD in the Western Cape and compare this to local and international PAD management guidelines. The secondary aim is to describe the profile of PAD patients presenting to Groote Schuur Hospital (GSH) and Tygerberg Hospital (TBH) vascular out-patient departments, and assess their perceived knowledge, attitudes and beliefs of PAD.

The study consists of two components:

1. A quantitative study will be conducted using a researcher-designed physiotherapist survey

EQ-5D, Exercise Behaviours Scale and Self-Efficacy for Managing Chronic Diseases 6-item scale. The study will not involve any physical testing of patients.

Recruitment of patient participants for the study:

- Following permission from the Western Cape Department of Health and the respective Hospital (TBH or GSH) Manager/CEO, flyers and posters will be posted in popular points around the Vascular OPD reception and waiting areas. The researcher will be positioned at a table within the Vascular OPD waiting or communal area, and any interested patients may approach the researcher for further information on the study. All participation will be entirely voluntary and confidential. It will be explained to all interested participants that participation in the study is voluntary and is separate from their doctor's appointment and management received by the hospital.

Informed consent process for interested participants:

- Should patients be interested in participating in the study, they will be required to give signed informed consent (see attached informed consent form) and will then be screened for inclusion and exclusion criteria by cross referencing their patient folders to confirm their diagnosis of PAD.

The inclusion and exclusion criteria are as follows:

Inclusion Criteria:

- Participants must attend the Groote Schuur Vascular OPD or Tygerberg Hospital Vascular OPD.

- Patients that have been diagnosed with PAD.

- Participants must be able to read and write in English, Afrikaans or isiXhosa as these are the most spoken languages in the Western Cape.

Exclusion Criteria:

- Participants who have had a previous limb amputation.

COVID–19 precautions will be strictly adhered to. This will include the use of face masks, hand sanitizer and social distancing at all times.

I therefore request permission to conduct the study at your facility within the vascular out-patient department. Furthermore, I request permission for the following as components of the study process:

1. To conduct a once off pilot study of five participants in a separate OPD to the Vascular OPD,

folders of interested participants (to screen for eligibility) and to folders of consenting participants to confirm PAD diagnosis.

Eligible participants' position in the line will be kept for them by use of a sign and will not disrupt service delivery, as participants can be interviewed before or after their appointment. This study will not affect the workload of any staff in the Vascular OPD.

Patient interviews will take approximately 20 minutes per participant starting from 07:00 and the researcher will be available until the Vascular OPD has closed for the day or until the last expected patient for the day has been seen. This will be done on allocated weekly Vascular OPD days over three months. Should participants require translation, the researcher will assist as far as possible. Between the two facilities, 138 participants are required for an appropriate sample size. This would be approximately 69 patients per facility over the three months.

Should any participants experience emotional fallout, whilst participating in the study they will receive immediate counselling from the researcher and if necessary, they will be referred to a psychologist at their local clinic. All participants will receive an educational pamphlet on PAD once they have participated in the study.

Attached to this letter you will find a copy of the following documents:

- Study poster
- Patient educational pamphlet about PAD
- Informed consent letter regarding the study for eligible participants

I look forward to hearing from you and your assistance is greatly appreciated.

Sincerely,

Lisa Abrahams (MSc candidate)

Email: lisa.abrahams13@gmail.com

Contact: 071 146 8035

Study supervisors:

Mrs. Naila Edries-Khan: naila.edries@uct.ac.za (Supervisor)

Mrs Candice Hendricks-De Kock: candice.hendricks@uct.ac.za (Co-Supervisor)

APPENDIX F

GROOTE SCHUUR HOSPITAL
Enquiries: Dr Bernadette Eick
e-mail: GSHReserach.Request@westerncape.gov.za

Ms. Naila Edries
HEALTH & REHABILITATION

E-mail: naila.edries@uct.ac.za / lisa.abrahams13@gmail.com

Dear Ms. Edries,

RESEARCH PROJECT: Physiotherapy Management of People with peripheral artery disease In TheWestern Cape (MSc. Ms. Lisa Abrahams)

Your recent letter to the hospital refers.

You are granted permission to proceed with your research, which is valid until **30 June 2022.**

Please note the following:

a) Your research may not interfere with normal patient care.
b) Hospital staff may not be asked to assist with the research.
c) **Confidentiality must always be maintained.**
d) No additional costs to the hospital should be incurred as indicated in your Annexure 2 i.e. Lab,consumables or stationery. **If access to TRACK Care/NHLS is required, kindly attach our letter of approval to the application form and approach Information Management to assist with data.**
e) No patient folders may be removed from the premises or be inaccessible.
f) Please provide the research assistant/field worker with a copy of this letter as verification of approval.
g) **Should you at any time require photographs of your subjects, please obtain the necessary indemnity forms from our Public Relations Office (E45 OMB or ext. 2187/2188).**
h) Should you require additional research time beyond the stipulated expiry date, please apply for anextension.
i) Please discuss the study with the HOD before commencing.
j) Please introduce yourself to the person in charge of an area before commencing.
k) On completion of your research, please forward any recommendations/findings that can be beneficial to use to take further action that may inform redevelopment of future policy / reviewguidelines.
l) Please contact Michelle Riley (Patient Fees) at ext. 2276 to ascertain if there will be charges forconducting the Research and to obtain a quote or to discuss charges
m) **Kindly submit a copy of the publication or report to this office on completion of the research.**
n) At no time should any posters encouraging patients to partake in research, be displayed within aclinical area.
o) Please adhere to ALL COVID-19 regulations and Groote Schuur Hospital policies.

I would like to wish you every success with the project.

Yours sincerely

DR BERNADETTE EICK
CHIEF OPERATIONAL OFFICER
Date: 10 September 2021

C.C. Mr. L. Naidoo / Dr B. Jacobs / Ms. C. Davids / Dr N. Naidoo

G46 Management Suite, Old Main Building,
Observatory 7925
Tel: +27 21 404 6288 fax: +27 21 404 6125
www.westerncape.gov.za/health

Private Bag X,
Observatory, 7935

APPENDIX G

TYGERBERG HOSPITAL
REFERENCE:
Research Projects
ENQUIRIES: **Dr GG Marinus**
TELEPHONE:**021 938 5752**

Ethics Reference: 207/2021

TITLE: **PHYSIOTHERAPY MANAGEMENT OF PATIENTS WITH PERIPHERAL ARTERY-DISEASE IN THE WESTERN CAPE-MSC CANDIDATE-MISS LISA ABRAHAMS**

Dear Ms N Edries

PERMISSION TO CONDUCT YOUR RESEARCH AT TYGERBERG HOSPITAL.

1. In accordance with the Tygerberg Hospital Health Research Policy and Protocol of **April 2018,** permission is hereby granted for you to conduct the above-mentioned research here at Tygerberg Hospital for a year based on your HREC approval.

2. Researchers, in accessing Provincial health facilities, are expressing consent to provide the Department with an electronic copy of the final feedback within six months of completion of research. This can be submitted to the Provincial Research Co-Ordinator (Health.Research@westerncape.gov.za).

DR GG MARINUS
MANAGER: MEDICAL SERVICES

Date: 7/9/2021

APPENDIX H

Do you have peripheral artery disease?

Participants are needed for a Research Study on Peripheral Artery Disease. Participation will be totally voluntary.

Will the interview be confidential?

Yes! Personal details will only be known by the researcher and will be kept completely confidential

How can I be sure that I have peripheral artery disease?

We can confirm this from your file.

How long will it take?

Each private interview will be 15 - 20 minutes long.

How do I get involved?

If you are interested in paricipating in this study and you have further questions please contact the researcher (Lisa), who will be able to explain further.

HREC NUMBER #

RESEARCHER:
LISA ABRAHAMS
abrlis004@uct.ac.za

APPENDIX I

23 June 2021

Dear

Request for Assistance:

Validation of a questionnaire to describe the management of people with peripheral artery disease in the Western Cape.

Title of study: "The management of people with peripheral artery disease in the Western Cape"

I am currently a MSc in Physiotherapy candidate at the University of Cape Town and I would like to request your voluntary assistance in the validation of a self-developed questionnaire. This would be a once-off questionnaire, to help obtain the personal profile, understanding of disease and management received by people with peripheral artery disease. As a 'validator', you will be acting as a reviewer and will be required to review the questions and provide comments on whether the questions are clear, concise and unambiguous. All the information that will be provided to me will be treated with utmost confidentiality.

I will be conducting a study to determine the physiotherapy management of people with peripheral artery disease over 3 months. The research study will be conducted at Groote Schuur Hospital and Tygerberg Hospital Vascular out-patient departments. The patient questionnaire will be read and filled in for participants. Once the survey is completed, patients will also be asked four outcome measures investigating pain, health-related quality of life, self-efficacy and exercise behaviours. The researcher will translate the questionnaire where necessary. Patients will have the opportunity to ask questions about the condition after their participation and will receive an educational pamphlet about peripheral artery disease. Any emotional distress with be managed and referred for further counsel if necessary.

The study has been reviewed and approved by the Human Research Ethics Committee (HREC), Faculty of Health Sciences, University of Cape Town. You can contact the UCT HREC on hrec-enquiries@uct.ac.za or telephone 021 650 1236. Ethics reference number: 207/2021

The objectives of the study are as follows:

1. To determine the extent to which physiotherapists in the Western Cape are currently managing patients with PAD using a researcher-designed online questionnaire/survey.

2. To compare the physiotherapy management of patients with PAD in the Western Cape to the latestevidence-based management guidelines from the VASSA and AHA.

3. To determine the perceived knowledge, attitudes and beliefs of physiotherapists currently working in the Western Cape about PAD.

