UNIVERSITY OF
KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

TAKING A HOLD OF HAND TRAUMA IN KWAZULU-NATAL

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A thesis submitted to the College of Health Sciences
University of KwaZulu-Natal, in fulfilment of the requirements for the degree of

MASTER OF OCCUPATIONAL THERAPY

January 2017

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ACKNOWLEDGEMENTS

Firstly, I would like to express sincere gratitude to my supervisors, Dr Pragashnie Govender and Dr Deshini Naidoo, for their continuous guidance, assistance and support during this research procedure.

I would like to express heartfelt appreciation to Miss Shivani Reddy; for undertaking this project with me, for motivating me when everything seemed to be going wrong, for constant assistance with editing, unwavering advice and support, and always providing a helpful ear.

I am extremely thankful to Miss Thirusha Ramsudh for her continuous assistance and advice at every stage of this research.

I would like to offer my appreciation to all participants in this research, without them this study would not have been possible.

Last but not least, I would like to express my gratitude towards my family, friends and colleagues for their encouragement and enduring support.

ABSTRACT

Background: Trauma is rife in KwaZulu-Natal, with hand trauma becoming increasingly common. Due to the complex nature of a traumatic hand injury, a multidisciplinary healthcare team approach is necessary. Hand rehabilitation, a specialised area of occupational therapy, is essential for the management of a traumatic hand injury. However, based on the perusal of available literature, there have been no studies to date that address occupational therapists perspective of hand trauma in KwaZulu-Natal. The burden faced by occupational therapists, their current practices in hand rehabilitation, the challenges they experience, or their feelings of confidence and preparedness to manage a traumatic hand injury, is uncertain.

Aim: This study aimed to identify the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal and their perceived ability to manage these injuries effectively in their daily practice.

Methods: This study followed a mixed method approach, utilising a descriptive cross-sectional survey and focus groups. Homogenous purposive sampling was used to recruit occupational therapists working in the field of hand rehabilitation in both the public and private health care sector of KwaZulu-Natal. Data were analysed using descriptive statistics and thematic analysis, and integrated under the objectives of the study. Ethical clearance was granted for the study by the Biomedical Research Ethics Committee and the KwaZulu-Natal Department of Health.

Findings: This study provided an overview of occupational therapists perspectives of traumatic hand injuries in KwaZulu-Natal. Tendon injuries, fractures and combined hand injuries were found to be more common in the province as compared to other traumatic hand injuries. Participants believed that their undergraduate training insufficiently prepared them in the field of hand rehabilitation. This impacted their feelings of confidence and preparedness, affecting overall patient care. Although undergraduate training provided the base of knowledge of traumatic hand injuries, occupational therapists rated it as one of the lowest sources of knowledge in this area, with them relying on hand therapy protocols, CPD training and work experience to advance their knowledge. The current practices of traumatic hand injuries vary depending on patient as well as therapist factors. Therapists appeared to utilise conditional reasoning predominantly whilst considering the challenges experienced, in order

to provide optimum patient care. Sufficient theoretical knowledge, suitable practical experience, hand therapy protocols, efficient training, and adequate mentorship were identified as essential in the management of a traumatic hand injury. Confidence, efficacy and preparedness to manage a traumatic hand injury appear to emerge with experience in the field of hand rehabilitation.

Conclusion: This study provided a comprehensive understanding of traumatic hand injuries and their occupational therapy management in KwaZulu-Natal. Strategies to improve occupational therapy management were proposed, for therapists as well as the undergraduate training programmes, in order improve the outcome of traumatic hand injuries.

Key Words: occupational therapy, traumatic hand injuries, hand rehabilitation, occupational therapy education.

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DEFINITION OF TERMS

Affective lability – Affective lability is when an individual experiences rapid fluctuations of strong feelings or emotions, with a difficulty in controlling these fluctuations and the consequences of their behaviour. (Marwaha et al., 2014)

Amputations – *"To have an amputation is to be without a limb or part because of congenital anomaly, injury or disease"* (Crepeau et al., 2003. p. 799)

Bites – *"Many creatures, including humans, bite when frightened or provoked. Bites may cause injuries ranging from superficial scratches to extensive wounds and often become infected with bacteria from the mouth of the biting creature"* (Beers et al., 2003, p. 1521)

Brachial plexus – The brachial plexus is a major network of nerves supplying the upper limb; it is formed by ventral rami from C5 to T1. (Moore & Dalley, 1999)

Burns – Burns may be defined as a skin injury often treated by occupational therapists; it can be classified by cause, depth, total body percentage, location and age. (Crepeau et al., 2003)

Carpal bones – These are 8 bones arranged in 2 rows of 4 that form the skeleton of the wrist. (Moore & Dalley, 1999)

Combined hand injuries – For the purposes of this study, combined hand injuries may be defined as damage to two anatomic structures, such as bones, tendons, nerves, etc., in the hand

Continual professional development – Continuing professional development is formal or informal education that commences after basic training and continues throughout ones professional career. (Roberts, 2002)

Crush injuries – *"Injury caused as a result of direct physical crushing of the muscles due to something heavy"* (Rajagopalan, 2010, p. 317)

Dislocations – *"A joint dislocation is a displacement of a bone from its normal position in the joint"* (Bremis et al., 2007, p. 582)

Distal interphalangeal joint – This is the joint between the second and third phalange

Extensor tendon injuries – Tendons are bands of connective tissue made up of collagen; they attach the end of a muscle to bone (Beers et al., 2003). Extensor tendon injuries are injuries to the tendons that are attached to the hand extensors

Flexor digitorum profundus – This is a deep flexor of the digits, the only muscle that can flex the distal interphalangeal joint

Flexor digitorum superficialis – This is the largest superficial muscle in the forearm and is a flexor of digits. (Moore & Dalley, 1999)

Flexor tendon injuries – Tendons are bands of connective tissue made up of collagen; they attach the end of a muscle to bone (Beers et al., 2003). Flexor tendon injuries are injuries to the tendons that are attached to the hand flexors

Fractures – *"A fracture is a break in a bone, usually accompanied by injury to the surrounding tissues"* (Beers et al., 2003, p. 313)

Hand therapy – According to the American Society for Surgery of the Hand, hand therapy is a rehabilitation of patients with conditions affecting the hands and upper extremities

Health care professionals – According to the World Health Organisation (WHO), health professionals provide essential services that promote health, prevent diseases, and deliver health care services.

Lacerations – In relation to this study, a laceration may be defined as a cut in skin or flesh

Median nerve – The median nerve arises from the brachial plexus and supplies the flexors in the forearm, skin of part of the hand as well as five muscles in the hand. (Moore & Dalley, 1999)

Metacarpal bones – This is the skeleton of the hand between the carpal bones and metacarpal bones, which is comprised of five bones. (Moore & Dalley, 1999)

Motor deficits – According to the International Neuromodulation Society (2012), a motor deficit is the total or partial loss of function of a body part.

Multidisciplinary team – In the context of the current study, the multidisciplinary team refers to all health care professionals involved in the management of a traumatic hand injury

Occupational therapy – An occupational therapist is an individual who has completed an accredited occupational therapy programme and passed the certification examination. (Crepeau et al., 2003)

Peripheral nerve injuries – This is an injury to peripheral nerves resulting in motor and/or sensory deficits. (Crepeau et al., 2003)

Phantom limb sensation – This is the feeling a person experiences of having a limb after it has been amputated (Beers et al., 2003).

Poly-trauma to the hand – For the purposes of this study, poly-trauma refers to damage to three or more anatomic structures, such as bones, tendons, nerves, etc., in the hand

Postgraduate – For the purposes of this study, postgraduate training refers to any studying/training undertaken following completion of an undergraduate occupational therapy programme

Proximal Interphalangeal joint – This is the joint between the first and second phalange of the hand

Radial nerve – The radial nerve is the largest branch of the brachial plexus; supplies all extensor muscles, as well as skin on the posterior aspect of arm and forearm. (Moore & Dalley, 1999)

Sensory deficits – For the purposes of this study, a sensory deficit may be defined as diminished or absent sensation in the hand due to damage of the sensory nerves

Soft tissue injuries – In the current study, a soft tissue injury is damage to any of the muscles, ligaments or tendons in the hand

The Health Professions Council of South Africa (HPCSA) – This is a council comprising of 12 professional boards; this council is committed to promoting health of the population, determining standards of professional education, setting and maintaining standards of professional practice. (HPCSA, 2016)

Trauma – In the context of the current study, trauma may be defined as any blunt or penetrating physical injury to the hand requiring medical attention.

Traumatic hand injuries – In the context of this study, a traumatic hand injury is any orthopaedic condition caused by intentional or unintentional trauma to the hand.

Ulnar nerve – The ulnar nerve arises from the brachial plexus and supplies one and a half muscles in the anterior compartment of the forearm, majority of the intrinsic muscles in the hand, and the skin on the medial aspect of the hand. (Moore & Dalley, 1999)

Undergraduate – In the context of the current study, undergraduate training refers to the initial occupational therapy training in a bachelor's degree.

Vascular injuries – An injury to the axillary, brachial, radial, or ulnar artery and accompanying veins occurring distal to the lateral border of the first rib may be defined as a vascular injury to the upper limb (Hunt and Kingsley, 2000).

ABBREVIATIONS

CPD	Continued Professional Development
HPCSA	Health Professions Council of South Africa
KAP	Knowledge-Attitude-Practice
KZN	KwaZulu-Natal
MTC	Multidisciplinary Team Care
OT	Occupational therapy
PEOP	Person-Environment-Occupation-Performance
SASHT	The South African Society of Hand Therapists
THI	Traumatic Hand Injury
WFOT	World Federation of Occupational Therapy

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Chapter 1 provides a synopsis of the study; it endeavours to highlight traumatic hand injuries in KwaZulu-Natal and the occupational therapy management of them. This chapter aims to elucidate the rationale upon which the study was based and the research questions that framed this study. The problem statement as well as the aims and objectives will be outlined, so as to provide an in-depth understanding of traumatic hand injuries in KwaZulu-Natal from an occupational therapy perspective. This chapter will conclude with an overview of the succeeding chapters.

1.2 BACKGROUND AND RATIONALE

The hand is where one's mind meets the world (Zimmer, 2012). *"The human hand has evolved into one of the most complex structures in nature"* (Khan & Sivakumar, 2016, p.155). This complex anatomical structure is what sets humans apart from primitive species; allowing the hand to have tactile feedback, fine motor precision and remarkable dexterity (Khan & Sivakumar, 2016; Malahias et al., 2014). Activities of daily living are a way of life, and we are dependent on the sensory and mechanical functioning of the hand to carry out these activities (Khan & Sivakumar, 2016). However ones hands are often taken for granted, and it is only when there is an injury or limitation in function that one realises the substantial impact hands have in everyday life.

Hand injuries are considered to be the most common of all bodily injuries, with an increasing number of traumatic hand injuries seen in emergency services (Trybus et al., 2006; Zárate-Ramírez et al., 2013). According to Hardcastle et al. (2013), trauma can be caused by intentional or unintentional means, with some sources of injury being motor vehicle accidents, stab wounds, gunshot wounds, burns and falls. A hand injury causes pain, trauma and subsequent physical, psychosocial and social consequences, which can lead to either temporary or permanent decline in hand function (Hannah, 2011). Loss of

hand function affects quality of life, negatively impacts on work, communication and independence (Khan & Sivakumar, 2016). The financial burden resulting from a hand injury in terms of treatment, time off from work and possible job loss has a major psychological influence on the person and affects overall recovery (Makabore et al., 2015). It is thus important for health care professionals to manage a client holistically, taking into consideration all the contributing elements and not just the biomechanical and physical factors.

'There are not many injuries that rival the injured hand in complexity' (Gupta et al., 2013, p.454). The complex nature of hand injuries requires a multidisciplinary team approach, including medical and rehabilitation specialists, in order to attain optimal recovery and function. Multidisciplinary Team Care (MTC) is important in improving effectiveness of care but also emphasizes the critical role of teams in achieving the goal of placing patients and their families at the centre of health care (Sorensen et al., 2008). Hand therapy is an area of speciality of occupational therapy which is essential for restoration of hand function (Punwar et al., 2000). An understanding of the unique management of specific hand injuries ensures facilitation of optimal healing, function and engagement in occupation (Eddy, 2012). The treatment of hand injuries is costly and costs may increase if the client develops complications resulting from incorrect treatment (Zárate-Ramírez et al., 2013). For that reason, occupational therapists should be fully equipped with the skills and knowledge to deal with such injuries.

The extensive scope of occupational therapy is contained within a four year curriculum; this curriculum comprises of eight semesters of full time study (UKZN, 2015). Students develop knowledge and skills through professional theoretical input and practical opportunities, depending on their university curriculum. It was Naidoo et al. (2014) opinion that educational programmes are slow to respond to the needs of the South African community and there is limited research exploring perceptions on the extent of undergraduate training in preparing occupational therapists for the profession. Understandably, every medical condition cannot be taught in detail with such a vast occupational therapy syllabus; and no educational programme can expect to completely prepare a therapist to deal with the huge expectations in the health care system (Naidoo et al., 2014). However, there is a need for educational programmes to be continually refined, updating them based on the needs of the community of which they will serve by liaising with therapists in the field.

Undergraduate training provides foundational knowledge however it is the responsibility of clinicians to engage in formal or informal educational training to ensure that their practices are current and adapt to changes with new trends. The fast paced changes in modernised practices create a need for professional development (Roberts, 2002). Continuing professional development is formal or informal education that continues throughout ones professional career to enhance the quality of clinical service provided by a health care professional (Alsop, 2000; Roberts, 2002). The responsibility of belonging to a profession as well as social accountability to clients creates an imperative need for every practitioner to engage in activities aimed at developing the profession (Roberts, 2002).