4. In a group of PAD patients attending the GSH and TBH vascular clinics: To describe demographics, PAD risk factors, HRQoL, self-efficacy, pain severity and interference with function and exercise behaviours using a researcher-designed questionnaire (demographics), the Brief Pain Inventory-short form (BPI-sf), EuroQol-5D (EQ-5D), Self-Efficacy for Managing Chronic Diseases-6 item scale and Exercise Behaviours Scale.

5. To determine patients' knowledge, attitudes and beliefs about PAD using a researcher-designedquestionnaire.

To the researcher's knowledge, there is currently no literature describing the physiotherapy management of people with peripheral artery disease in the Western Cape.

The self-developed questionnaire consists of 14 questions that will assist in determining the patient profile and management that they have received regarding peripheral artery disease.

I am requesting your assistance in reviewing this self-developed questionnaire to ensure that the questions are clear and unambiguous, easy to understand, and that they adequately measure what they are supposed to measure to be able to answer the research question of this study.

Below you will find the questionnaire with an allocated comments section for each question. Could you please review each question and provide the necessary comments? Your feedback will be greatly appreciated. If possible, please return any feedback by Wednesday 30 June 2021. Please contact me should you have any further questions, or should you be unable to assist with the validation process.

Thank you for your time and for supporting this research study.

Kind regards,
Lisa Abrahams
ABRLIS004
071 146 8035
lisa.abrahams13@gmail.com

Research Supervisors:

Mrs Naila Edries: naila.edries@uct.ac.za

Mrs Candice Hendricks: candice.hendricks@uct.ac.za

QUESTIONNAIRE TO DETERMINE THE PHYSIOTHERAPY MANAGEMENT OF PEOPLE WITH PERIPHERAL ARTERY DISEASE IN THE WESTERN CAPE.

Instructions for Validator

Please review the following questions and indicate in the tables below each question your consensus as to whether the questions are clear, concise and unambiguous; if the questions are appropriate to gather content to meet objectives; if questions are in a logical order and comment on the overall length of time to complete the questionnaire.

You may add a comment or suggestion below any question, should you wish to do so.

EXAMPLE

Have you participated in a group exercise class in the last month?

□ No □Yes

Is the question clear, concise, unambiguous	Yes X	No
Is the question appropriate	Yes X	No
Is question in a logical order	Yes X	No
Comments: Clear. Time frame too short, suggest three months.		

1. How old are you?

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

2. Gender

- Male
- Female
- Other

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

3. Do you experience any pain in your lower limbs due to peripheral artery disease? (Fontaine stage -asked based on symptoms):

- Stage I – No symptoms (Asymptomatic)
- Stage IIa – Pain with walking more than 200m (Mild claudication >200m)
- Stage IIb – Pain with walking less than 200m (Moderate-severe claudication <200m)
- Stage III – Pain at rest (ischemic rest pain)
- Stage IV – Necrosis and or gangrene of the limb

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

4. Do you have any of the following conditions?

- ☐ High blood pressure
- ☐ Diabetes Mellitus
- ☐ Kidney disease
- ☐ High cholesterol
- ☐ Do you have any other medical conditions – Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

5. Do you smoke?
- ☐ Yes
- ☐ No
- ☐ Used to - How many years ago?

If yes, how many pack years?
Calculate:

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

KNOWLEDGE, ATTITUDES AND BELIEFS

6. How would you describe your knowledge about the following regarding Peripheral Artery Disease (PAD)?

	No knowledge	Poor	Fair	Good	Excellent Knowledge
What causes PAD?					
The complications associated with this condition?					
The treatment or management options available to you?					

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

MANAGEMENT

7. Have you been advised to stop smoking or to avoid second-hand smoke?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

8. If yes, by whom?

- Doctor
- Nurse
- Physiotherapist
- Other – Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

9. Have you been advised to walk as a form of exercise in order to manage your condition? (Skip logic question)

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

10. If yes, by whom?

- Doctor
- Nurse
- Physiotherapist
- Other – Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

11. If yes, how frequently were you instructed to walk?

□ < 30 mins a week
□ 30-60 mins a week
□ 60-90 mins a week
□ 90+ mins a week
□ I don't know about dosage or intensity

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

12. If offered, would you attend a 45-minute exercise class with others with your specific condition at your local clinic? (Skip logic option)

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

13. If yes, how frequently would you be able to attend a group exercise class?

- Once a week
- Bimonthly
- Monthly
- Other - Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

14. If no, why not?

- I don't have the time
- I don't have transport
- I have pain
- I would prefer to exercise on my own at home
- I would prefer to walk in my community on my own
- Other (explain):

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

Additional comments:

Thank you for your time in answering this questionnaire.

APPENDIX J

PHYSIOTHERAPIST SURVEY VALIDATION SUMMARY

PARTICIPANT PROFILE

Participant number e.g. PT001 (randomly allocated to maintain anonymity of participants)

1. Which municipality do you mainly work in? (select option from list below)

- Cape Winelands District Municipality
- Central Karoo District Municipality
- Garden Route District Municipality
- Overberg District Municipality
- West Coast District Municipality
- City of Cape Town District Municipality

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear.		

2. What type of facility do you work in? If applicable, please tick more than one.

- ☐ Private Hospital
- ☐ Government Tertiary Hospital
- ☐ Government Secondary Hospital
- ☐ Private Outpatient Practice
- ☐ Community Health Centre
- ☐ Home Based Care
- ☐ School
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear.		

3. How many years of clinical experience do you have following your BSc Physiotherapy qualification (including community service)?

- Less than one year
- 1 – 5 years
- 5 – 10 years
- 10 – 15 years
- More than 15 years

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear.		

KNOWLEDGE, ATTITUDES AND BELIEFS

4. How would you describe your knowledge about the following regarding PAD?

	No knowledge	Poor	Fair	Good	Excellent Knowledge
Pathophysiology					
Causes					
Risk factors					
Clinical characteristics					
Stages of disease					
Complications					
Pharmacological management options					
Non-pharmacological management options					

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No

Comments: clear.

This is the first time in the questionnaire where PAD is used. Do you have it written out somewhere in the instructions to the respondent?

Amended (bold):

4. How would you describe your knowledge about the following regarding **Peripheral Artery Disease?**

	No knowledge	Poor	Fair	Good	Excellent Knowledge
Pathophysiology					
Causes					
Risk factors					
Clinical characteristics					
Stages of disease					
Complications					
Pharmacological management options					
Non-pharmacological management options					

5. Do you receive referrals for patients specifically to manage PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No

Comments: clear.

6. At which stage do you manage patients with PAD? If applicable, tick more than one.

- ☐ Fontaine stage I – Asymptomatic PAD
- ☐ Fontaine stage IIa – Mild claudication (Claudication >200m)
- ☐ Fontaine stage IIb – Moderate-severe claudication (Claudication <200m)
- ☐ Fontaine stage III – Pain at rest
- ☐ Fontaine stage IV – critical limb ischemia, gangrene or severe non-healing and ischemic ulcers
- ☐ Post amputation relating to gangrene or non-healing ulcer

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear.		

7. On average, how many times in a week do you see a patient with PAD?

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X	No X
Comments: So again I had to re-read this more than once. At first I thought you were asking how many PAD patients I see in a week…then when I read it again, I was like ohhhhh maybe the question is asking how many times a patient with PAD is treated in a week (once a week, twice a week, every day?etc). Perhaps you could reword the question so that it's clearer		
Amended: 7. On average, **how many patients do you see with PAD in a week?**		

8. What is your highest level of training regarding PAD?

- ☐ Doctoral degree
- ☐ Masters degree
- ☐ BSc degree
- ☐ CPD accredited course
- ☐ Other

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear. Are there any post-graduate degrees specifically aimed at PAD? No.		

9. Do you conduct screening for patients at risk of PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear and valid question		

10. If yes to 9, what type of screening do you conduct?

☐ Symptom- based questions
☐ Physical assessment
☐ Ankle-Brachial Index testing
☐ Referral for medical screening

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear. Allow for the respondent to answer more than one option		
Amended: 10. If yes to 9, what type of screening do you conduct? **If applicable, please select more than one.** ☐ Symptom- based questions ☐ Physical assessment ☐ Ankle-Brachial Index testing ☐ Referral for medical screening		

11. Do you conduct any promotional talks or prevention education for PAD at your facility?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear. If the answer to this question is yes, is the answer for the talks or for education?		
Amended: 11. Do you conduct any **educational talks at your facility to promote awareness of PAD?** ☐ Yes ☐ No		

12. Do you manage any exercise groups at your facility for Vascular related conditions such as PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear.		

13. What tools do you make use of for patient education around management of PAD? If applicable, please tick more than one:

- ☐ Flyers or pamphlets
- ☐ Posters
- ☐ Group promotional talks
- ☐ Video clip
- ☐ One on one patient education
- ☐ None
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear.		

14. How do you manage patients with PAD? If applicable, please tick more than one:

- ☐ I refer them to other health care professionals
- ☐ General physical activity recommendations
- ☐ Structured supervised exercise program
- ☐ Home exercise program (unsupervised)
- ☐ Education (i.e. smoking cessation, lifestyle changes)
- ☐ Pain management - Please explain
- ☐ Other - Please specify

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments:		

15. What are the most common problems that you have managed in your PAD patients? If applicable, tick more than one.

- ☐ Pain
- ☐ Decreased mobility
- ☐ Decreased gait speed
- ☐ Decreased gait endurance
- ☐ Decreased health-related quality of life
- ☐ Poor standing balance
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear		

16. What treatment techniques do you use to manage a) pain b) decreased mobility c) decreased gait speed d) decreased gait endurance e) decreased health-related quality of life f) poor standing balance g) other for patients with PAD? (skip logic question with explanation based on question 15)

- ☐ Chronic pain management
- ☐ Deep breathing exercises
- ☐ Stretching
- ☐ Treadmill walking
- ☐ Stationary bike cycling
- ☐ Advice to walk
- ☐ Lower limb strengthening
- ☐ Upper limb strengthening
- ☐ Circulation drills
- ☐ Aerobic exercises
- ☐ Electrotherapy
- ☐ Heat
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes	No X X X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X	No X X
Comments: This question looks too full…perhaps separate each point. So maybe rather ask what treatment techniques do you use to manage pain? Then give the options to tick. Next question, what treatment techniques do you use to manage decreased mobility? Then give the options to tick. Etc		

I am not sure how one will answer this question? Does your online survey break the question up into separate questions? I think this may be the case.