This study aims to identify the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal and their perceived ability to treat these injuries effectively. It is anticipated that this study will highlight problems experienced by occupational therapists that work in the field of hand rehabilitation, and may assist in informing CPD activities and possibly contribute towards occupational therapy undergraduate curriculum reviews, through the exploration of current practices of occupational therapists.

1.3 PROBLEM STATEMENT

In 2015, there were approximately 54.96 million people living in South Africa with 10.92 million living in KwaZulu-Natal (KZN), making it the province with the second largest population (Statistics South Africa, 2015). Trauma is extensive in KwaZulu-Natal, constituting at least 17.8% of overall emergency cases (Hardcastle et al., 2013). Hand trauma is common in the province; however there is a paucity of literature in this area. In an Australian study of 231 new graduates, Gray et al. (2012) reported that 33% of new graduate occupational therapists felt unprepared to work in the field of hand rehabilitation. Based on the perusal of available literature, there have been no studies to date that address occupational therapists perspective of hand trauma in KwaZulu-Natal. The purpose of the current study is to explore traumatic hand injuries in KwaZulu-Natal and occupational therapists perceived ability to manage these injuries.

1.4 RESEARCH QUESTION

What are the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal and what is their perceived ability to manage these injuries effectively.

1.5 AIMS AND OBJECTIVES

1.5.1 Aim

This study aims to identify the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal and their perceived ability to manage these injuries effectively.

1.5.2 Objectives

- To determine the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal.
- To determine what the current trends and practices are of occupational therapists working in the field of hand rehabilitation.
- To determine the sources of knowledge as well as knowledge seeking trends of occupational therapists working in the field of hand rehabilitation in KwaZulu-Natal.
- To describe the perceptions and experiences of occupational therapists of their undergraduate training in traumatic hand injuries.
- To describe the perceptions and experiences of occupational therapists of their feelings of confidence and preparedness to assess and manage traumatic hand injuries.
- To determine what occupational therapists consider essential in the management of traumatic hand injuries.

1.6 OUTLINE OF THESIS

Chapter 1: This chapter provides an overview and rationale of the research. The background to traumatic hand injuries, occupational therapy management, undergraduate occupational therapy training, as well as continuing professional development is discussed with the problem statement, research questions, aims and objectives.

Chapter 2: This chapter provides a representation of the literature perused concerning the human hand, traumatic hand injuries, occupational therapy, and KAP studies in relation to the current research. The PEOP model is also outlined as it was used as the theoretical framework that formed basis of the study.

Chapter 3: This chapter outlines the methodology that guided the study. The mixed method convergent parallel design, convenience sampling, recruitment and selection of participants via electronic bases, administration of surveys and conduction of focus groups, and the research procedure will be discussed. Additionally, quality inference from both a quantitative and qualitative perspective, as well as ethical considerations that were adhered to in this study, will be outlined.

Chapter 4: This chapter offers the findings of the study. The demographics of survey and focus group participants will be described by grouping them categorically. This chapter also provides the merged interpreted data, represented under the objectives of the study. In addition, figures, tables and verbatim quotations are used to represent the findings.

Chapter 5: This chapter discusses the findings of the research by alignment of the study's objectives. Relevant supporting and contradicting literature, as well as the theoretical framework is used to explore the dynamics of the study.

Chapter 6: The last chapter of this study will offer concluding statements based on the study findings and implications. It highlights the key findings of the research, provides the significance as well as limitations of the study, and offers recommendations.

1.7 SUMMARY

This chapter provided the context and framework of the study, with the succeeding chapters providing the details. The challenges faced in KwaZulu-Natal regarding traumatic hand injuries have been outlined, showing the necessity for a study exploring these injuries in the province to be conducted. The subsequent chapter examines literature in relation to this study and provides a theoretical understanding of the basis of this research.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION TO LITERATURE REVIEW

This chapter explores the theoretical framework upon which this study was based on, a description of the human hand, its anatomy and importance, traumatic hand injuries and burden of disease, occupational therapy role in hand rehabilitation and relevant training aspects, as well as the importance of KAP studies.

2.2 THEORETICAL FRAMEWORK

The Person-Environment-Occupation-Performance (PEOP) Model was used as a theoretical framework in this study. This model stresses the need for skill and competency in occupational performance in order to achieve occupational participation, and to lead a meaningful life (Christiansen et al., 2005). When using this model, enablers and barriers within a person (intrinsic) and environmental factors (extrinsic) are taken into consideration in order to determine occupational participation (Christiansen et al., 2005). Within the context of this study, the PEOP model was used to determine what influence the intrinsic and extrinsic factors have on occupational therapists management of traumatic hand injuries (Figure 2.1). The intrinsic factors include occupational therapists knowledge towards traumatic hand injuries as well as their knowledge seeking behaviour. If therapists have a good base of knowledge which is supplemented by updated literature, the outcome of traumatic hand injuries may be more acceptable. Extrinsic factors include their undergraduate training, and further post graduate or CPD training as well as resources available. These activities have a direct impact on therapist's knowledge of traumatic hand injuries which influences the management of these injuries and ultimately the outcome of rehabilitation. These intrinsic and extrinsic factors affect competency and efficiency which impacts occupational performance and participation.

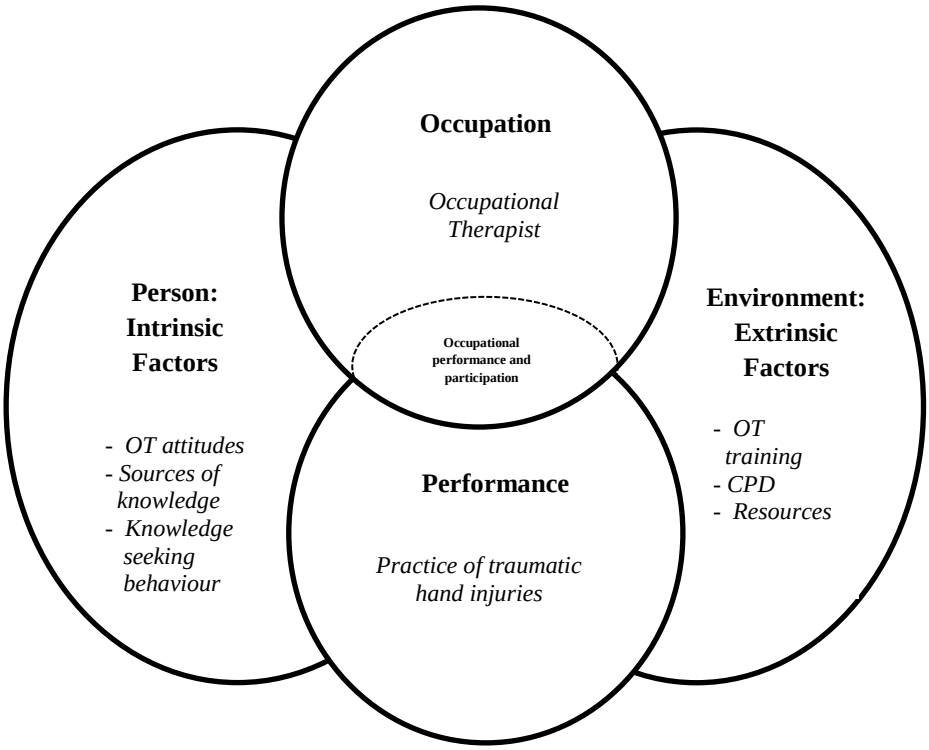

Figure 2.1 The PEOP model applied to this study

2.3 LITERATURE REVIEW

2.3.1 The human hand

2.3.1.1 Anatomy of the hand

The hand, man's greatest tool, retains primitiveness in its ancestral features whilst exhibiting specialized movements, acute sensitivity, precision, subtlety and expressiveness (Napier, 1993; Panchal-Kildare & Malone, 2013). The extraordinary anatomy of the hand allows for function which is a direct result of interactions between musculature, ligaments and bones (Panchal-Kildare & Malone, 2013; Zimmer, 2012). This complex component of our body comprises of 27 bones (Figure 2.2), intrinsic muscles including lumbricals and interossei (Figure 2.3), extrinsic muscles including the flexor and extensor masses (Figure 2.3), annular ligaments, tendons, sagittal bands and three nerve distributions (Figure 2.4) (McCallister, 2016). Due to the specialised and complex nature of the hand, good knowledge of hand anatomy is required in order to effectively manage a hand injury

(McKenna, 2006). An understanding of this anatomy provides a better grasp of knowledge on the daily use of the hand (Panchal-Kildare & Malone, 2013).

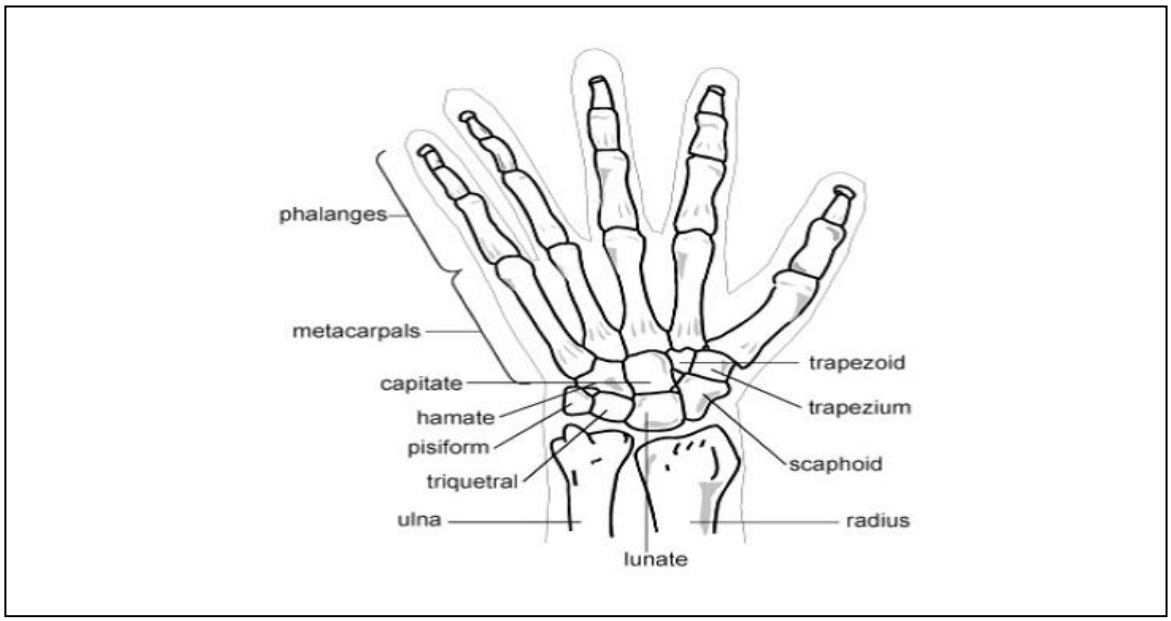

Figure 2.2 Bones of the hand (Kenny, 2010)

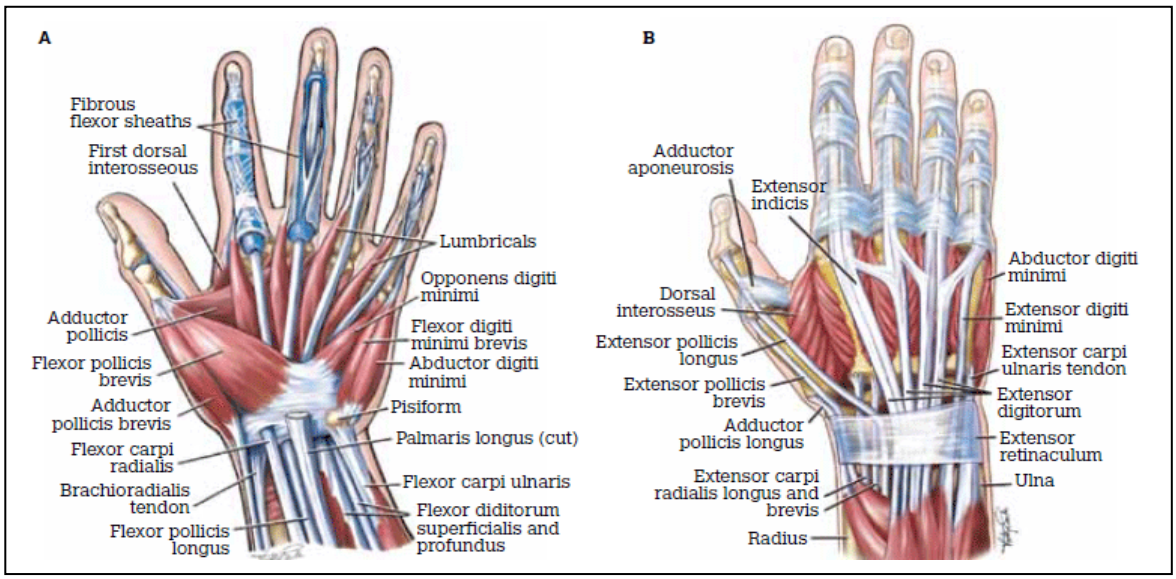

Figure 2.3 *Intrinsic muscles, and flexor and extensor tendons of the hand* (Steward, 2013)

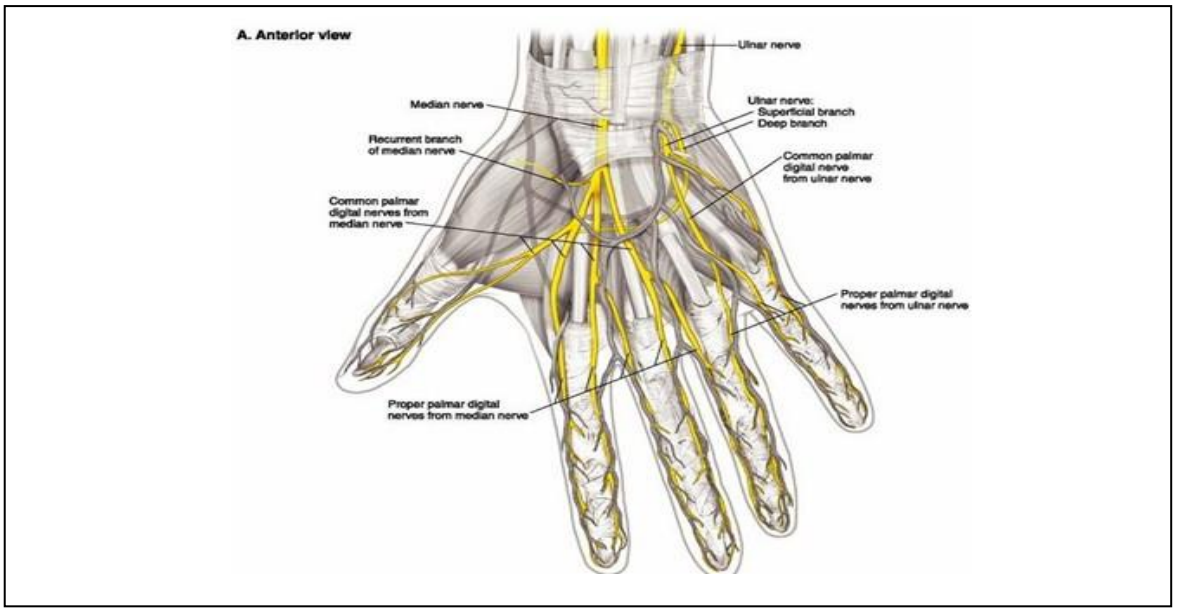

Figure 2.4 Nerve innervation of the hand (Karuji, n.d)

2.3.1.2 Importance of hand function

"The hand is a complex and dynamic structure that balances form and function. To many, the hand is a highly versatile tool used to interact with the surrounding world. To others, it is an instrument of expression and beauty. It is this dual purpose that makes the hand arguably one of our most important body parts and, perhaps second only to the face, the most representative of humanity."

(Andrade et al., 2011, p.2)

Hands are an integral part of what defines us as human beings (Meyer, 2003). The hand is an amazing multifaceted device that can perform an extreme range of tasks including precise movements, heavy labour, provides a sense of touch and plays an important role in communication (Smith, 2006). The human hand is *"a miraculous instrument that serves us extremely well in a magnitude of ways"* (Jones & Lederman, 2006, p.3). Hand function includes identification of objects and extraction of knowledge from it, manual dexterity such as grasping and manipulation, manual gestures such as those used in communication, and it is used as an artistic instrument such as in dance, sculpture, drawing and playing music (Jones & Lederman, 2006). The use of the human hand is synonymous with function, productivity, and autonomy; it provides us with independence in personal

management, work, leisure and socialisation (Meyer, 2003). If hand function is disrupted by disease or injury causing interference in the balance of the muscle, the hand loses its remarkable skill (Trombly-Latham et al., 2008). The literature reviewed supports the view that the hand plays an irreplaceably important role in human life.

2.3.2 Traumatic hand injuries

2.3.2.1 Definition and prevalence

Trauma is a major burden in KwaZulu-Natal with approximately 160 000 trauma cases being seen per annum in this province alone, with 65% of these injuries being intentional with the other 35% being unintentional (Hardcastle et al., 2013). Orthopaedic conditions such as injuries to bone, joints, muscles, tendons, ligaments and nerves can be caused by traumatic events such as motor vehicle, recreational or work accidents (Trombly-Latham et al., 2008). Due to the nature of the hand, it is most often in use and thus a particularly common site for a traumatic injury (Birndorf, n.d). Based on the above literature, a traumatic hand injury may be defined as an orthopaedic condition caused by intentional or unintentional trauma to the hand. Such an injury can result in limitations in function and thus loss of independence (Kingston et al., 2010).

Hardcastle et al. (2013) indicates the high prevalence of trauma in general in KwaZulu-Natal but there has been scarce literature found on the incidence of hand trauma in the province. '*The hand, as the human executing organ, is in the centre of daily life activities in professions and sports. In this outstanding position, the hand is always exposed to injuries and overuse*' (Schöffl et al., 2012, p.62). Hand injuries are unfortunately common and complex in nature (Gupta et al., 2013). In Uganda, the burden of hand injuries was found to be 5.5% in trauma services (Makobore et al., 2015). In the United Kingdom, 20% of patients attending emergency services were hand injuries, resulting in 1.36 million hand injuries seen a year, with 271 000 of those requiring surgical intervention (The British Society for Surgery of the Hand, 2007). Angermann et al. (1993) stated that an average of 14% to 30% of all patients treated in Danish Emergency Care were hand injuries (Cited by Schöffl et al., 2012). Similarly, in a European study, Clark et al. (1985) revealed that hand injuries were accountable for 10% of all Emergency Department visits and 20% of all

injuries treated. These statistics reveal how prevalent hand injuries are in relation to other traumatic injuries.

The spectrum of traumatic hand injuries is vast including minor injuries and fractures to more complex injuries requiring nerve, tendon or artery repair (De Jong et al., 2014). However this raises the question of how common each type of traumatic hand injury is. No literature to date has been found regarding the common traumatic hand injuries seen in KwaZulu-Natal, or even in South Africa. Hardcastle et al. (2013), reports that this is a major gap in literature considering the statistics of trauma in KwaZulu-Natal. In India, however, data reveals that closed fractures were the most common injuries, followed closely by soft tissue injuries of the hand (Gupta et al., 2013). This differs from the results in a study in Uganda which found that hand lacerations were the most frequent injuries as seen in 32% of their patients, with fractures only contributing a mere 16% of the sample (Makobore et al., 2015). Gupta et al. (2013) findings were similar to Angermann et al. (1993) in a Danish study which found that the most common injury in their sample were fractures (42%), followed by tendon injuries (29%). The variability of these statistics may be accounted for by the study location or time frame in which the sample was collected. Based on these varied results, one cannot generalise these indicators to a diverse country such as South Africa, hence the need for statistics and literature within the country and each province.

Although traumatic hand injuries are invariably common, they are not always found in isolation. Gupta et al. (2013) set out to identify the combination profile of hand injuries in North India and found that of the 67.21% of lacerations seen, 74.4% of the patients had accompanying tendon injuries and 25.61% had fractures. Crush injuries were found to be in 22.95% of their sample, with associated bone injuries in 57.14% and tendon injuries in 39.34%. The incidence of tendon injuries was 60.66% with associated vascular injury in 39.34% of the patients. Tuncali et al. (2005) noted similar findings with the prevalence of associated tendon injuries. They found that 54.8% of patients with small lacerations and 92.5% of patients with deep injuries experienced concomitant tendon injuries. Observably, in the above statistics, it is clear that tendon injuries are characteristically common given their close proximity to the skin.

2.3.2.2 Classification of traumatic hand injuries

2.3.2.2.1 Amputations of the hand

An amputation is a procedure in which the whole limb or a part of it is surgically removed (Jain & Robinson, 2008). Amputation of a limb is one of the oldest surgical procedures, with evidence showing congenital, traumatic and surgical amputations of prehistoric people (Edwards & Osterman, 2015). Most amputations are related to peripheral vascular disease but other causes include trauma, malignant tumours, congenital deformities, or chronic pain (Marshal et al., 2016). Amputations can be referred to as major, when the bulk of the limb is detached, or minor when a portion of the limb is removed (Marshal et al., 2016). With regards to the hand, there are different types of amputation including trans-radial, wrist disarticulation, partial hand and digit amputations (Jain & Robinson, 2008).

2.3.2.2.2 Bites of the hand

A bite to the human hand, from human, pet or other animals, often poses serious complications to the individual suffering the bite (Malahias et al., 2014). These complications range from cellulitis to amputation of the hand if managed incorrectly which is why these injuries need to be monitored and managed by experts in the field (Malahias et al., 2014). Treatment for bite injuries to the hand varies; Babovic et al. (2014) state that there is no widely accepted procedure for the treatment of this injury and clinicians should merely rely on their judgement; however they outline possible treatment options as observation, oral antibiotics, intravenous antibiotics, surgical irrigation and debridement. Malahias et al. (2014) echoes these management preferences but in addition believe that early mobilisation and splinting are also required to ensure the best possible chance of recovery.

2.3.2.2.3 Burns of the hand

According to the World Health Organisation (WHO, 2016), burns are a serious problem globally and may be defined as injury to the skin or tissue caused by heat, radioactivity, electricity, friction or chemicals. WHO estimates that burns accounts for 265 000 deaths a

year with millions of people left with disabilities and disfigurements. Burns to the upper extremity is a common form of trauma but an increasing number of burns patients are surviving multiple surgical procedures, sepsis and long hospitalization (Abu-Sittah et al., 2011). According to Belliappa & McCabe (1993), most upper limb burns can be self-treated with only 25% requiring medical intervention and a small percentage of this requiring hospitalization. As the survival rates of these patients improve, there is an increase in importance in restoring hand function (Cowan et al., 2013). Contractures are prevalent with the burned hand (Cowan et al., 2013), and the patient can be left with dysfunctional hands if it is not prioritized (Abu-Sittah et al., 2011).

2.3.2.2.4 Dislocations of the hand

A dislocation may be defined as a shift of the bone from its normal anatomical position in a joint (Bremis et al., 2007). Lefere et al. (2016) reviewed literature on hand dislocations and found that 50% of dislocations involved the 5th carpometacarpal joint, 30% involved the 2nd to 5th metacarpals, 30% involved 4th and 5th metacarpals, 25% the 5th metacarpal and 25% the 2nd carpometacarpal joint. Carpometacarpal dislocations of the thumb were found to be very rare (Jeong et al., 2012), with dislocation of this joint in other digits also uncommon and rarely in solitary (Lefere et al., 2016). Dislocations, if unstable, may require K-wire stabilisation after reduction (Hodgson & Shewring, 2007)

2.3.2.2.5 Tendon injuries of the hand:

Tendon injuries may be broken down into flexor tendon injuries and extensor tendon injuries, each with its own set of procedures and precautions. De Jong et al. (2015) noted that extensor tendon injuries were far more common than flexor tendon injuries; accounting for 395 of their sample as compared to the 297 for flexor tendons. Four extensor tendons extend to the fingers, namely extensor digitorum communes, extensor indicus for the 2nd digit and extensor digiti minimi for the 5th (Schöffl et al., 2012). The flexor tendons are looked at as a functional unit of tendons, sheaths and pulleys; there are two flexor tendons of the fingers namely flexor digitorum superficialis and flexor digitorum profundus, and one flexor of the thumb known as flexor pollicus longus, that run through the carpal tunnel (Schöffl et al., 2012). The hand is further divided into zones for

both flexors (Figure 2.5) and extensors (Figure 2.6) of the hand and thus injuries to these tendons are classified by zones in order to help health care professionals locate the injury and treat it appropriately. De Jong et al. (2015) further noted that zone three of the extensor tendons was injured more frequently, followed closely by zones two and five. With regard to flexor tendons, they found that flexor digitorum profundus was the most injured tendon and this can occur in any of the flexor zones of the hand.

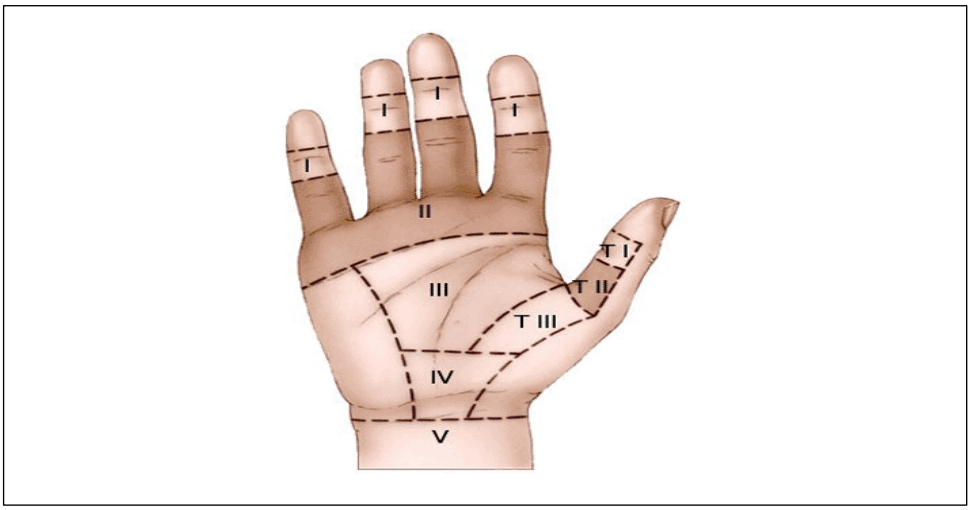

Figure 2.5 Flexor zones of the hand (Steward, 2013)

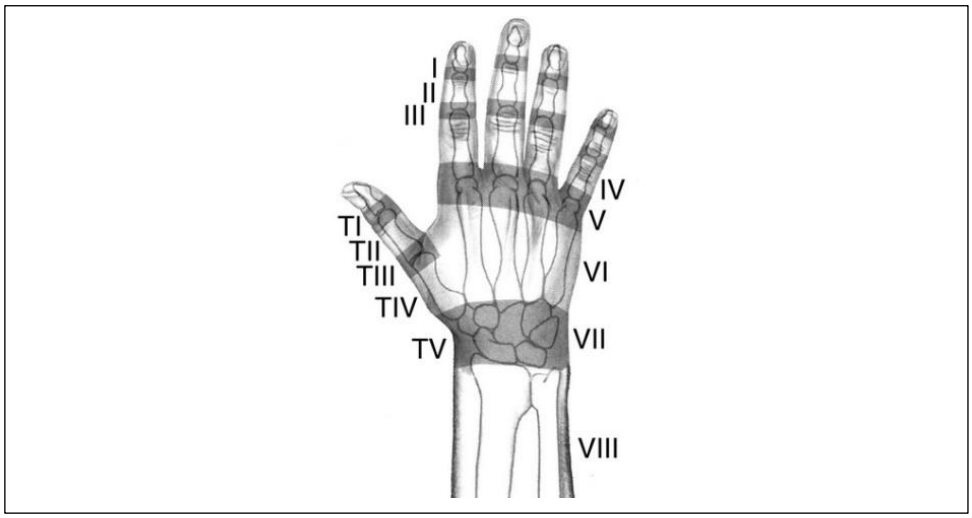

Figure 2.6 Extensor zones of the hand (Steward, 2013)

2.3.2.2.6 Fractures of the hand

"A fracture is a break in a bone, usually accompanied by injury to the surrounding tissues" (Beers et al., 2003, p.313). Prior to the management of a fracture, an accurate patient medical history as well as the cause of the fracture needs to be obtained, this is followed by aggressive management which can either be conservative or surgical (Kasdan, 1993). Corley & Schenck (1996) outline basic principles in the management of open and closed fractures; these include (i) reduction and stabilisation, (ii) elevation and oedema management, (iii) mobilisation of unaffected joints, and (iv) early mobilisation of injured joint depending on rate of healing. Fractures of the hand are quite common; Hove's (1993) reported that in Norway 1000 fractures of the hand were recorded in a 10 month period. Of these, metacarpals accounted for 36%, phalanges 46% and carpal bones 28%. In addition, distal radius fractures were also found to be a particularly common condition (Liporace et al., 2009). Although the management of hand and wrist fractures have evolved over time, from rest and immobilisation to internal fixation and early motion, patients still experience stiffness, non-union, mal-union and chronic pain (Harness & Meals, 2006). Hence, an active role by the physician and hand therapist is essential (Kasdan, 1993).