Participants may get confused with the a,b,c,d etc in the question. Perhaps you can just ask what treatment techniques the physio would use in the question and then leave all the options as they are?

Amended**: Questions 16-22 will be optional/not required to answer if not applicable**

16. What treatment techniques do you use to manage pain for patients with PAD?

- ☐ Chronic pain management
- ☐ Deep breathing exercises
- ☐ Stretching
- ☐ Treadmill walking
- ☐ Stationary bike cycling
- ☐ Advice to walk
- ☐ Lower limb strengthening
- ☐ Upper limb strengthening
- ☐ Circulation drills
- ☐ Aerobic exercises
- ☐ Electrotherapy
- ☐ Heat

17. What treatment techniques do you use to manage decreased mobility for patients with PAD?

- ☐ Chronic pain management
- ☐ Deep breathing exercises
- ☐ Stretching
- ☐ Treadmill walking
- ☐ Stationary bike cycling
- ☐ Advice to walk
- ☐ Lower limb strengthening
- ☐ Upper limb strengthening
- ☐ Circulation drills
- ☐ Aerobic exercises
- ☐ Electrotherapy
- ☐ Heat

18. What treatment techniques do you use to manage decreased gait speed for patients with PAD?

- ☐ Chronic pain management
- ☐ Deep breathing exercises
- ☐ Stretching
- ☐ Treadmill walking
- ☐ Stationary bike cycling
- ☐ Advice to walk
- ☐ Lower limb strengthening
- ☐ Upper limb strengthening
- ☐ Circulation drills
- ☐ Aerobic exercises

☐ Electrotherapy
☐ Heat

19. What treatment techniques do you use to manage decreased gait endurance for patients with PAD?

☐ Chronic pain management
☐ Deep breathing exercises
☐ Stretching
☐ Treadmill walking
☐ Stationary bike cycling
☐ Advice to walk
☐ Lower limb strengthening
☐ Upper limb strengthening
☐ Circulation drills
☐ Aerobic exercises
☐ Electrotherapy
☐ Heat

20. What treatment techniques do you use to manage decreased health-related quality of life for patients with PAD?

☐ Chronic pain management
☐ Deep breathing exercises
☐ Stretching
☐ Treadmill walking
☐ Stationary bike cycling
☐ Advice to walk
☐ Lower limb strengthening
☐ Upper limb strengthening
☐ Circulation drills
☐ Aerobic exercises
☐ Electrotherapy
☐ Heat

21. What treatment techniques do you use to manage poor standing balance for patients with PAD?

☐ Chronic pain management
☐ Deep breathing exercises
☐ Stretching
☐ Treadmill walking
☐ Stationary bike cycling
☐ Advice to walk
☐ Lower limb strengthening
☐ Upper limb strengthening
☐ Circulation drills
☐ Aerobic exercises
☐ Electrotherapy
☐ Heat

17. If you were unable to manage a patient with PAD, who would you refer them to?
If applicable, tick more than one:

- ☐ Another physiotherapist
- ☐ General Practitioner
- ☐ Vascular surgeon or specialist
- ☐ I don't know
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear **Now question 22.**		

18. Do you manage patients with intermittent claudication?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear **Now question 23.**		

19. Do you manage patients with asymptomatic PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear **Now question 24.**		

20. Do you manage patients for their critical limb ischemia?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X	No X
Comments: perhaps you could rather ask "Do you manage patients with critical limb ischemia?" or if you would like more details, ask "how do you manage patients with critical limb ischemia? "		
25. Do you manage patients **with chronic limb-threatening ischemia (previously known as critical limb ischemia)?** ☐ Yes ☐ No		

21. Do you believe that physiotherapists should screen patients for PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear Perhaps move this question to be with the other question on screening for PAD. Left in this section as this question is about beliefs and not current practice. **Now question 26.**		

22. Do you believe that physiotherapists should manage patients for critical limb ischemia?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X	No
Is the question appropriate	Yes X X	No
Is question in a logical order	Yes X X	No

Comments: clear

Perhaps move this question to be with the other question on critical limb ischaemia.

Left this in this section to make reporting easier for beliefs topic.

27. Do you believe that physiotherapists should manage patients for **chronic limb-threatening ischemia?**

☐ Yes
☐ No

APPENDIX K

23 June 2021

Dear Amy Morgan

Request for Assistance:
Validation of a questionnaire to describe the management of people with peripheral artery disease in the Western Cape.

Title of study: "The management of people with peripheral artery disease in the Western Cape"

I am currently a MSc in Physiotherapy candidate at the University of Cape Town and I would like to request your voluntary assistance in the validation of a self-developed questionnaire. This would be a once-off questionnaire, to help obtain the personal profile, understanding of disease and management received by people with peripheral artery disease. As a 'validator', you will be acting as a reviewer and will be required to review the questions and provide comments on whether the questions are clear, concise and unambiguous. All the information that will be provided to me will be treated with utmost confidentiality.

I will be conducting a study to determine the physiotherapy management of people with peripheral artery disease (Padilla & Fadel) over three months. The research study will be conducted online using Microsoft forms software. This questionnaire will be emailed through the Physiotherapy Association of South Africa and the South Africa Society of Physiotherapy. To promote the involvement of physiotherapists working in the public sector, physiotherapy departments in the Western Cape will be contacted telephonically to encourage participation. Physiotherapists will be able to answer the online questionnaire in their personal capacity if they have mobile data or access to internet.

The study has been reviewed and approved by the Human Research Ethics Committee, Faculty of Health Sciences, University of Cape Town. Ethics reference number: 207/2021

The objectives of the study are as follows:

1. To determine the extent to which physiotherapists in the Western Cape are currently managing patients with PAD using a researcher-designed online questionnaire/survey.

2. To compare the physiotherapy management of patients with PAD in the Western Cape to the latestevidence-based management guidelines from the VASSA and AHA.

3. To determine the perceived knowledge, attitudes and beliefs of physiotherapists currently working in the Western Cape about PAD.

4. In a group of PAD patients attending the GSH and TBH vascular clinics: To describe demographics, PAD risk factors, HRQoL, self-efficacy, pain severity and interference with function and exercise behaviours using a researcher-designed questionnaire (demographics), the Brief Pain Inventory-short form (BPI-sf), EuroQol-5D (EQ-5D), Self-Efficacy for Managing Chronic Diseases-6 item scale and Exercise Behaviours Scale.

5. To determine patients' knowledge, attitudes and beliefs about PAD using a researcher-designedquestionnaire.

To the researcher's knowledge, there is currently no literature describing the physiotherapy management of people with peripheral artery disease in the Western Cape.

The self-developed questionnaire consists of 22 questions that will assist in determining the physiotherapy management of people with peripheral artery disease.

I am requesting your assistance in reviewing this self-developed questionnaire to ensure that the questions are clear and unambiguous, easy to understand, and that they adequately measure what they are supposed to measure to be able to answer the research question of this study.

Below you will find the questionnaire with an allocated comments section for each question. Could you please review each question and provide the necessary comments? Your feedback will be greatly appreciated. If possible, please return any feedback by Wednesday 30 June 2021. Please contact me should you have any further questions, or should you be unable to assist with the validation process.

Thank you for your time and for supporting this research study.

Kind regards,

Lisa Abrahams

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QUESTIONNAIRE TO DETERMINE THE PHYSIOTHERAPY MANAGEMENT OF PEOPLE WITH PERIPHERAL ARTERY DISEASE IN THE WESTERN CAPE.

Instructions for Validator

Please review the following questions and indicate in the tables below each question your consensus as to whether the questions are clear, concise and unambiguous; if the questions are appropriate to gather content to meet objectives; if questions are in a logical order and comment on the overall length of time to complete the questionnaire.

You may add a comment or suggestion below any question, should you wish to do so.

EXAMPLE

1. Do you believe physiotherapists should manage patients with PAD at your facility?

□ No □Yes

Is the question clear, concise, unambiguous	Yes X	No
Is the question appropriate	Yes X	No
Is question in a logical order	Yes X	No
Comments: Clear.		

PARTICIPANT PROFILE

Participant number e.g. PT001 (randomly allocated to maintain anonymity of participants)

1. Which municipality do you mainly work in? (select option from list below)

- Cape Winelands District Municipality
- Central Karoo District Municipality
- Garden Route District Municipality
- Overberg District Municipality
- West Coast District Municipality
- City of Cape Town District Municipality

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

2. What type of facility do you work in? If applicable, please tick more than one.

- ☐ Private Hospital
- ☐ Government Tertiary Hospital
- ☐ Government Secondary Hospital
- ☐ Private Outpatient Practice
- ☐ Community Health Centre
- ☐ Home Based Care
- ☐ School
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

3. How many years of clinical experience do you have following your BSc Physiotherapy qualification (including community service)?