2.3.2.2.7 Soft tissue injuries and lacerations of the hand

Soft tissue injuries are complex and may involve skin, tissue, muscles or all these structures; with the main aim of management being functional and aesthetic recovery (Mohan et al., 2015). These injuries may be classified as contusions, abrasions or lacerations (Mohan et al., 2015).

Lacerations are simple problems (Quinn et al., 2002) and commonly seen by clinicians (Barclay & Vega, 2008). Initial management includes pressure on the wound to control the bleeding and a cautious examination to assess the severity and involvement of other structures such as muscle, tendons, nerves, blood vessels or bones (Barclay & Vega, 2008). The management of a laceration may include suturing, which is the most popular method, or by delayed secondary healing, which is when the wound is left to heal normally (Quinn et al., 2002). In a study by Patel et al. (1998), 147 lacerations were studied with 113 of those being classified as palmar and 34 as dorsal. Within that sample, 69% of the lacerations were in the digits, 21% in the hand and 10% in the wrist. The goal of care of a

laceration is to have an acceptable scar, functionally and cosmetically, low morbidity and patient satisfaction (Quinn et al., 2002).

2.3.2.2.8 Peripheral nerve injuries of the hand

A peripheral nerve injury may be defined as an injury to the peripheral nerves resulting in motor and/or sensory deficits. (Crepeau et al, 2003). These injuries are common, with incomplete being the most frequent and no simple method for successful management (Lee & Wolfe, 2000). Seddon classified nerve injuries into 3 categories; neurotmesis which is the complete anatomical transection of a nerve, axonotnmesis which is lesion to the nerve fibres but the sheath and supporting structures is not completely divided, and neuropraxia which is a minimal lesion causing temporary paralysis (Seddon, 1942). Injured nerves have the ability to regenerate but functional recovery may be unsatisfactory depending on the location of the injury (Gordan, 2010). If injury to the nerve occurs far from target sense organs and muscles, nerve regeneration may take years to recover with the rate of regeneration being 1-3mm per day (Fu & Gordan, 1997). Majority of the axons will regenerate but some will be trapped in the scar and others misdirected to different areas, leaving the rest to reach the target receptor (Oud et al., 2007). The outcome of a peripheral nerve injury to the upper limb is often impaired sensation of the hand, and although motor function may be intact, the hand can be severely affected by loss of sensation impeding the ability of the individual to perform activities of daily living (Oud et al., 2007).

2.3.2.2.9 Vascular injuries of the hand

An injury to the axillary, brachial, radial, or ulnar artery and accompanying veins occurring distal to the lateral border of the first rib may be defined as a vascular injury to the upper limb (Hunt and Kingsley, 2000). Vascular injuries represent 0.2% to 4% of traumatic injuries with 80% of these occurring in the peripheral vascular system (Nagarsheth & DuBose, 2014); and upper limb vascular trauma accounts for 30% to 50% of peripheral vascular injuries (Hunt & Kingsley, 2000). In order to avoid amputation and ensure functional outcome, there needs to be proper management of these injuries; with timely restoration of blood flow being essential in this process (Hunt and Kingsley, 2000).

2.3.2.3 Demographic profile of hand injuries

The demographics of hand injuries were looked at in multiple studies in terms of age, gender and dominance. De Jong et al. (2015) in an American study, found that majority of the patients were in the 20-29 year old age group which corresponds to the findings of Makobore et al. (2015) in a Ugandan study who found that the average age was 26 years. This age group contributes to the working age era in society suggesting that most traumatic hand injuries occur at work. Statistical support for this statement is found in Makobore et al. (2015) study which found that 50% of injuries occurred at work followed by injuries at home. Contrary to the above mentioned studies, Trybus et al. (2006) found that majority of hand injuries occurred at home (45.3%) followed closely by injuries at work. Most of the tasks we carry out require primarily the dominant hand with the non-dominant hand providing support and assistance. This corresponds with Trybus et al. (2006) findings which identified that the dominant hand was more commonly injured (51.2%) than the non-dominant hand (46.6%). Trybus et al. (2006) further indicated that trauma to both hands is also possible as seen in 2.1% of patients. With regards to gender, males have a significantly higher incidence of hand trauma as compared to women (de Jong et al., 2015).

2.3.2.4 Residual outcomes of a traumatic hand injury

Traumatic hand injuries vary in severity; with the more complex cases resulting in motor or sensory deficits, which have a severe impact on a person's ability to perform daily activities (Gustafsson et al., 2000). Regardless of the complexity, trauma to the hand results in difficulty performing fine motor and bilateral hand tasks which leads to limitations in function and subsequent loss of independence, which negatively affects an individual's performance in their life roles (Kingston et al., 2010). Although the physical symptoms are imperative when treating a hand injury, one must be careful not to overlook the psychological, social and economic implications of it (Tocco et al., 2011).

Gustafsson et al. (2000) explored the psychological effect of a traumatic hand injury and described it as becoming aware of one's own vulnerability. Hannah (2011) explored the psychological issues after a traumatic hand injury, and found that psychological aspects of a hand injury create barriers to successful adjustment and must be treated alongside the

physical limitations. This was highlighted when reviewing statistics of psychosocial problems experienced after a hand injury. Tocco et al. (2011) found that 94% of people have significant psychological symptoms after a hand injury including nightmares, flashbacks, affective lability, pre-occupation with phantom limb sensation, concentration difficulties, cosmetic concerns and fear of death. This emphasises the importance of looking at a person holistically and not merely treating the overt physical deficits.

An individual's life roles, career and financial security may be affected by a hand injury resulting in impairment in their quality of life and emotional wellbeing (Kingston et al., 2010). Occupational therapists are physical rehabilitation experts but also have the training and knowledge to deal with psychosocial issues that arise in order to promote patient recovery (Hannah, 2011).

2.3.3 Occupational therapy

2.3.3.1 What is occupational therapy?

'Occupational therapy is a client-centred health profession concerned with promoting health and well-being through occupation. The primary goal of occupational therapy is to enable people to participate in the activities of everyday life. Occupational therapists achieve this outcome by working with people and communities to enhance their ability to engage in the occupations they want to, need to, or are expected to do, or by modifying the occupation or the environment to better support their occupational engagement'

(WFOT, 2010, p.4)

2.3.3.2 Occupational therapy in hand rehabilitation

Hand therapy is considered an area of speciality of occupational therapists, who not only address the biomechanical complications of a hand injury but also the functional implications (Amini, 2011). Therapy is focussed on facilitating functional recovery of the affected hand and promoting return to their premorbid functioning (Case-Smith, 2003). Occupational therapists in the field of hand rehabilitation are typically involved in the

treatment of orthopaedic conditions such as fractures, lacerations, amputations, burns, tendon and nerve repair; as well as acquired conditions such as tendonitis, arthritis, and carpal tunnel syndrome (Amini, 2011).

Hand rehabilitation by an occupational therapist consists of an initial evaluation in order to determine client centred treatment goals, preparatory methods and purposeful activities, and possible provision of splints and adaptive devices (Amini, 2011). Physiological factors addressed in hand therapy include pain, stiffness, oedema, tissue healing and scarring; and these may be treated using physical agent modalities, splinting, manual techniques, and individually designed activities (Taylor & Humphry, 2001, cited by Case-Smith, 2003). Occupational therapy has proven effective in hand rehabilitation; substantial progress is generally noted after an 8 week programme, with patients being discharged with mild residual impairments (Case-Smith, 2003).

2.3.3.3 Occupational therapy undergraduate training

Occupational therapy, in its expansive nature, requires adequate preparation in order for occupational therapists to function as competent clinicians. The World Federation of Occupational Therapy (WFOT) provides guidelines for the minimum standards of educational programmes including conceptual frameworks, programme objectives, and content organisation (Rodgers, 2005). Guiding strategies are required to ensure that the occupational therapy curriculum is relevant to the specific needs of the country. Curriculum should be guided by the evidence based on the prevalence of conditions in the country to ensure that graduates are prepared for practice. The South African population is diverse and educational programmes need to ensure that students are competent and orientated to these needs, which is a constant challenge (Naidoo et al., 2014). Thus on-going educational programme evaluations are imperative, as practice domains are constantly changing and expanding (Hodgetts et al., 2007).

2.3.3.4 Occupational therapy and continual professional development (CPD)

Health care is a dynamic field that is constantly developing, making it essential for health care professionals to keep up-to-date with advances in the field (Jiandani et al., 2015).

Health care professionals should be liable to the individuals they provide intervention for (Fleet et al., 2008); hence these professionals need to constantly update their knowledge and skills to ensure optimum patient care amongst other things (Jiandani et al., 2015). Globally there has been focus on ensuring that health care professionals maintain and exhibit adequate abilities in their field throughout their careers (Austin, 2013).

The need for more health professional education is evident whether it is undergraduate, postgraduate or continual professional development; in order to meet the needs of the society being served (Fleet et al., 2008). An individual requires firm foundations skills, which can be gained at higher education centres, as a basis on which to build their knowledge and skill (Alsop & Lloyd, 2002). Undergraduate training, or pre-registration programmes assists students to learn in different ways, think critically about their work and guides them towards developing competence at the commencement of their career, but critical skills must be developed after qualification (Alsop & Lloyd, 2002). Although adequate undergraduate training is imperative in building foundation skills, learning does not cease there. Continuing education ensures health care practitioners have the ability to utilise new knowledge and skills in their practice in a positive way (Alsop & Lloyd, 2002).

Continuing professional development (CPD), as the name suggests, is an on-going process throughout ones professional career, enabling the individual to acquire new knowledge, skills and attitudes in order to be competent practitioners (Fikar et al., 2002). This definition is reiterated by Evans et al. (2002), who refer to continuing professional development as lifelong learning empowering professionals to fulfil their potential and meet the needs of their patients. Globally, CPD is emerging as an important way of understanding how professionals maintain their knowledge over long careers (Austin, 2013). The Health Professions Council of South Africa (HPCSA) (2014) outlines the purpose of continuing professional development for professionals; it is to assist these individuals to maintain as well as acquire new knowledge, skills and ethical attitudes that will promote and enhance professional integrity. Similarly, Schostak et al. (2010) stated that CPD is a valued activity impacting on knowledge, skills, values, attitudes, behaviours and changes in work practice; but the effectiveness of CPD is directly related to the professional's ability to determine their own learning needs within their practice. Fleet et al. (2008) identified CPD as a way for health professionals to not only satisfy their professional needs, but personal needs as well in order to meet their career goals. The

concept and provision of CPD is gaining worldwide importance; and a critical component in maintaining health care standards (Fleet et al., 2008; Wan, 2008).

Continuing professional development does not only involve educational activities to improve knowledge and skill, as one might assume, but also management, team building, professionalism, communication, technology and accountability (Filipe et al., 2014). CPD comprises of formal and informal activities aimed at maintaining and developing skills and knowledge (Jiandani et al., 2015). There are many activities an individual can engage in for CPD; audits, case presentations, and service reviews are just some of the activities that could take place as part of service provision (Alsop, 2000). Alsop & Lloyd (2002) further identified fieldwork education, lecturing or supporting students during research or independent studies, and semi-formal learning as educational activities that will assist occupational therapists that are daunted by higher education to gain confidence in an academic environment.

From the literature reviewed above, the importance of continuing professional development is evident, but it isn't always easy to engage in these activities. Becoming involved in CPD also involves extra cost, time, effort and strain on the health professional; and barriers such as decreased access and the pressure of academic study are evident (Alsop & Lloyd, 2002; Tennant & Field, 2004). Educational opportunities and clinical service delivery share a dynamic relationship; with each impacting on the other (Schostak et al., 2010).

2.3.3.5 Occupational therapy and preparedness for practice

The constantly changing pace and complexity of occupational therapy practice requires therapists to have critical thinking and reasoning skills, confidence, competency, and skills to contribute constructively towards discussions that will lead to overall improvement in practice and professional growth (Alsop & Lloyd, 2002). The need for the development of competency for occupational therapists is great; the profession requires individuals to push boundaries and move the profession forward (Alsop & Lloyd, 2002).