- Less than one year
- 1 – 5 years
- 5 – 10 years
- 10 – 15 years
- More than 15 years

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

KNOWLEDGE, ATTITUDES AND BELIEFS

4. How would you describe your knowledge about the following regarding PAD?

	No knowledge	Poor	Fair	Good	Excellent Knowledge
Pathophysiology					
Causes					
Risk factors					
Clinical characteristics					
Stages of disease					
Complications					
Pharmacological management options					
Non-pharmacological management options					

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

5. Do you receive referrals for patients specifically to manage PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

6. At which stage do you manage patients with PAD? If applicable, tick more than one.

- ☐ Fontaine stage I – Asymptomatic PAD
- ☐ Fontaine stage IIa – Mild claudication (Claudication >200m)
- ☐ Fontaine stage IIb – Moderate-severe claudication (Claudication <200m)
- ☐ Fontaine stage III – Pain at rest
- ☐ Fontaine stage IV – critical limb ischemia, gangrene or severe non-healing and ischemic ulcers
- ☐ Post amputation relating to gangrene or non-healing ulcer

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is the question in a logical order	Yes	No
Comments:		

7. On average, how many times in a week do you see a patient with PAD?

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is the question in a logical order	Yes	No
Comments:		

8. What is your highest level of training regarding PAD?

- ☐ Doctoral degree
- ☐ Masters degree
- ☐ BSc degree
- ☐ CPD accredited course
- ☐ Other

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is the question in a logical order	Yes	No
Comments:		

9. Do you conduct screening for patients at risk of PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

10. If yes to 9, what type of screening do you conduct?

- ☐ Symptom- based questions
- ☐ Physical assessment
- ☐ Ankle-Brachial Index testing
- ☐ Referral for medical screening

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

11. Do you conduct any promotional talks or prevention education for PAD at your facility?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

12. Do you manage any exercise groups at your facility for Vascular related conditions such as PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No

Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

13. What tools do you make use of for patient education around management of PAD? If applicable, please tick more than one:

- ☐ Flyers or pamphlets
- ☐ Posters
- ☐ Group promotional talks
- ☐ Video clip
- ☐ One on one patient education
- ☐ None
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

14. How do you manage patients with PAD? If applicable, please tick more than one:

- ☐ I refer them to other health care professionals
- ☐ General physical activity recommendations
- ☐ Structured supervised exercise program
- ☐ Home exercise program (unsupervised)
- ☐ Education (i.e. smoking cessation, lifestyle changes)
- ☐ Pain management - Please explain
- ☐ Other - Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No

Is question in a logical order	Yes	No
Comments:		

15. What are the most common problems that you have managed in your PAD patients? If applicable, tick more than one.

- ☐ Pain
- ☐ Decreased mobility
- ☐ Decreased gait speed
- ☐ Decreased gait endurance
- ☐ Decreased health-related quality of life
- ☐ Poor standing balance
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

16. What treatment techniques do you use to manage a) pain b) decreased mobility c) decreased gait speed d) decreased gait endurance e) decreased health-related quality of life f) poor standing balance g) other for patients with PAD? (skip logic question with explanation based on question 15)

- ☐ Chronic pain management
- ☐ Deep breathing exercises
- ☐ Stretching
- ☐ Treadmill walking
- ☐ Stationary bike cycling
- ☐ Advice to walk
- ☐ Lower limb strengthening
- ☐ Upper limb strengthening
- ☐ Circulation drills
- ☐ Aerobic exercises
- ☐ Electrotherapy
- ☐ Heat
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No

Is question in a logical order	Yes	No
Comments:		

17. If you were unable to manage a patient with PAD, who would you refer them to?
If applicable, tick more than one:

- ☐ Another physiotherapist
- ☐ General Practitioner
- ☐ Vascular surgeon or specialist
- ☐ I don't know
- ☐ Other – Please specify

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

18. Do you manage patients with intermittent claudication?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

19. Do you manage patients with asymptomatic PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

20. Do you manage patients for their critical limb ischemia?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

21. Do you believe that physiotherapists should screen patients for PAD?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No
Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

22. Do you believe that physiotherapists should manage patients for critical limb ischemia?

- Yes
- No

Is the question clear, concise, unambiguous	Yes	No

Is the question appropriate	Yes	No
Is question in a logical order	Yes	No
Comments:		

Additional comments:

Thank you for your time in answering this questionnaire.

APPENDIX L

PATIENT SURVEY VALIDATION SUMMARY

1. How old are you?

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: It is clear and straight forward, however another way of asking the question could be "what is your age?"		
Amended: 1. What is your age?		

2. Gender

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: I would word the question as follows: Please indicate your gender? Then you can follow the question with the same three boxes (Male, female, and other). Amended: 2. What is your gender? ☐ Male ☐ Female ☐ Other		

3. Do you experience any pain in your lower limbs due to peripheral artery disease?

(Fontaine stage -asked based on symptoms):

- ☐ No symptoms (Asymptomatic)
- ☐ Pain with walking more than 200m (Mild claudication >200m)
- ☐ Pain with walking less than 200m (Moderate-severe claudication <200m)
- ☐ Pain at rest (ischemic rest pain)
- ☐ Necrosis and or gangrene of the limb

Is the question clear, concise, unambiguous	Yes	No X X
Is the question appropriate	Yes X X	No
Is question in a logical order	Yes X X	No

Comments: so this one I had to re-read a few times. If someone asks me if I have pain, I would give a YES/NO answer. I understand why you would want them to specify according to the frontline stages…however this might confuse a patient. Perhaps you could ask if they experience pain and then use the VAS scale for a little more detail? Also maybe this should be question 6. So after the knowledge, attitudes and beliefs.
The answer to your question is yes or no. So the second to the fifth options can maybe have a yes in front of it e.g. Yes, I experience pain with walking more than 200m.
How do you relate Necrosis and/or gangrene with the experience of pain? Will you get this data from your question? I think it should be a separate question.
I believe that the medical jargon may possibly confuse some patients when answering, especially terms like necrosis, gangrene and claudication. Perhaps a good plan to replace with easier-to-understand terms for patients.
Would the patients necessarily know that their symptoms are due to PVD?
I would replace 'lower limbs' with 'legs'.
Would the referral to mild/moderate-severe Claudication possibly create some extra anxiety for patients when reading the text as they may be scared to answer due to the stress of something severe being wrong with them.

Amended:

4. Do you experience any pain in your legs due to Peripheral Artery Disease?

- ☐ No, I have no pain
- ☐ Yes, I have pain with walking more than 200m
- ☐ Yes, I have pain with walking less than 200m
- ☐ Yes, I have pain at rest
- ☐ Yes, I have sores or infections in my feet or legs that won't heal

4. Do you have any of the following conditions?

- High blood pressure
- Diabetes Mellitus
- Kidney disease
- High cholesterol
- Do you have any other medical conditions – Please specify

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X	No X
Comments: perhaps this could be question 3, so that it's like the DEARTH check that we do early in subjective when finding out a little more about the patient's medical history before going into if they are experiencing symptoms etc. The answer to the first question is yes or no. But then you also ask a question in a question with your last option. Rather make it a separate question. I also do not really know why you need to know which conditions the respondents are diagnosed with? It may then also be worth your while to determine if they are compliant with their treatment. Do you want to know if these conditions are controlled with medication, lifestyle etc.? You may have respondents that are diagnosed with hypertension but because of the dizzy feeling they get from taking the medication they do not comply with taking it. This may be significant to know when you interpret and discuss your data. It will make the data you collect so much more valuable.		
Amended: 3. Do you have any chronic medical conditions? ☐ High blood pressure ☐ Diabetes Mellitus ☐ Kidney disease ☐ High cholesterol ☐ Other		

5. Do you smoke?

- Yes
- No
- Used to - How many years ago?

If yes, how many pack years?
Calculate:

Is the question clear, concise, unambiguous	Yes X	No X X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No

Comments: perhaps rather say "If yes, how many cigarettes a day?"

It may also be worthwhile finding out what exactly they smoke…

Are you really going to get the valuable information with this question that you need? Your answer can be "No, Used to – one month ago, one and a half packs per day." I think you are only going to get "No" from this respondent and that does not tell the whole story. But I can be wrong.

The question on how many years ago the patients smoked I would word as follows:

How long ago did you stop smoking? As to not guide the answer to be in years specifically as it could be months on even less.

Amended:

5. Do you smoke cigarettes?

☐ Yes

☐ No

If yes, how many cigarettes a day?

If no, are you a former smoker? If yes, how long ago did you stop smoking cigarettes?

KNOWLEDGE, ATTITUDES AND BELIEFS

6. How would you describe your knowledge about the following regarding Peripheral Artery Disease (PAD)?

	No knowledge	Poor	Fair	Good	Excellent Knowledge
What causes PAD?					
The complications associated with this condition?					
The treatment or management options available to you?					

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No

Comments: Clear

Just a recommendation: Instead of "What causes PAD?" state "Causes of PAD" and in stead of "The complications associated with this condition?" state" The complications associated with PAD" and lastly "The treatment or management options available for treatment of PAD". Limit your question (question 6) to one question.

Good question and good to get a baseline of the patient knowledge.

Amended:

6. How would you describe your knowledge about the following regarding **Peripheral Artery Disease?**

	No knowledge	Poor	Fair	Good	Excellent Knowledge
Causes of Peripheral Artery Disease					
The complications associated with Peripheral Artery Disease					
Treatment or management options available for treatment of Peripheral Artery Disease					

MANAGEMENT

7. Have you been advised to stop smoking or to avoid second-hand smoke?

- Yes
- No

Is the question clear, concise, unambiguous	Yes X	No X
Is the question appropriate	Yes X X	No
Is question in a logical order	Yes X	No X
Comments: clear. You have two questions, but only one option to answer. I would move this question to be just after question 5 if possible.		
Amended: 7. Have you been advised to stop smoking **and** to avoid second-hand smoke? ☐ Yes ☐ No		

8. If yes, by whom?

- Doctor
- Nurse
- Physiotherapist
- Other – Please specify

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X	No X
Comments: clear. I assume the question refers to question 7, but question 7 has two possible answers.		
8. If yes, by whom? ☐ Doctor ☐ Nurse ☐ Physiotherapist ☐ Other		
Is the question clear, concise, unambiguous	Yes X	No X X
Is the question appropriate	Yes X X X finding out about exercise is important	No
Is question in a logical order	Yes X	No X X
Comments: perhaps another way to ask could be: "has anyone ever advised you to do some form of exercise in order to manage your condition?" Do you refer to the asthma answered in question 4 under other conditions?		
Amended: 9. Have you been advised to walk as a form of exercise to **manage Peripheral Artery Disease?** ☐ Yes ☐ No		

9. Have you been advised to walk as a form of exercise in order to manage your condition? (Skip logic question)

- Yes
- No

10. If yes, by whom?

- Doctor
- Nurse
- Physiotherapist
- Other – Please specify

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: clear.		
10. If yes, by whom? ☐ Doctor ☐ Nurse ☐ Physiotherapist ☐ Other – Please specify		

11. If yes, how frequently were you instructed to walk?

- ☐ < 30 mins a week
- ☐ 30-60 mins a week
- ☐ 60-90 mins a week
- ☐ 90+ mins a week
- ☐ I don't know about dosage or intensity

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: : if you just want to find out about walking as a form of e exercise then yes this is appropriate. If you just want to find out about exercise frequency in general, perhaps just tweak this question a little. Your last option refers to intensity, but the question was only about the frequency.		