Anecdotal evidence suggests that little has changed over the years; the skills and knowledge that are believed necessary for practice may not be what educators think are most important (Hodgetts et al., 2007). Naidoo et al. (2014) investigated the preparedness

of final year students for practice in a South African study and found that students appeared to feel confident to cope with basic practice but their responses suggest that the curricula could be improved to ensure that they gain more confidence and competence. The transition from student to therapist is a big change and there have been many studies reporting on the perceived preparedness for practice. A 2012 study in Australia and New Zealand exploring new graduates feelings of preparedness for practice found that 10.3% felt unprepared, 17.1% felt well prepared and 66.4% felt somewhat prepared to fulfil their work requirements (Gray et al., 2012). Hodgetts et al. (2007) found that graduates only began feeling confident in their clinical abilities between six months to two years after graduation which is similar to the findings by Naidoo et al. (2014) who discovered that students lacked confidence and some technical skills. Hand rehabilitation, a specialised area of practice for occupational therapists, was an area affected in feelings of incompetency, with 33% of new graduates feeling unprepared to deal with hand rehabilitation (Gray et al., 2012). These authors have shown that majority of students do not feel fully prepared and lack a great deal of confidence, which is needed for such a dynamic profession (Gray et al., 2012; Hodgetts et al., 2007; Naidoo et al., 2014)

The above literature indicates that graduates are clearly lacking this key aspect of confidence and this could impact negatively on clinical practice. Gray et al. (2012) found that students were lacking practical skills rather than knowledge. Similarly Doherty et.al (2009) found that more block and acute hospital placements would have been beneficial in preparing students for practice, and that there was limited time available for students to develop practical skills. Fieldwork is a central component for preparing a student for a clinical setting; it provides them with a safe but real situation in which knowledge can be applied and integrated (Mulholland et al., 2004). Professional competencies are the crux of what a curriculum sets out to develop and are addressed through coursework and fieldwork (Mulholland et al., 2004).

Scheirton et al. (2003) discovered that most errors made by occupational therapists were due to perceived lack of experience and incorrect judgement. They found that errors ranged from minor harm such as causing fatigue to major harm such as tendon tears. Their study emphasised the need for error reduction in practice thus lessening the impact of suffering on patients (Scheirton et al., 2003). Although certain traits are beyond the scope of undergraduate training, aspects of the curriculum could be reviewed and improved in order to ensure effective service delivery by occupational therapists in current health care

settings (Naidoo et al., 2014). Educational programmes have a responsibility to the community to be responsive to their needs and integrate them into professional and educational theory (Mulholland et al., 2004).

2.4 SUMMARY

This chapter provided an exploration of the literature reviewed in relation to this study, highlighting key aspects which formed the foundation of the current study. From the literature reviewed in this chapter, it is clear that traumatic hand injuries are invariably common but there is limited existing literature related to traumatic hand injuries from a South African perspective, and specifically a lack of published literature related to hand injuries in KwaZulu-Natal. Furthermore, the literature illustrates the need for occupational therapists to be better prepared for practice, specifically in the area of hand rehabilitation. The next chapter will provide an overview of the procedure used in conducting the research.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter provides a representation of the process the researcher embarked on to conduct this study. The mixed method convergent parallel design, convenience sampling, recruitment and selection of participants, data collection via survey and focus group, research procedure, quality inference from both a quantitative and qualitative perspective, and ethical considerations that were adhered to in this study will be discussed.

3.2 STUDY DESIGN

A mixed method approach was used in this study, following a convergent parallel design (Creswell, 2015). Mixed method research involves a combination of qualitative and quantitative approaches in different phases of the research. (Tashakkori & Teddlie, 2008). This design was selected in order to gain a general understanding of the research problem from the quantitative data, whilst obtaining in-depth information from the qualitative aspect. Quantitative and qualitative research have limitations when conducted on their own; but by using a mixed method approach, the limitation of one approach can be counterbalanced by the strengths of the other thus providing a comprehensive understanding of the research problem (Creswell et al., 2011). Focus groups were chosen as it encourages group interaction, which is useful in exploring people's knowledge and experiences, and assists with discovering and clarifying their views through the group process, which is difficult to obtain through individual interviews (Kitzinger, 1995).

A descriptive cross-sectional survey was administered electronically to occupational therapists in KwaZulu-Natal. During the eight week window period allocated for return of the surveys, two focus groups were carried out in order to gain a thorough understanding of the therapists experiences in the rehabilitation of traumatic hand injuries.

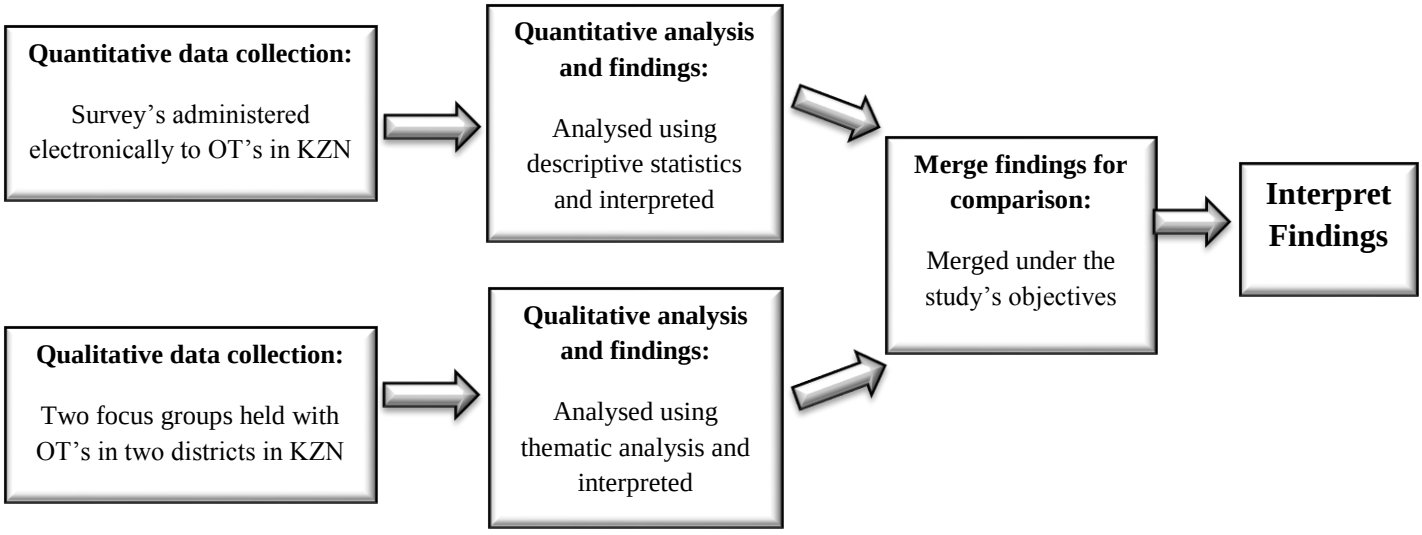

Figure 3.1 Convergent parallel design (Adapted from Creswell, 2015, p.56)

3.3 STUDY SAMPLE

Sampling is an integral step in the research process, *"it helps to inform the quality of inferences made by the researcher that stem from the underlying findings"* (Onwuegbuzie et al., 2007, p.281). For this study, convenience sampling was used for both survey and focus group, as the aim was to obtain insight into a specific group of individuals in order to maximise understanding of an underlying phenomenon, in this case traumatic hand injuries in occupational therapy practice (Onwuegbuzie et al., 2007). This type of non-probability sampling allowed a specific domain of occupational therapists to be studied based on the qualities they possess (Tongco, 2007).

The participants were occupational therapists who are employed in KwaZulu-Natal, registered with the Health Professions Council of South Africa (HPCSA) and have been exposed to hand rehabilitation currently or at some point in their career. According to the HPCSA register, 6935 occupational therapists are currently registered with the board, with 422 of those therapists practicing in KwaZulu-Natal (HPCSA, 2015). These statistics do not provide a comprehensive overview as some practitioners keep their registration with the board but are not actively practicing in the profession. The KwaZulu-Natal occupational therapy service report of 2015 highlighted a total of 245 occupational therapists employed in the government sector; this comprises of seven assistant directors, 36 chief occupational therapists, 142 production level occupational therapists and 60 community service occupational therapists (Watson, 2015). This is also not a

comprehensive indication as these statistics highlights only the public and not the private sector therapists. The South African Society of Hand Therapists (SASHT) has a comprehensive list of hand therapists in South Africa available; 17 hand therapists are currently registered in KwaZulu-Natal (SASHT, 2015). Similarly, these statistics are not a thorough representation of hand therapists, as many are not registered with the association but are practicing in the field or are not occupational therapists by profession. Based on the information above, the correct number of therapists working in hand rehabilitation could not be established. Consequently the target population could not be ascertained, affecting the calculation of the sample size.

By the use of convenience sampling, 200 email addresses of occupational therapists were acquired from relevant data bases and electronic surveys were distributed. From the 200, only 52 therapists responded to the electronic survey; and of these, only 41 worked in the field of hand rehabilitation and were valid. Convinience sampling was subsequently used to recruit participants working with traumatic hand injuries, for the focus group. There were two focus groups run, with six participants involved in each one.

3.4 RECRUITMENT AND SELECTION OF PARTICIPANTS

3.4.1 Survey participants

Occupational therapists in KwaZulu-Natal were contacted via email with an information document with the relevant study details (Annexure 7), as well as the survey to complete (Annexure 9), provided that they consented to participation in the study. Email addresses of therapists were obtained from electronic data bases as well as by contacting relevant district representatives in the province; 200 surveys were distributed electronically to occupational therapists in KwaZulu-Natal. The window period allocated for return of the survey was eight weeks, as per the statistician's discretion, with seven electronic reminders sent during this time. During this period, 52 surveys were returned but only 41 were valid.

3.4.2 Focus group participants

During this period, two focus groups were run in the eThekwini and uMgungundlovu districts, each with six participants. These districts were chosen via convenience sampling due to their high burden of traumatic hand injuries and the specialized hand clinics run. Convenience sampling was also used with both focus groups; these groups had representations from each level of the public health care system, with 50% of these participants being employed in facilities with a specialized hand clinic. The potential therapists, obtained via convenience sampling based on the researcher's knowledge, were contacted telephonically to extend an invitation for participation, and once verbal consent was obtained the researcher proceeded to submit the relevant documentation and make logistical arrangements (Annexure 8). The focus group in the eThekwini district was held in the occupational therapy department at a district hospital, participants were seated around a table in a private room with no distractions to facilitate the group process. A similar set up was used in the uMgungundlovu district, but it was held at a Tertiary Hospital.

3.4.3 Inclusion and exclusion criteria for survey and focus group participants

3.4.3.1 Inclusion criteria

- Occupational therapists that are currently registered with HPCSA.
- Occupational therapists that have had some experience with hand assessments and rehabilitation currently or within the last year.
- Occupational therapists currently working in the province of KwaZulu-Natal.
- Occupational therapists that are employed both in the private and public sector.

3.4.3.2 Exclusion criteria

- Occupational therapists who were involved in the pilot study.
- Occupational therapy technicians and assistants.

3.5 DATA COLLECTION STRATEGIES

3.5.1 Survey

A survey developed by the researcher (Annexure 9) was used to gather quantitative data from the sample. This was developed on the basis of describing occupational therapists knowledge, attitude and practice (KAP) with traumatic hand injuries.

KAP surveys are very useful diagnostic and evaluation tools; they are mainly used to investigate behaviour in relation to a specific topic (Vandamme, 2009). This instrument was originally created in the 1950's in order to estimate the resistance against the idea of family planning in different populations (Launiala, 2009). KAP surveys are broken up into 3 aspects; the first aspect is knowledge which identifies what people actually know about the specific topic, the second aspect is attitude and this looks at how people feel about this topic, and the last one is practice which indicates what people actually do in relation to this topic (Vandamme, 2009). KAP studies are important in that they describe a population's current knowledge, attitude and practice; they increase insight in order to implement appropriate interventions; and lastly they evaluate the effectiveness of specific programmes (Vandamme, 2009). It basically is conducted to determine the pre-existing prevalence and the willingness to make changes for the better (Kaliyaperumal, 2004). KAP, in relation to the current study, will increase knowledge of common traumatic hand injuries, contribute towards attitude change when dealing with traumatic hand injuries and make adjustments in the kinds of practices that are followed in the management of traumatic hand injuries

According to Vandamme (2009), there is no clear methodology to develop a KAP survey, with different studies using different formats. The survey originally sought out to determine occupational therapists knowledge of traumatic hand injuries but this would be impractical as traumatic hand injuries comprise of a number of injuries making it difficult to delineate, hence it is considered as a group of injuries. Therefore this section focussed more on sources of knowledge and knowledge seeking behaviours to improve practice. The survey was divided into six sections, namely: (i) consent, (ii) biographical data, (iii) traumatic hand injuries, (iv) knowledge of traumatic hand injuries (how do they seek knowledge), (v) attitude towards traumatic hand injuries (how do they feel) and (vi) practice of traumatic hand injuries (what they do). The survey was administered electronically and comprised of all closed ended questions, multiple selection items, likert scales and the opportunity for comments where necessary.

3.5.2 Focus Group

During the eight week window period of the survey, two focus groups were conducted in order to gauge an understanding of therapist's knowledge, attitudes and practices in the assessment and management of traumatic hand injuries. The questions for the focus group were guided by the study's aims, objectives and research questions (Annexure 10). The initial focus group was held in the eThekwini district and the second one in the uMgungundlovu district (Figure 3.2), with representatives from district, regional and tertiary hospitals as well as community health care centres, with 50% of the recruited participants employed at facilities with specialised hand clinics, allowing different perspectives and experiences to be voiced. Only public service occupational therapists were involved in the focus groups, due to convenience sampling. The focus groups ran for approximately one hour in a setting that was convenient for the participants and refreshments were provided for all participants attending the focus group. The focus group was facilitated by the researcher; all participants were given a number and the researcher recorded non-verbal actions as well any significant inferences made based on that number. All information was audio-recorded, transcribed, coded and stored.