Amended:

11. If yes, how frequently were you instructed to walk?

☐ **Less than** 30 minutes a week

☐ 30-60 minutes a week

☐ 60-90 minutes a week

☐ **More than** 90 minutes a week

☐ I don't know about dosage or **frequency**

12. If offered, would you attend a 45-minute exercise class with others with your specific condition at your local clinic? (Skip logic option)

- Yes
- No

Is the question clear, concise, unambiguous	Yes X X	No X
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No
Comments: I am not sure if it is necessary to put the time (45min). You could just ask if they would be open to join an exercise group at the local clinic. Not sure which condition again?		
Amended: 12. If offered, would you attend an exercise class with others **with Peripheral Artery Disease** at your local clinic? ☐ Yes ☐ No		

13. If yes, how frequently would you be able to attend a group exercise class?

- Once a week
- Bimonthly
- Monthly
- Other - Please specify

Is the question clear, concise, unambiguous	Yes X X	No
Is the question appropriate	Yes X X	No
Is question in a logical order	Yes X X	No

Comments: perhaps you could change the word 'bimonthly' to 'twice a month'

I think when working with patients, it's always best to use the simplest phrases. Example, I once told my mum that I had to see patients bidaily, and she said "what is that?", when I explained to her what it meant, she then responded with "why must you use fancy words?…just say twice a day" lol

Maybe just refer to question 12.

I would perhaps rather use "twice a month" than bimonthly as many patients might not understand the word that easily.

Amended:

13. If yes, how frequently would you be able to attend a group exercise class?

☐ Once a week

☐ **Twice a month**

☐ **Once a month**

☐ Other

14. If no, why not?

- I don't have the time
- I don't have transport
- I have pain
- I would prefer to exercise on my own at home
- I would prefer to walk in my community on my own
- Other (explain):

Is the question clear, concise, unambiguous	Yes X X X	No
Is the question appropriate	Yes X X X	No
Is question in a logical order	Yes X X X	No

Comments: clear.

Just refer to question 12 again.

Amended:

14. If no, why not?

☐ I don't have the time

☐ I don't have transport

☐ I have pain

☐ I would prefer to exercise on my own at home

☐	I would prefer to walk in my community on my own
☐	Other

Additional comments:

I know that someone is going to help respondents to complete these questions, but if you limit the explanation needed for each question and you limit possible leading questions the questions will give you the data that you need. You know what you want from the questions but if someone else helps you to complete the questions the amount of help that they can give to the patients may not be consistent with how you help the respondents to answer the questions.

I think it is a very good questionnaire. I hope my comments are helpful. I think with the mentioned changes it will help you during your study to limit patients not understanding the questions.

If your data is mainly quantitative this will be perfect.

If you were looking for some qualitative data as well i.e more opinions and beliefs of patients as examples, I would suggest adding a few open-ended questions to allow for this.

Time to complete is not too long.

APPENDIX M

Dear Ms. Lisa Abrahams ,

We have registered your agreement with our Terms of Use regarding your request with tracking number: 43346 .

A team member will contact you as soon as possible to deliver the requested versions.Yours

sincerely,

Best regards,

Bernhard Slaap
Executive Director
EuroQol Research Foundation

T *New nr as of 1 APR 2021: +31 882026890* | E www.euroqol.org | Marten Meesweg 107 | 3068AV Rotterdam The Netherlands

APPENDIX N

Health Questionnaire

English version for the UK

Under each heading, please tick the ONE box that best describes your health TODAY.

MOBILITY

I have no problems in walking about ❑
I have slight problems in walking about ❑
I have moderate problems in walking about ❑
I have severe problems in walking about ❑
I am unable to walk about ❑

SELF-CARE

I have no problems washing or dressing myself ❑
I have slight problems washing or dressing myself ❑
I have moderate problems washing or dressing myself ❑
I have severe problems washing or dressing myself ❑
I am unable to wash or dress myself ❑

USUAL ACTIVITIES *(e.g. work, study, housework, family or leisure activities)*

I have no problems doing my usual activities ❑
I have slight problems doing my usual activities ❑
I have moderate problems doing my usual activities ❑
I have severe problems doing my usual activities ❑
I am unable to do my usual activities ❑

PAIN / DISCOMFORT

I have no pain or discomfort ❑
I have slight pain or discomfort ❑
I have moderate pain or discomfort ❑
I have severe pain or discomfort ❑
I have extreme pain or discomfort ❑

ANXIETY / DEPRESSION

I am not anxious or depressed ❑
I am slightly anxious or depressed ❑
I am moderately anxious or depressed ❑
I am severely anxious or depressed ❑
I am extremely anxious or depressed ❑

We would like to know how good or bad your health is TODAY.

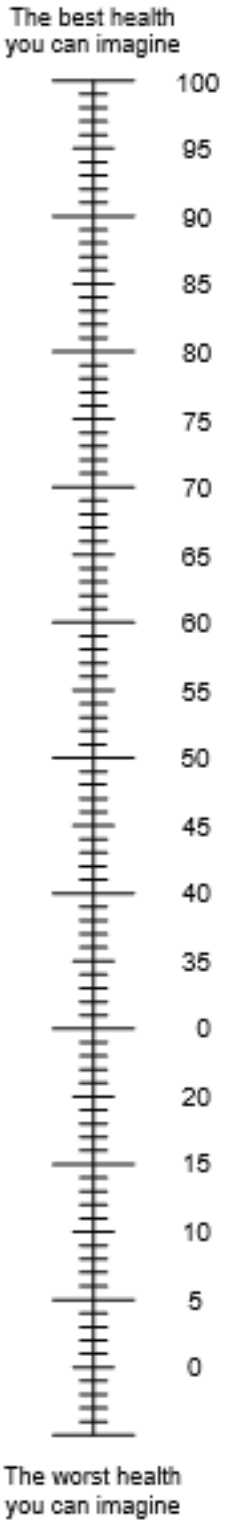
This scale is numbered from 0 to 100.

100 means the best health you can imagine. 0 means the worst health you can imagine.

Mark an X on the scale to indicate how your health is TODAY.

Now, please write the number you marked on the scale in the box below.

YOUR HEALTH TODAY = ☐



APPENDIX O

Self-Efficacy for Managing Chronic Disease 6-item Scale

We would like to know how confident you are in doing certain activities. For each of the following questions, please choose the number that corresponds to your confidence that you can do the tasks regularly at the present time.

1. How confident do you feel that you can keep the fatigue caused by your disease from interfering with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

2. How confident do you feel that you can keep the physical discomfort or pain of your disease from interfering with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

3. How confident do you feel that you can keep the emotional distress caused by your disease from interfering with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

4. How confident do you feel that you can keep any other symptoms or health problems you have from interfering with the things you want to do?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

5. How confident do you feel that you can the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

6. How confident do you feel that you can do things other than just taking medication to reduce how much your illness affects your everyday life?

not at all confident | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | totally confident

Scoring

The score for each item is the number circled. If two consecutive numbers are circled, code the lower number (less self-efficacy). If the numbers are not consecutive, do not score the item. The score for the

scale is the mean of the six items. If more than two items are missing, do not score the scale. Higher number indicates higher self-efficacy.

Characteristics

Tested on 605 subjects with chronic disease

.

No. of items	Observed Range	Mean	Standard Deviation	Internal Consistency Reliability	Test-Retest Reliability
6	1-10	5.17	2.22	.91	NA

Source of Psychometric Data

Stanford/Garfield Kaiser Chronic Disease Dissemination Study. Psychometrics reported in: Lorig KR, Sobel, DS, Ritter PL, Laurent, D, Hobbs, M. Effect of a self-management program for patients with chronic disease. *Effective Clinical Practice*, 4, 2001,pp. 256-262.

Comments

This 6-item scale contains items taken from several SE scales developed for the Chronic Disease Self-Management study. We use this scale now, as it is much less burdensome for subjects. It covers several domains that are common across many chronic diseases, symptom control, role function, emotional functioning and communicating with physicians. For internet studies, we add radio buttons below each number. There are 2 ways to format these items. We use the format on this document, the other is shown on the web page. A 4-item version of this scale available in Spanish.

References

Lorig KR, Sobel, DS, Ritter PL, Laurent, D, Hobbs, M. Effect of a self- management program for patients with chronic disease. *Effective Clinical Practice*, 4, 2001,pp. 256-262.

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APPENDIX P

DocuSign Envelope ID: E5EA9207-1AFE-4DCA-B37F-DF2D514CAF3D

SYMPTOM ASSESSMENT TOOL
LICENSE AGREEMENT

This Symptom Assessment Tool License Agreement (the "Agreement," including both Part I License Information and PartII Terms & Conditions) is entered into as of the Effective Date by and between The University of Texas M. D. Anderson Cancer Center ("MD Anderson") and the Licensee identified below. MD Anderson and Licensee may each hereinafter be individually referred to as a "Party" and collectively as the "Parties."