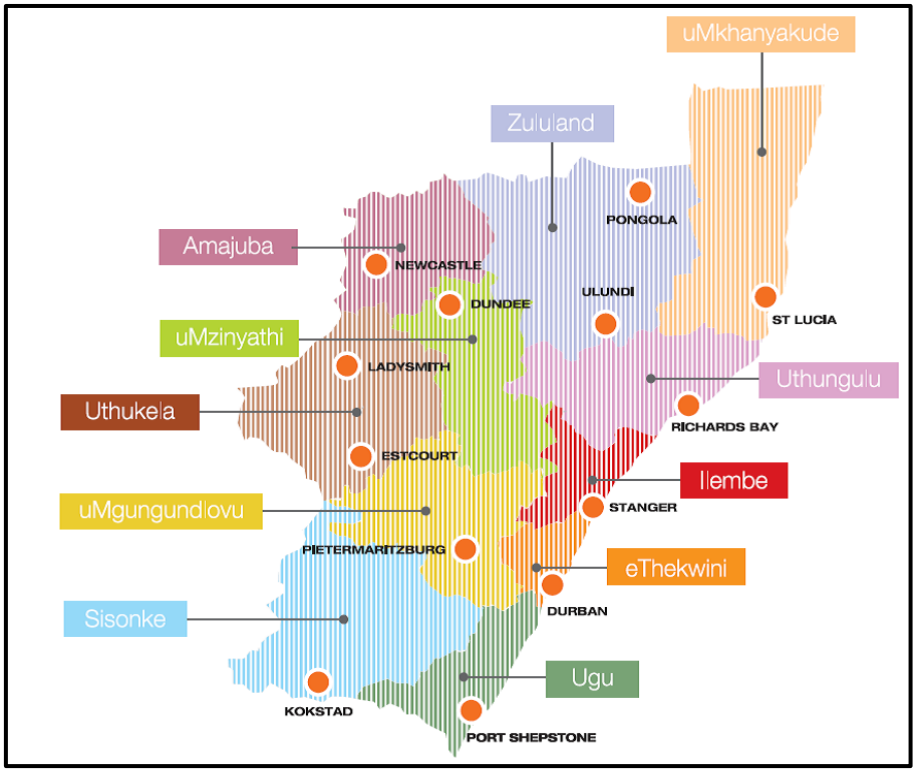

Figure 3.2 Study location (KZN GDP Strategy, 2016)

3.6 RESEARCH PROCEDURE

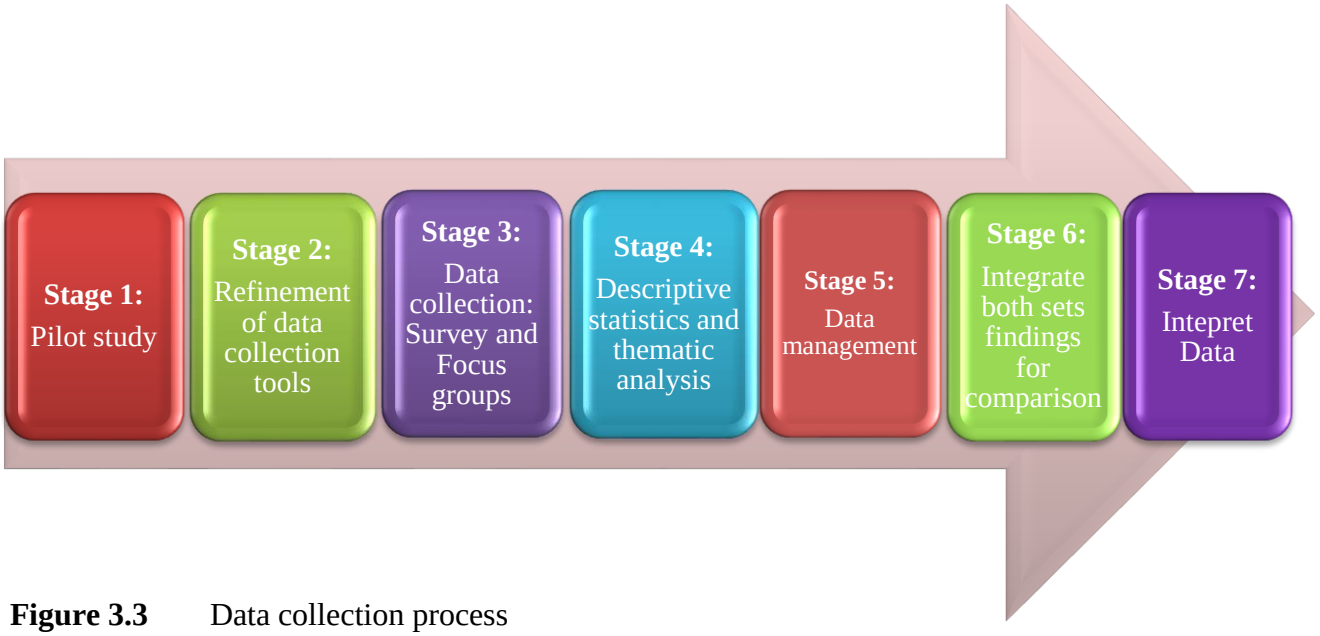

Figure 3.3 Data collection process

3.6.1 Stage 1: Pilot study

A pilot study was conducted in order to refine the survey as well as the focus group schedule. The survey was piloted with five individuals, accessed via convenience sampling. These individuals included three occupational therapists within KwaZulu-Natal but not currently working in hand rehabilitation, one occupational therapist out of the province but practicing in hand rehabilitation as well as one physiotherapist with a master's degree in hand therapy. The five participants were asked to complete the survey which was emailed to them; the data was then coded and analysed so that amendments to the survey could be made. The reason for piloting the survey was that it aided in providing information on the efficiency of administration, ease of answering the questions, gaps in the survey relating to the research questions, as well as the structure of the survey.

The focus group questions were piloted in a dyad; this was then transcribed and coded. The piloting of the focus group questions was initiated in order to determine operational aspects, additional probes needed, further questions to be added, as well as to determine if the questions met the objectives of the study.

3.6.2 Stage 2: Refinement of data collection tools

Once the pilot study was completed, all feedback received from therapists who participated were taken into consideration. Some of the questions from the survey were rephrased to avoid ambiguity (Annexure 9, questions F2, F8 and F10), some were simplified and restructured to ensure ease of answering (Annexure 9, questions C9 and C10), and additional questions were included to ensure a comprehensive overview of the topic. With the focus group, pilot participant feedback provided insight into probes needed in section F (Annexure 10), and allowed the researcher to rephrase questions to avoid ambiguity.

3.6.3 Stage 3: Administration of the survey and conduction of focus groups

The cross sectional descriptive survey was emailed and two focus groups were held, with therapists who met the inclusion criteria. The particulars of the data collection have been explained in detail in section 3.5.

3.6.4 Stage 4: Data analysis

Descriptive statistics is a technique used for collection, analysis, interpretation and presentation of numerical data; using numbers that characterize features of that data by presenting it in tables or graphs (Larson, 2006). Descriptive statistics were utilised to analyse the quantitative data from the 52 surveys received.

The survey was coded prior to distribution to ensure ease of data management. Data were organised into an excel spread sheet based on the initial coding by the researcher; and then organised into nominal variables (categorical variables such as age, gender, etc.) and ordinal variables (variables that are naturally ordered such as those in Likert scales) (Anthony, 2011). Of the 52 surveys received, only 41 were valid as eleven of these participants did not work in the field of hand rehabilitation, therefore only the biographic information of these eleven participants were considered. The assistance of a statistician was enlisted once the data was coded onto an excel spread sheet. The statistician made use of SPSS 15 to generate tables which were open to interpretation. These tabulations highlighted frequencies, percentages, valid percentages and cumulative percentages for each of the questions. Comparative tables were similarly generated using cross tabulations.

Using the tables, the findings of the quantitative data were compiled with relevant graphical representations.

Thematic analysis; a method of identifying and reporting themes within data was used for the analysis of the qualitative data (Braun & Clarke, 2006). Data obtained from the focus group were transcribed, coded and then organised into themes; a theme captures the essence of data in relation to the research questions and gives meaning within the data set (Braun & Clarke, 2006). The six phases of thematic analysis were followed, namely: (i) familiarizing yourself with your data, (ii) generating initial codes, (iii) searching for themes, (iv) reviewing themes, (v) defining and naming themes and (vi) producing a report (Braun and Clarke, 2006). The researcher transcribed the initial data and thereafter went through the recording and transcription to ensure that it was accurately transcribed. The researcher then read through the transcriptions highlighting key points; these key points, known as the initial codes, were then tabulated and highlighted according to the relevant objective. Categories were drawn within each focus group and were merged into sub-themes. The sub-themes were reviewed, with themes emerging (Annexure 11). The findings from the qualitative data were presented using relevant information with thick descriptions and verbatim quotations.

The findings were merged under the study objectives in order to provide structure and understanding of the two sets of data that sought to describe knowledge, attitudes and practices of occupational therapists in the management of traumatic hand injuries.

3.6.5 Stage 5: Data management

From the conception of the project, all data were stored on a password protected laptop. This data was not accessible to any person besides the researcher. After the data collection phase, all documents pertaining to the research was stored in a lock up cabinet and will be stored for a period of five years. At the end of the five year period, the hard copy data will be incinerated and all electronic data will be deleted.

3.6.6 Stage 6: Integration of data

Once the quantitative and qualitative data was analysed, findings were compared and described under the objectives of the study. Conclusions were drawn and relevant recommendations were made.

3.7 QUALITY INFERENCE

Quality inference is a term used in mixed method research to integrate the validity in quantitative research, and trustworthiness and credibility in qualitative research (Teddlie & Tashakkori, 2009).

3.7.1 Reliability and validity

Reliability and validity is a term used in quantitative research to evaluate the data received; validity is whether the data represents the theories they were expected to capture, with reliability being the whether the data consistently and accurately represents these theories (Teddlie & Tashakkori, 2009). Therefore, validity is drawing meaning from the data and reliability is showing consistency in the data (Creswell, 2009). Reliability and validity was ascertained through the survey. Face validity was firstly attained by having an editor correct the language and grammar, and secondly by piloting the survey with participants who were not part of the final sample. This ensured that there was no ambiguity, that the survey was designed to respond to specific research questions and for ease of interpretation and administration. Content validity was ensured by the appraisal of the survey by supervisors.

3.7.2 Trustworthiness and credibility

Trustworthiness is a term used in qualitative research as a substitute for validity in quantitative research; it is the extent to which the researcher can persuade the reader that the findings are worth concentrating on, as defined by Lincoln and Guba (1985). Credibility may be defined as whether or not a research report is reliable; techniques include prolonged engagement, persistent observation and triangulation (Teddlie &

Tashakkori, 2009). Trustworthiness and credibility were ensured in the focus group, by using member checking and peer debriefing. Member checking which is used to determine the accuracy of the qualitative findings by taking the responses back to the participants to decide if the responses are correctly interpreted (Creswell, 2009). Member checking was carried out in two ways for this study; at the end of each focus group, the researcher summarised the salient points brought up giving the participants an opportunity to agree or disagree, and data received from the focus group was transcribed verbatim and once the themes were developed, select members of the focus group were consulted giving them an opportunity to comment on the validity of the findings. Peer debriefing, *"…a process of exposing oneself to a disinterested peer in a manner paralleling an analytical sessions and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer's mind"* (Lincoln & Guba, 1985, p. 308), was subsequently used to ensure trustworthiness and credibility. This involved locating a person who reviewed the study and asked questions so the research resonated with people other than the researcher; this strategy involves interpretation beyond the researcher and adds validity to the research (Creswell, 2009). Two individuals reviewed the current study, one was an occupational therapist working out of the field of hand rehabilitation but has knowledge and experience in the field, and one was a physiotherapist with a master's degree in hand therapy; this provided a different perspective to the researcher.

3.8 ETHICAL CONSIDERATIONS

Prior to commencement of the study, ethical clearance was obtained by the Biomedical Research Ethics Committee of the University of KwaZulu-Natal (BE203/16) (Annexure 1) in addition to completion of an online ethics course (Annexure 6). Permission was also obtained from the KwaZulu-Natal Department of Health (Annexures 2 and 3) as well as gatekeeper permission from the relevant facilities (Annexures 4 and 5), prior to initiation of the focus groups. The ethical principles that were taken into consideration in this study are described below.

3.8.1 Respect for persons

This ethical principle incorporates two aspects; people should be treated as autonomous agents and individuals with diminished autonomy are entitled to protection (The Belmont Report, 1979), with the latter not applicable to this study. Respecting one's autonomy means respecting their ability to make decisions and self-determination. Each participant

received an information document (Annexures 7 and 8) outlining the study and processes involved. They were informed that the study is completely voluntary and they have the option to withdraw at any time without an explanation or prejudice. They were informed that confidentiality will be maintained at all times, no names will be used in the research document, pseudonyms and voice changing will be used if required, and all information will be stored on a password protected laptop and locked cupboard for a period of five years before being permanently deleted and incinerated.

3.8.2 Informed Consent

Informed consent is not only valuable for supporting an individual's autonomy but also provides assurance that the participants of the study are not coerced into participation (O'Neill, 2003). Informed consent was obtained from each participant prior to commencing any aspect of the study, by the provision of an information document (Annexures 7) outlining the research purpose and methodology, so that participants were able to make an informed decision on their involvement in the study. Section A of the survey (Annexure 9) required participants to indicate if they had read and understood the information document and if they voluntarily choose to participate in the study. For the focus group, the chosen sample was required to sign an informed consent form prior to commencement of the group (Annexure 8).