Under certain license agreements with Symptom Assessment Systems, LLC, MD Anderson has obtained the exclusive right to grant a license to use, reproduce, and/or distribute copies of, the Symptom Assessment Tool. Licensee desires to obtain the right to use, reproduce, and/or distribute copies of, the Symptom Assessment Tool for the Permitted Use described herein.

NOW, THEREFORE, in consideration of the promises, conditions, covenants and warranties herein contained, the Parties agree as follows:

PART I LICENSE INFORMATION

1.	**Licensee**	Name:	University of Cape Town
		ATTN:	Lisa Abrahams
		Address Line 1:	F45 Groote Schuur
		Address Line 2:	Cape Town, Western Cape 7780
		Address Line 3:	South Africa
		Address Line 4:	N/A
		Email Address:	lisa.abrahams13@gmail.com
2.	**Permitted Use** UCT HREC 207/2021-Physiotherapy Management of People with peripheral artery disease in the Western Cape This quantitative study has two components. One component aims to describe the management by physiotherapists in the Western Cape with people with peripheral artery disease. The second component aims to describe the Pain, Health Related Quality of Life, Self-Efficacy and Exercise Behaviours of patients presenting to two vascular outpatient departments in the Western Cape.		
3.	**Symptom Assessment Tool** BPI-SF English, Afrikaans, Xhosa		
4.	**License Fee:** $ 100.00		

IN WITNESS WHEREOF, the parties hereto have caused their duly authorized representatives to execute this Agreement.

Licensee *(see Item 1, above)*		**The University of Texas M.D. Anderson Cancer Center**	
Signed:	LRooza (signature of representative)	Signed:	DocuSigned by: 17DF6A654D8245B... (signature of representative)
Name:	Lucinda Rooza (printed name of representative)	Name:	Andrew Dennis (printed name of representative)
Title:	Contracts Manager (position within Licensee organization)	Title:	Managing Director (position within MD Anderson)
Date:	12 August 2021 (date signed by representative)	Date:	9/3/2021 | 11:50 AM CDT (date signed by representative)

Part II Terms & Conditions are available at the following URL:
https://www.mdanderson.org/content/dam/mdanderson/documents/about-md-anderson/about-us/Office-of-Technology- Commercialization/Terms-Conditions-BPI,MDASI,v11,NMD951.pdf

APPENDIX Q

1903

Date: (month) / (day) / (year)

Study Name: _____

Subject's Initials : _____

Study Subject #:

Protocol #: _____

PI: _____

Revision: 07/01/05

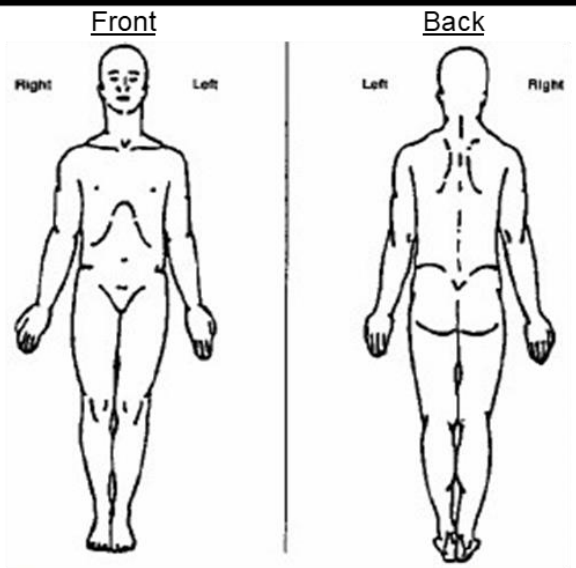
PLEASE USE BLACK INK PEN

Brief Pain Inventory (Short Form)

1. Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain today?

☐ Yes ☐ No

2. On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.



3. Please rate your pain by marking the box beside the number that best describes your pain at its worst in the last 24 hours.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

No Pain — Pain As Bad As You Can Imagine

4. Please rate your pain by marking the box beside the number that best describes your pain at its least in the last 24 hours.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

No Pain — Pain As Bad As You Can Imagine

5. Please rate your pain by marking the box beside the number that best describes your pain on t average.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

No Pain — Pain As Bad As You Can Imagine

1903

Date: (month) / (day) / (year)

Study Name: _____

Subject's Initials : _____

Study Subject #:

Protocol #: _____

PI: _____

Revision: 07/01/05

PLEASE USE BLACK INK PEN

7. What treatments or medications are you receiving for your pain?

8. In the last 24 hours, how much relief have pain treatments or medications provided? Please mark the box below the percentage that most shows how much relief you have received.

0% ☐ No Relief | 10% ☐ | 20% ☐ | 30% ☐ | 40% ☐ | 50% ☐ | 60% ☐ | 70% ☐ | 80% ☐ | 90% ☐ | 100% ☐ Complete Relief

9. Mark the box beside the number that describes how, during the past 24 hours, pain has interfered with your:

A. General Activity

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

B. Mood

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

C. Walking ability

☐ 0 Does Not Interfere ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 Completely Interferes

D. Normal Work (includes both work outside the home and housework)

☐ 0 Does Not Interfere ☐ 1 2 3 4 5 6 7 8 ☐ 9 ☐ 10 Completely Interferes

E. Relations with other people

☐ 0 Does Not Interfere ☐ 1 2 3 4 5 6 7 8 ☐ 9 ☐ 10 Completely Interferes

F. Sleep

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ Does Not ☐ ☐ ☐ Interfere

G. Enjoyment of life

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

Does Not Interfere

APPENDIX R

Exercise Behaviors

During the past week, even if it was not a typical week for you, how much **total** time *(for the **entire week**)* did you spend on each of the following? *(Please circle **one** number for each question.)*

	none	less than 30 min/wk	30-60 min/wk	1-3 hrs per week	more than 3 hrs/wk
1. Stretching or strengthening exercises (range of motion, using weights, etc.)	0	1	2	3	4
2. Walk for exercise	0	1	2	3	4
3. Swimming or aquatic exercise	0	1	2	3	4
4. Bicycling (including stationary exercise bikes)	0	1	2	3	4
5. Other aerobic exercise equipment (Stairmaster, rowing, skiing machine, etc.)	0	1	2	3	4
6. Other aerobic exercise *Specify*_____	0	1	2	3	4

Scoring

Code each item as the number circled, then covert as follows. If two consecutive numbers are circled, code the lower number (less exercise). If two non-consecutive numbers are circled, do not score the item. For "Other aerobic", try to fit the type of exercise into the existing aerobic categories (i.e., treadmill as "other aerobic equipment"), otherwise leave as "other aerobic" (i.e., "dancing"). However, if exercise that is **not** aerobic, such as yoga or weight training, do not score as aerobic. Yoga, weight training, tai chi, etc., should be scored as "stretching or strengthening".

Each category is converted to the number of minutes below. Time spent in stretching or strengthening is the value for item 1. Time spent in aerobic exercise is the sum of the values for items 2 through 6.

None	Less than 30 minutes/week	30-60 minutes/week	1-3 hours/week	More that 3 hours/week
0	15	45	120	180

Characteristics

Stretching/strengthening (minutes/week) tested on 1,127 subjects with chronic disease. N=51 for test-retest.

No. of items	Observed Range	Mean	Standard Deviation	Internal Consistency Reliability	Test-Retest Reliability
1	0-180	40.1	54.8	—	.56

Aerobic exercise (minutes/week) tested on 1,130 subjects with chronic disease. M=51 for test-retest.

No. of items	Observed Range	Mean	Standard Deviation	Internal Consistency Reliability	Test-Retest Reliability
5	0-540	90.6	90.9	—	.72

Source of Psychometric Data

Stanford Chronic Disease Self-Management Study. Psychometrics reported in: Lorig K, Stewart A, Ritter P, González V, Laurent D, & Lynch J, *Outcome Measures for Health Education and other Health Care Interventions*. Thousand Oaks CA: Sage Publications, 1996, pp.25,37-38.

Comments

We have used this scale to measure both aerobic and a combination of stretching strengthening exercise for many years. This scale available in Spanish.

References

Lorig K, Stewart A, Ritter P, González V, Laurent D, & Lynch J, *Outcome Measures for Health Education and other Health Care Interventions*. Thousand Oaks CA: Sage Publications, 1996, pp.25,37-38.

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APPENDIX S

FOR MORE INFORMATION, LOG ONTO **bit.ly/whatispad**

Sources

1. PVD and Me. (n. d.). *Peripheral Artery Disease.* [Online] Available at: http://pvdandme.com/wp-content/themes/dt-the7-child/brochures/pad-patient-brochure.pdf [Accessed: 28 Nov 2020]
2. Naidoo, N., 2015. Vascular Society of Southern Africa. *Peripheral Arterial Disease.*

PAD

PERIPHERAL ARTERY DISEASE

WHAT IS PERIPHERAL ARTERY DISEASE?

Peripheral Artery Disease (PAD) is a very serious and common condition. It is caused by plaque build-up in the arteries, which can block blood flow to the limbs.

Although PAD can occur in any blood vessel in the body, it typically affects the legs, ankles and feet. People who have PAD may not always experience symptoms but restricted bloodflow to these areas may lead to uncomfortable symptoms such as chronic leg pain, achy legs, and pulse changes.

PAD

10% - 20% OF PEOPLE SUFFER FROM PERIPHERAL ARTERY DISEASE AND IT OCCURS MORE IN OLDER PEOPLE.

29% OF PEOPLE OLDER THAN 70 HAVE PAD[2].

SYMPTOMS OF PERIPHERAL ARTERY DISEASE

Some people may have PAD and experience no symptoms. However, for those who do, the following symptoms may indicate PAD:

- Pain, aching or heaviness in the leg muscles.
- Weaker pulse in one limb compared to the other.
- One limb being colder than the other.
- Pain after walking a short distance.

RISK FACTORS FOR PERIPHERAL ARTERY DISEASE

Although anyone can develop PAD, there are certain things that increase the risk that a person will develop PAD. These risk factors include:

- Smoking
- Obesity or being overweight
- High cholesterol
- High blood pressure
- Diabetes
- Being older than 60 years old

WHAT ARE SOME TREATMENT OPTIONS?

There are several treatment options available to effectively manage PAD. Some options include:

- **Dietary changes.** Consult your doctor or dietician for guidance.
- **Quit smoking** and reduce contact with second-hand smoke.
- **Regular exercise** for 30-60 mins, three times a week until the point of discomfort and then resting. Such exercises can be made up of walking, aerobics, and/or hydrotherapy. Speak to a physiotherapist to learn more!

APPENDIX T

TIME SCHEDULE AND BUDGET

Budget:

The budget spent on this study was R15174.98.

Resources required:

- Tablet for electronic patient survey completion
- Microsoft forms login
- SASP membership

Physiotherapist survey:

- R200 airtime was required to contact different physiotherapy departments to promote participation for the survey (R10 a phone call to 20 physiotherapy departments).

Patient survey:

Expense	**Cost**
Research assistant fees	R12,250.00
Daily PPE (3-ply surgical mask x 31 days x R1.78)	R55.18
Face Shield x1	R40.00
Hand sanitizer (1 litre)	R100.00
Printing pages (4 outcome measures, 1 consent form = 5 x (138 +5) participants x R1.00 per page)	R715.00
R1,519.80 use of M. D. Anderson Brief Pain Inventory R295 associated international bank charges	R1,814.80

Funding:

SASP and Neuro Group Research Foundation funding towards research study expenses.

UCT Nephrology Wyeth P/G Scholar award towards study fees.

Actual time schedule:

- March-June 2021 – UCT HREC review and approval
- June-July 2021 – Survey Validations and amendments.

  Shared physiotherapist survey with SASP, PASA, WCPG.

  Covid-19 third wave in South Africa prevents hospital access for research studies.
- November 2021 – Permission received to contact department of health facilities.

  People with peripheral artery disease assessed the face validity of the patient survey.
- November 2021-March 2022 – GSH (Fridays) and TBH (Tuesdays) patient survey.
- March 2022 – Data collection completed (patient and physiotherapist survey).
- March-November 2022 – Data analysis completed.
- December 2022 – Submission and completion of dissertation.

APPENDIX U

HUMAN RESEARCH ETHICS COMMITTEE
16 NOV 2021
HEALTH SCIENCES FACULTY
UNIVERSITY OF CAPE TOWN

UNIVERSITY OF CAPE TOWN

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

Form FHS007: Amendment – study staff

HREC office use only (FWA00001637; IRB00001938)			
☑ Approved			
This serves as notification that all changes to the study staff and documentation described below are approved.			
Chairperson of the HREC signature		Date	6/11/21

Principal Investigator to complete the following:

1. Protocol information

Date (when submitting this form)	5 November 2021
HREC REF Number	207/2021
Protocol title	Physiotherapy management of patients with peripheral artery disease in the Western Cape.
Protocol number (if applicable)	
Principal Investigator	Naila Edries (supervisor) on leave Candice Hendricks (co-supervisor)
Department / Office Internal Mail Address	

1.1 Does this protocol receive US Federal funding?	☐ Yes	✓ No

2.1 Staff changes (tick ✓)

Are new personnel being added to this research?	✓ Yes	☐ No
Are current personnel being removed from this research?	☐ Yes	✓ No
Is the principal investigator for this research being changed? If yes, please attach revised conflict of interest and PI declaration statements. (Refer: sections 7 and 8.3 in the New Protocol Application Form - FHS013)	☐ Yes	✓ No
Do the consent and assent forms need modification to reflect these staff changes? If yes, please attach copies of the revised forms, with all changes highlighted or tracked and listed in the documents for approval.	☐ Yes	✓ No

2.2 Amended study staff details

Title, first name, surname	Department/Division	E-mail	Role of new staff member
Miss Jade Nell	Physiotherapy	jadeynell3@gmail.com	Research Assistant

3. List of documentation for approval

Please list below all staff documentation such as CVs, declarations, GCP certificates and revised consent forms which need approval. This information must correspond to all 'yes' answers in 2.1 above. This form will be signed and returned to the PI as notification of approval. Please add extra pages if necessary.

CV of Jade Nell
HPCSA certificate

4. Signature

My signature certifies that I will maintain the anonymity and/ or confidentiality of information collected in this research. If at any time I want to share or re-use the information for purposes other than those disclosed in the original approval, I will seek further approval from the HREC.

Signature of PI		Date	04/11/2021

APPENDIX V

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

FHS016: Annual Progress Report / Renewal

HREC office use only (FWA00001637; IRB00001938) **This serves as notification of annual approval, including any documentation described below.**			
☑ Approved	Annual progress report	Approved until/next renewal date	30-6-23
☐ Not approved	See attached comments		
Signature Chairperson of the HREC/ Designee		Date Signed	27/7/2022

Note: Please email this form and supporting documents (if applicable) in a combined pdf-file to hrec-enquiries@uct.ac.za.
Please clarify your plan for research-related activities during COVID-19 lockdown.
Please use the latest form found on our website:
http://www.health.uct.ac.za/fhs/research/humanethics/forms

Comments to PI from the HREC

Principal Investigator to complete the following:

1. Protocol information

Date (when submitting this form)	26 July 2022		
HREC REF Number	207/2021	Current Ethics Approval was granted until	30 June 2022
Protocol title	Physiotherapy management of patients with Peripheral Artery Disease in the Western Cape		
Protocol number (if applicable)			
Are there any sub-studies linked to this study?		☐ Yes	☒ No
If yes, could you please provide the HREC Reference number for all sub-studies? **Note:** A separate FHS016 must be submitted for each sub-study.			
Principal Investigator	Ms Naila Edries		

(Note: Please complete the Closure form (FHS010) if the study is completed within the approval period)

Department / Office Internal Mail Address	naila.edries@uct.ac.za

1.1 Does this protocol receive US Federal funding?	☐ Yes	☒ No
1.2 If the study receives US Federal Funding, does the annual report require full committee approval? **Note:** Any annual approvals for **Full Committee** review MUST be submitted on the monthly HREC submission dates. (Please send electronic copy for full committee review to hrec-submission@uct.ac.za)	☐ Yes	☐x No

If yes in 1.2 please complete section 1.3 below for invoicing purposes

1.3 Ethics Renewal Fee

Please **(tick ✓)**appropriate box for billing purposes:

Submission Type	***Description***	***New fee (Vat Incl.)***	***tick ✓***
Research funded solely from UCT departmental/ divisional/group budget	Annual evaluation of research progress report for re-certification	**R0,00**	☐
Non-sponsored student research for degree purposes at UCT/Other Universities & Colleges	Annual evaluation of research progress report for re-certification	**R0,00**	☒
Annual re-certification / Progress report (FHS016 Form)	Clinical Trial & International Grant Funded Research - Annual evaluation of research progress report for re-certification for Full Committee Approval	**R7000,00**	☐
Annual re-certification / Progress report (FHS016 Form)	Clinical Trial & International Grant Funded Research - Annual evaluation of research progress report for re-certification for Expedited review	**R3 710.00**	☐
Annual re-certification / Progress report (FHS016 Form)	National grant funded research - Annual evaluation of research progress report for re-certification for Full Committee Approval	**R6000.00**	☐
Annual re-certification / Progress report (FHS016 Form)	National Grant funded research for Annual evaluation of research progress report for re-certification for Expedited review	**R1 500,00**	☐

NB: Protocols funded by UCT (e.g. departmental funding / student research) and by certain grant funding organizations (e.g. MRC, NRF, CANSA,) are exempt from these charges.

Please provide details for Invoicing, either complete section 1 or 2 :

1. Invoice billing – Directly to Sponsor

Sponsor's name	
Billing Address of Sponsor:	
Vat Number:	

(Note: Please complete the Closure form (FHS010) if the study is completed within the approval period)

Contact person	
Telephone number	
Email Address	
2. **Internal Journal Billing:**	
Fund Number:	
Cost Centre Number:	
Account Holder Name:	
Division of Account Holder:	

2. List of documentation for approval

3. Protocol status (tick ✓)

☐	Open Enrolment
☒	Closed to enrolment (tick ✓)
☐	Research-related activities are ongoing
☐	Research-related activities are complete, long-term follow-up only
☒	Research-related activities are complete, data analysis only
☐	Main study is complete but sub-study research-related activities are ongoing
☐	Study is closed → Please submit a Study Closure Form (FHS010)

4. Enrolment

Number of participants enrolled to date	212 (71x physios & 141 patients)
Number of participants enrolled, since last HREC Progress report (continuing review)	n/a
Additional number of participants still required	0

5. Refusals

(Note: Please complete the Closure form (FHS010) if the study is completed within the approval period)

Total number of refusals (participants invited to join the study, but refused to take part)	

6. Cumulative summary of participants

Total number of participants who provided consent	212 (71x physios & 141 patients)
Number of participants determined to be ineligible (i.e. after screening)	64
Number of participants currently active on the study	0
Number of participants completed study (without events leading to withdrawal)	212
Number of participants withdrawn at participants' request (i.e. changed their mind)	2
Number of participants withdrawn by PI due to toxicity or adverse events	N/A
Number of participants withdrawn by PI for other reasons (e.g. pregnancy, poor compliance)	N/A
Number of participants lost to follow-up. Please comment below on reasons for loss of follow-up.	N/A
Number of participants no longer taking part for reasons not listed above. Please provide reasons below:	N/A

7. Progress of study

Please provide a brief summary of the research to date including the overall progress and the progress since the last annual report as well as any relevant comments/issues you would like to report to the HREC:
Data collection involved 2 components. One component was the completion of an online survey by physiotherapists. The second component involved in person researcher administered patient questionnaires at two vascular clinics. Data collection was completed on the 29 March 2022. Data analysis and write up is now being completed.