3.8.3 Beneficence and Non-maleficence

"Respecting the principle of beneficence in the research context means that researchers will, to the best of their ability, do good; and it is closely linked to the principle of non-maleficence where the aim is 'above all, do no harm'" (Cambell-Crofts et al., 2013, p. 76). The principles of beneficence and non-maleficence require health professionals and researchers to put the needs of the patients and research sample first, promoting goodness and doing no harm. The outcome of this study and the participation will cause no harm to the participants; it will not directly benefit the individual person involved in this research but will impact on the occupational therapy community as a whole, which indirectly benefits the participants.

3.8.4 Confidentiality

Confidentiality refers to the obligation of the researcher to protect all information received from the participant and respecting their right to privacy. During this study; all information received from participants, via survey or focus group, were kept private and confidential. Biographical data was obtained from the survey but specific information such as names and HPCSA numbers were omitted. All quantitative data was coded with no way of linking the data to an individual person. Section 3.6.5 highlights how confidentiality was maintained during data management

3.8.5 Scientific Honesty and Integrity

The Singapore statement highlights that the significance of research is crucially reliant on the integrity of the research, and thus will be used to ensure on scientific honesty and integrity in this study. These principles are honesty, accountability, professional courtesy and fairness, and good stewardship (Steneck et al., 2010). Honesty was maintained in all aspects of the research in that all information is available at the participant's request. The researcher was accountable for all aspects of the study from conception to completion and may be held responsible for any irregularities. Professional courtesy was maintained with all individuals involved in the study and appropriate acknowledgments have been given to individuals who contributed towards the study.

3.9 SUMMARY

Chapter 3 provided a detailed outline of the steps involved in the design of the study as well as the rationale. Selection and recruitment of the participants in the sample have been described as well as the data collection processes followed in this study. Ethical principles that were upheld throughout the research have also been described. This chapter demonstrated how the aims, objectives and research questions that this study is based on were addressed. Chapter 4 will outline the findings of the study.

CHAPTER 4

FINDINGS

4.1 INTRODUCTION

This chapter describes the findings of both the quantitative and qualitative data analysis. The quantitative data was collected using a descriptive survey which was submitted electronically to occupational therapists in KwaZulu-Natal, and the qualitative data was gathered via two focus groups in the eThekwini and uMgungundlovu districts of KwaZulu-Natal. The two sets of data will be outlined individually and then merged under the objectives of this study.

4.2 DEMOGRAPHICS

4.2.1 Survey participant demographics

A total of 200 surveys were emailed to occupational therapists in KwaZulu-Natal, with only 52 of those surveys returned to the researcher, indicating a cumulative response rate of 26%. Of the 52 surveys completed, only 41 of those therapists currently work with patients with traumatic hand injuries. A valid response rate excludes the 11 surveys with missing responses, thus indicating a valid response rate of 20.5% for the current study. The demographic profiles of the participants of the survey are outlined in table 4.1.

Table 4.1 Demographics of survey participants (n=41)

Characteristics	% of participants
Age	
20-30 years	63.4%
31-40 years	17.1%
41-50 years	19.5%
Years of experience	
1-5 years	46.3%
6-10 years	26.8%
11-20 years	9.8%
> 20 years	17.1%

Highest level of education	
Bachelor's degree	85%
Master's degree	10%
Post graduate diploma	5%
Undergraduate University	
UKZN	75.6%
UFS	9.8%
UCT	4.9%
WITS	4.9%
UP	2.4%
SMU	2.4%
Facility	
District public hospital	31.8%
Regional public hospital	26.8%
Private practice	17.1%
Tertiary public hospital	14.6%
Private hospital/rehabilitation facility	2.4%
Community health care centre	7.3%

4.2.2 Focus group participant demographics

Two focus groups were held in the EThekwini and UMgungundlovu districts, each with six participants from each level of the public health care system. The demographic profiles of participants of the focus group are outlined in table 4.2.

Table 4.2 Demographics of qualitative participants (n=12)

Characteristics	**% of participants**
Age	
20-30 years	83.3%
31-40 years	8.3%
41-50 years	8.3%
Years of experience	
1-5 years	50%

6-10 years	41.6%
11-20 years	8.3%
Highest level of education	
Bachelor's degree	91.6%
Master's degree	8.3%
Facility	
District public hospital	25%
Regional public hospital	25%
Tertiary public hospital	41.7%
Community health care centre	8.3%

4.3 DATA REPRESENTATION

The issues addressed in this research are complex, as with most health science issues, and the use of either quantitative and qualitative modes of inquiry may prove inadequate to explain this complexity, thus a combination of the two may assist in providing greater insight and a comprehensive understanding of the research (Creswell, 2009). The data obtained were analysed using descriptive statistics and thematic analysis, as outlined in chapter 3. The quantitative data were simplified into frequency tables and the qualitative data were generated into themes by using content analysis (Annexure 11). The quantitaitve and qualitative data is merged under the objectives of the study, in order to integrate the findings as recommended for mixed methods research (Creswell et al., 2011). The objectives of the study are outlined in figure 4.1.

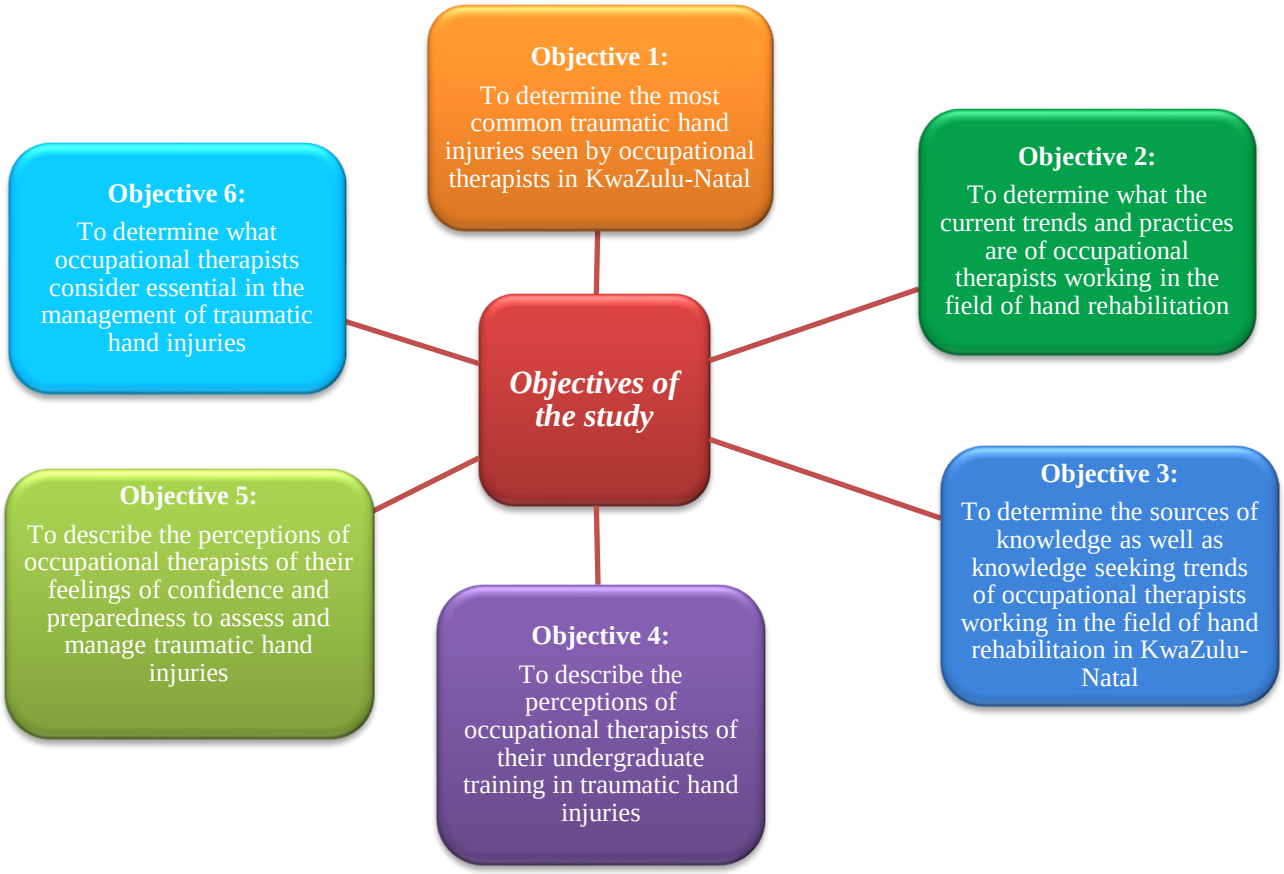

Figure 4.1 Objectives of the study

4.3.1 Objective 1: Most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal

4.3.1.1 Frequency of traumatic hand injuries in different facilities

Traumatic hand injuries are common in KwaZulu-Natal and are seen frequently by occupational therapists. Majority of the occupational therapists in the sample (40.4%, n=52) have been working with these injuries between 1 and 5 years. The entire sample was used in this calculation as some therapists have worked in hand rehabilitation at some point in their career but not currently. The 41 participants, that currently work in hand rehabilitation, were invited to comment on the amount of hand injuries they manage in a month; 26.8% (n=41) of the sample see an average of 5 patients or less, 36.6% (n=41) see 6-10 patients, 7.3% (n=41) see 16 to 20 patients, with 19.5% (n=41) seeing over 21 traumatic hand injuries in one month. Occupational therapists in public regional hospitals appear to carry the highest burden of traumatic hand injuries, with five of the participants reporting seeing over 21 patients each month.

4.3.1.2 Common traumatic hand injuries

Participants were requested to comment on the most common traumatic hand injuries they have seen in the last year, in order to determine the current burden in KwaZulu-Natal. Flexor tendon injuries emerged as the most common traumatic hand injury seen by occupational therapists in the last year of practice, as noted by 87.8% of the participants (n=36). This is reinforced in the findings of the focus groups, where majority of participants agreed that flexor tendon injuries were the most commonly managed. This is followed closely by fractures, as seen by 82.9% of the participants (n=34). The third common traumatic hand injury included extensor tendon injuries and combined injuries to the hand, noted by 73.2% of the participants (n=30). These statistics were emphasized in the qualitative data where participants expressed that flexor tendons, extensor tendons, nerve injuries and fractures were the most common. Vascular injuries were the least common traumatic hand injury, only seen by 17% of the participants (n=7). Figure 4.2 illustrates the frequency of each traumatic hand injury as seen by participants of the study

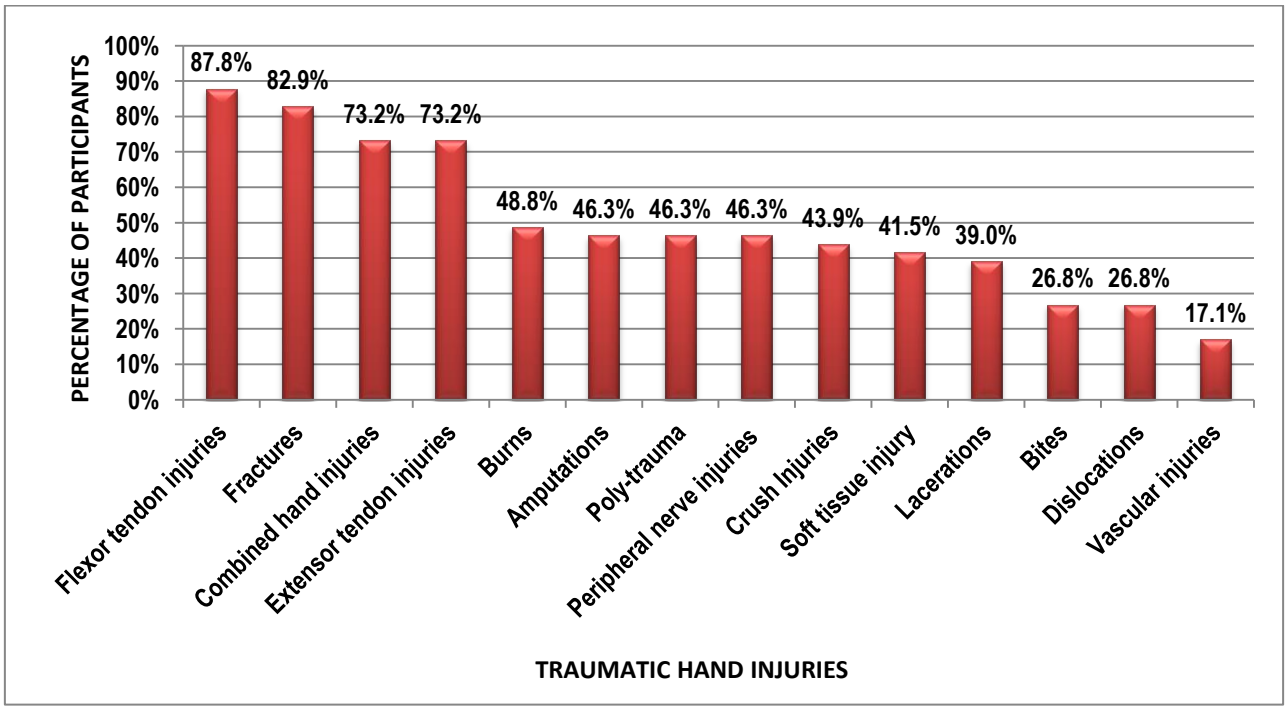

Figure 4.2 Traumatic hand injuries seen by occupational therapists (n=41)

4.3.1.3 Sub-categories of traumatic hand injuries

The traumatic hand categories were further broken down to determine which type of each injury was most common.