8. Protocol violations and exceptions (tick ✓ all that apply)

☒	No prior violations or exceptions have occurred since the original approval
☐	Prior violations or exceptions have been reported since the last review and have already been acknowledged or approved

☐	Unreported minor violations that have occurred since the last review, as well as significant deviations not yet reported, are attached for review

9. Amendments (tick ✓ all that apply)

☐	No Prior amendments have been made since the original approval
☒	Prior amendments have been reported since the last review and have already been approved
☐	New protocol changes/ amendments are requested as part of this continuing review (See note below)

Note: If new protocol changes are being requested in this review, please complete an amendment form (FHS006).
Specific changes in the amended protocol and consent/assent forms must be **bolded**, *italicised* or tracked and all changes must include a rationale.

10. Adverse events

10.1 Please provide below or attach a narrative summary of serious adverse events and/ or unanticipated problems since the last progress report. Please indicate changes made to the protocol and informed consent document(s) as a result (if not already reported to the HREC). Please comment on whether causality to any study procedure or intervention could be established.
None.

10.2 Have participants received appropriate treatment/ follow-up/ referral when indicated (e.g. in the case of abnormal or incidental clinical findings, distress or anxiety)?		
☒ Yes	☐ No	☐ Not applicable
If yes, please describe:		
One patient who presented as very anxious or distressed during interview, with their consent was given a written referral letter from the researcher to take with to their doctors OPD appointment in order to refer for intervention from the GSH or TBH mental health team.		

11. Summary of Monitoring and Audit Activities (tick ✓)

11.1 Was this study monitored or audited by an external agency (e.g. SAHPRA, FDA)?		
☐ Yes	☒ No	☐ Not applicable

11.2 Did a Data and Safety Monitoring Board publish a report?		
☐ Yes	☒No	☐ Not applicable

11.3 If yes, please identify the agency and attach a summary of the findings.					
Agency Name		Report attached	☐ Yes	☐ No	☐ Not applicable

(Note: Please complete the Closure form (FHS010) if the study is completed within the approval period)

	DSMB report attached	☐ Yes	☐ No	☐ Not applicable

11.4 Has there been any agency, institutional or other inquiry into non-compliance in this study, or any finding of non-compliance concerning a member of the research team?	
☐ Yes	☒No
If yes, please explain:	

12. Level of risk (tick ✓)

12.1 In light of your experience of this research, please indicate whether the level of risk to participants has:	
☐	Increased
☐	Decreased
☒	Shown no change
If there has been a change, please explain:	

12.2 Please provide a narrative summary of recent relevant literature that may have a bearing on the level of risk.
N/A

13. Insurance

Please confirm that valid no fault insurance is still in place? **(tick ✓)**			
☐ Yes	☐ No		☒ Not Applicable – N/A
If yes, please complete the following:			
Insurer's name:			
Policy no.		*Coverage Period:	
For UCT sponsored studies please liaise the Insurance office via fhs.sponsorship@uct.ac.za regarding the required documentation and information required obtain a renewed UCT No-fault Insurance Certificate.			

14. Statement of conflict of interest

(Note: Please complete the Closure form (FHS010) if the study is completed within the approval period)

Has there been any change in the conflict of interest status of this protocol since the original approval? (tick ✓)	
☐ Yes	☒ No
If yes, please explain and if necessary, attach a revised conflict of interest statement (Section #7 in the New Protocol Application Form FHS013):	

15. Signature

My signature certifies that the above is complete and correct.			
Signature of PI		Date	26 July 2022

(Note: Please complete the Closure form (FHS010) if the study is completed within the approval period)

APPENDIX W

Western Cape Government
Health

STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 0866: fax: +27 21 483 6058
5th Floor, Norton Rose House,, 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za)

REFERENCE: WC_202106_049
ENQUIRIES: Dr Sabela Petros

University of Cape Town
Anzio Road
Observatory
Cape Town
7925

For attention: Ms Lisa Abrahams, Mrs Naila Edries, Mrs Candice Hendricks

Re: The management of patients with peripheral artery disease in the Western Cape

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.
Please contact the following people to assist you with any further enquiries in accessing the following sites:

Elsies River CHC	**Mr Theodore Abrahams**	**0219310211/0219316023**
George Hospital	**Mr Michael Vonk**	**044 802 4534**
Helderberg Hospital	**Dr Werner Viljoen**	**021 850 4700**
Caledon Hospital	**Dr Makondelele Rambiyana**	**028 212 1070**
Otto Du Plessis Hospital	**Ronell Zondo**	**028 214 5804**
Swartland Hospital	**Dr Andre Stoffels**	**022 487 9202**
Vredendal Hospital	**Dr Anthony Hawkridge**	**027 213 2039**
Vredenburg Hospital	**Dr Silvio Morales Perez**	**022 814 0036**
Clanwilliam Hospital	**Sharnotte Lingeveldt**	**022 487 9264**

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted and the constraints caused by the Covid-19 epidemic above are respected and adhered to.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**Annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
3. In the event where the research project goes beyond the *estimated completion* date which was submitted, researchers are expected to complete and submit a progress report (**Annexure 8**) to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
4. The reference number above should be quoted in all future correspondence.

Yours sincerely

DR M MOODLEY
DIRECTOR: HEALTH INTELLIGENCE
DATE: 3 November 2021
CC

APPENDIX X

STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 0866: fax: +27 21 483 6058
5th Floor, Norton Rose House,, 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za)

REFERENCE: WC_202106_049
ENQUIRIES: Dr Sabela Petros

University of Cape Town
Anzio Road
Observatory
Cape Town
7925

For attention: Ms Lisa Abrahams, Mrs Naila Edries, Mrs Candice Hendricks

Re: The management of patients with peripheral artery disease in the Western Cape

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.
Please contact the following people to assist you with any further enquiries in accessing the following sites:

Western Cape Rehab Centre	**Hans Human**	**021 370 2316**
Paarl Hospital	**Dr Stephanus Fourie**	**021 860 2716**
New Somerset Hospital	**Dr Donna Stokes**	**021 402 6408**
George Hospital	**Mr Michael Vonk**	**044 802 4534**
Eerste River Hospital	**Dr Adele Anthony**	**021 902 8019**
Karl Bremer Hospital	**Mandy Naidoo**	**021 918 1753**
Mitchells Plain Hospital	**Dr Jacek Marszalek**	**021 377 4782**

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted and the constraints caused by the Covid-19 epidemic above are respected and adhered to.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**Annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
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4. The reference number above should be quoted in all future correspondence.

Yours sincerely

DR M MOODLEY
DIRECTOR: HEALTH INTELLIGENCE
DATE: 15/11/2021
CC

APPENDIX Y

STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 0866: fax: +27 21 483 6058
5th Floor, Norton Rose House,, 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za)

REFERENCE: WC_202106_049
ENQUIRIES: Dr Sabela Petros

University of Cape Town
Anzio Road
Observatory
Cape Town
7925

For attention: Ms Lisa Abrahams, Mrs Naila Edries, Mrs Candice Hendricks

Re: The management of patients with peripheral artery disease in the Western Cape

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.
Please contact the following people to assist you with any further enquiries in accessing the following sites:

Hermanus Hospital	**Jannie Mouton**	**028 313 5243**

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted and the constraints caused by the Covid-19 epidemic above are respected and adhered to.
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4. The reference number above should be quoted in all future correspondence.

Yours sincerely

DR M MOODLEY
DIRECTOR: HEALTH INTELLIGENCE
DATE: 30/11/2021
CC

APPENDIX Z

STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 0866: fax: +27 21 483 6058
5th Floor, Norton Rose House,, 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za)

REFERENCE: WC_202106_049
ENQUIRIES: Dr Sabela Petros

University of Cape Town
Anzio Road
Observatory
Cape Town
7925

For attention: Ms Lisa Abrahams, Mrs Naila Edries, Mrs Candice Hendricks

Re: The management of patients with peripheral artery disease in the Western Cape

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.
Please contact the following people to assist you with any further enquiries in accessing the following sites:

Worcester Hospital	**Elbie Vosloo/ Zandile Kwinana**	**023 348 1100**
	Sue-Ann Williams	**023 348 1113**

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted and the constraints caused by the Covid-19 epidemic above are respected and adhered to.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**Annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
3. In the event where the research project goes beyond the *estimated completion* date which was submitted, researchers are expected to complete and submit a progress report (**Annexure 8**) to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
4. The reference number above should be quoted in all future correspondence.

Yours sincerely

DR M MOODLEY
DIRECTOR: HEALTH INTELLIGENCE
DATE: 18/01/2022
CC

APPENDIX AA

STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 0866: fax: +27 21 483 6058
5th Floor, Norton Rose House,, 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za)

REFERENCE: WC_202106_049
ENQUIRIES: Dr Sabela Petros

University of Cape Town
Anzio Road
Observatory
Cape Town
7925

For attention: Ms Lisa Abrahams, Mrs Naila Edries, Mrs Candice Hendricks

Re: The management of patients with peripheral artery disease in the Western Cape

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.
Please contact **Dr Eberhard Steinmann (023 626 8543)** to assist you with any further enquiries in accessing the following sites:

Montagu Hospital
Robertson Hospital

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted and the constraints caused by the Covid-19 epidemic above are respected and adhered to.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**Annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
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4. The reference number above should be quoted in all future correspondence.

Yours sincerely

DR M MOODLEY
DIRECTOR: HEALTH INTELLIGENCE
DATE: 18/01/2022
CC