Amputation: PIPJ and DIPJ amputation were most common, observed by 63.4% of the participants (n=26).

Bites: Human bites were the most common amongst bite injuries as noted by 46.3% participants (n=19).

Burns: Hot liquid was found to be the leading cause of hand burns by 65.8% (n=27) of the participants followed closely by flame burns as noted by 51.2% participants (n=21).

Combined hand injuries: Flexor tendon injuries combined with peripheral nerve injuries surfaced as the most common noted by 56% participants (n=23).

Dislocations: PIPJ dislocations were found to be most prevalent, seen by 34.1% participants (n=14).

ETR: Zone 5 appeared as the most common extensor as seen by 75.6% participants (n=31)

FTR: Zone 2 emerged as the most prevalent flexor tendon injury, seen by 78% participants (n=32).

Fractures: Distal radius fractures surfaced as the most common in both quantitative and qualitative data, seen by 75.6% of participants in the survey (n=31).

PNI: Ulnar nerve was noted to be the most common nerve injured noted by 75.6% of participants (n=31), followed by the radial nerve noted by 68.3% participants (n=28).

4.3.2 Objective 2: The current trends and practices of occupational therapists working in the field of hand rehabilitation

4.3.2.1 Waiting times

Occupational therapists vary in response time to the management traumatic hand injuries. It appears that most of the injuries are attended to on the same day, with various time intervals thereafter; figure 4.3 outlines the average waiting time for each traumatic hand injury. The qualitative data mirrors this; most traumatic hand injuries will be seen on the same day of referral or screening.

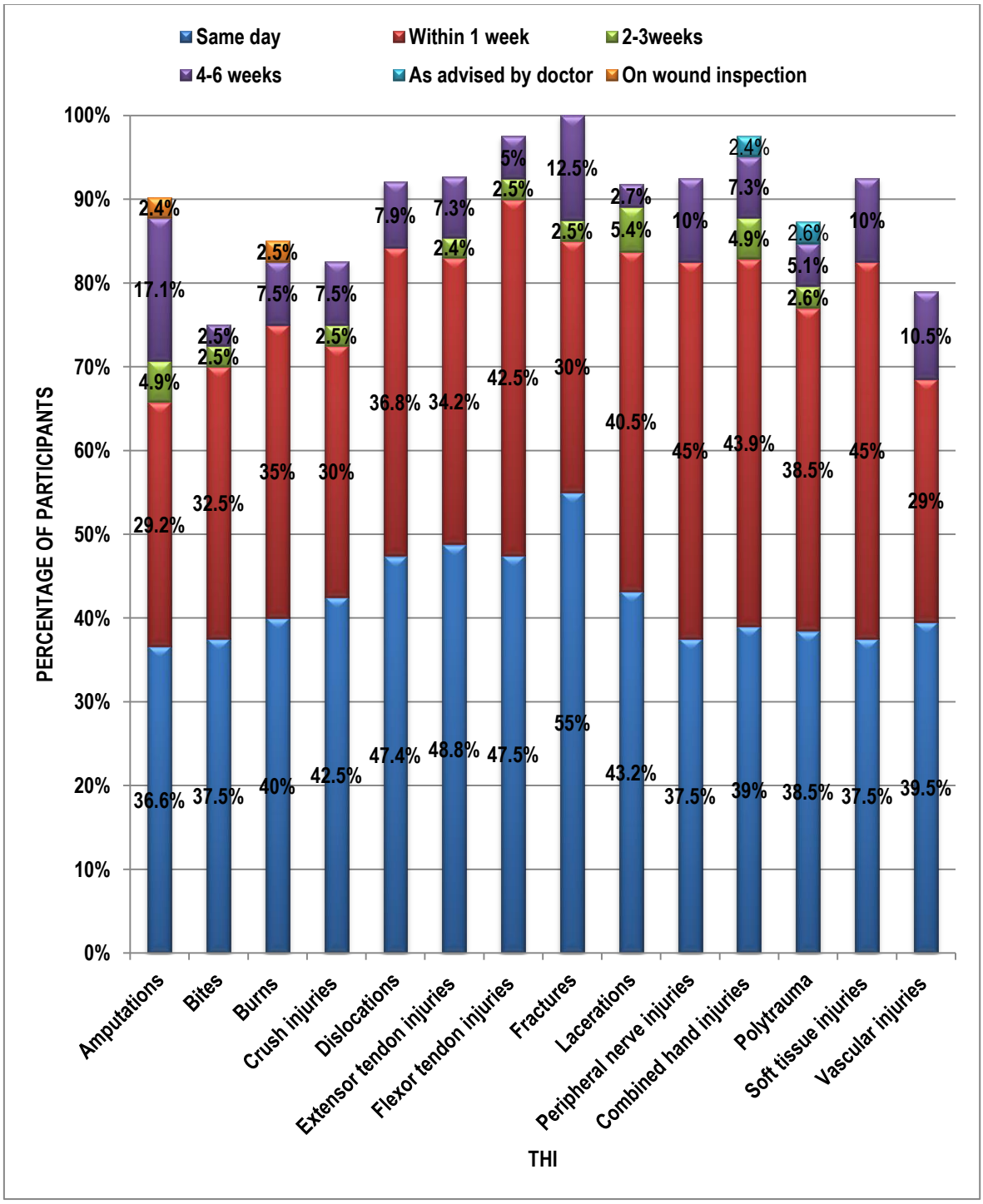

Figure 4.3 Waiting times for occupational therapy management (n=41)

4.3.2.2 Assessment

Assessment of a traumatic hand injury is essential in planning appropriate intervention; 76.9% (n=30) of the participants reported to assess their patient on the initial visit as well as on an on-going basis. Participants mainly used informal assessments (59%, n=23) with 41% (n=16) using both standardised and informal assessments. Some of the more common standardised assessments include the use of a dynamometer (41.5%, n=17), the DASH self-report survey (17%, n=7), the Semmes Weinstein monofilaments sensation test (12.2%, n=5) and the Purdue peg board (12.2%, n=5). A few other standardised tests were reported by individual participants such as the Nine hole peg test, Jebson-Taylor hand function test, WASP, O'Connor Dexterity test, Minnesota hand dexterity test and pinch gauges.

4.3.2.3 Treatment planning

Treatment planning differs from therapist to therapist, each using different approaches. Participants were provided with five treatment approaches; (i) interactive reasoning (considering the impact the injury has on an individual's life), (ii) narrative reasoning (considering an individual's daily activities, habits and roles), (iii) pragmatic reasoning (considering factors such as reimbursement, documentation, resources, discharge environment, therapists knowledge and skill), (iv) conditioning reasoning (considering premorbid functioning, current status, prognosis, social and physical environment as well as cooperation of the individual), and (v) procedural reasoning (considering the individuals diagnostically related performance components and areas) (Coppard and Lohman, 2008). Majority of the sample (71.9%, n=23) uses conditional reasoning as an approach when working with traumatic hand injuries, 9.4% (n=3) uses narrative and pragmatic reasoning, 6.3% (n=2) uses procedural reasoning and 3.1% (n=1) uses interactive reasoning.

There are several factors occupational therapists take into consideration when planning treatment for a patient with a traumatic hand injury (Figure 4.4). Knowledge of the condition emerged as a primary aspect of treatment planning by 95.1% (n=39) of participants, with 87.8% (n=36) considering the resources they have available, 82.9% (n=34) considering their experience with the condition and 80.5% (n=33) looking at their competency in dealing with that particular condition.

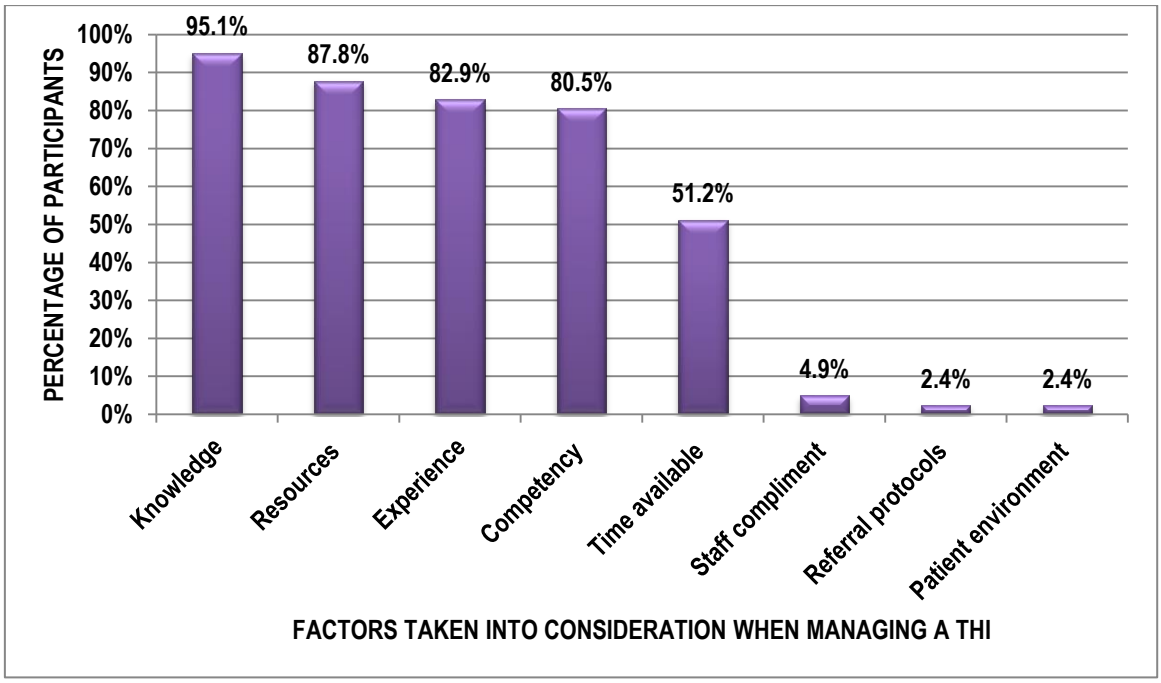

Figure 4.4 Factors occupational therapists take into consideration (n=41)

The qualitative data provides additional factors therapists take into consideration. These include the patient's level of functioning, therapist's level of interest, stage of healing, phase of rehabilitation, pain and discharge planning.

> *"…three components that serve as a blue print for therapy: your stage of healing, anatomy and your safe positions of the hand. And then whenever those overlap is what you are going to do, based on your clinical reasoning"*
> (participant 5, focus group 2)

Therapists also use certain factors to guide their treatment approach with a traumatic hand injury (Figure 4.5). Clinical judgement is used by 92.7% (n=38) followed closely by hand protocols used by 87.8% (n=36) of the participants.

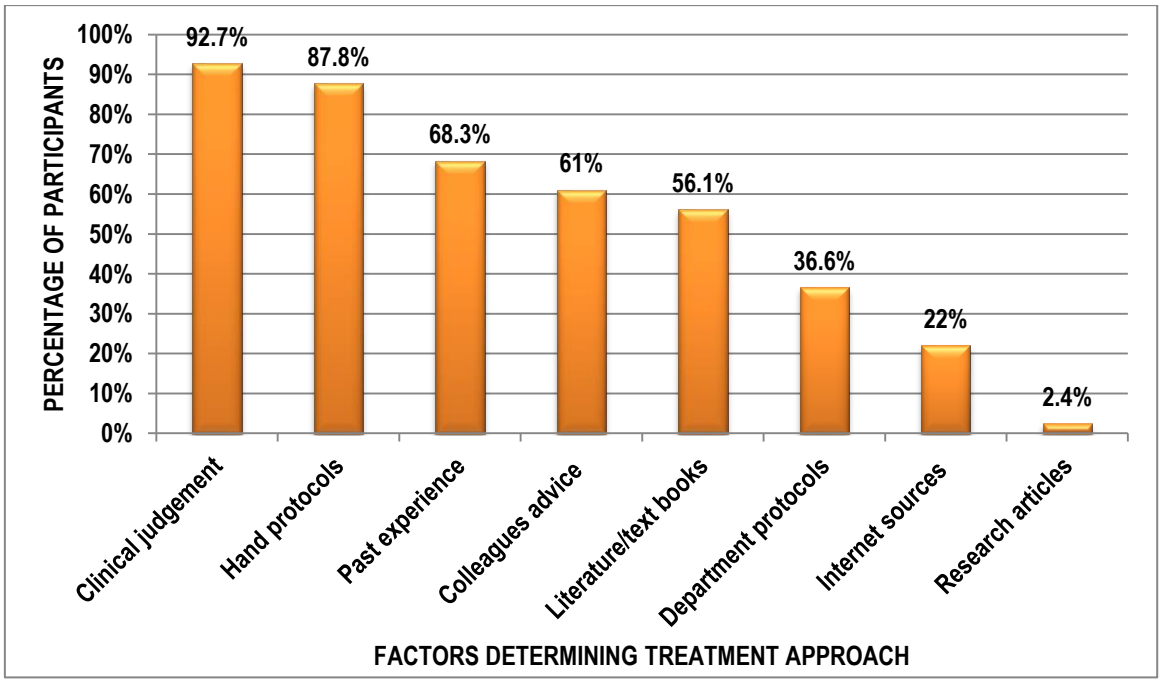

Figure 4.5 Factors determining treatment approach (n=41)

Similarly in the qualitative data, participants highlighted factors including protocols, clinical judgement, and requests from the orthopaedic surgeon.

> *"I still have to go back and read. I'll have a patient in front of me and more than half of the time, I go back and read up protocols, how to manage this [injury], ask [questions], bounce ideas with colleagues."* (participant 1, focus group 2)

4.3.2.4 Treatment

4.3.2.4.1 Treatment time

The duration of treatment was examined in terms of injury, figure 4.6 highlights the duration of treatment for each injury. An average of 30-60 minutes is spent on treatment of a traumatic hand injury.

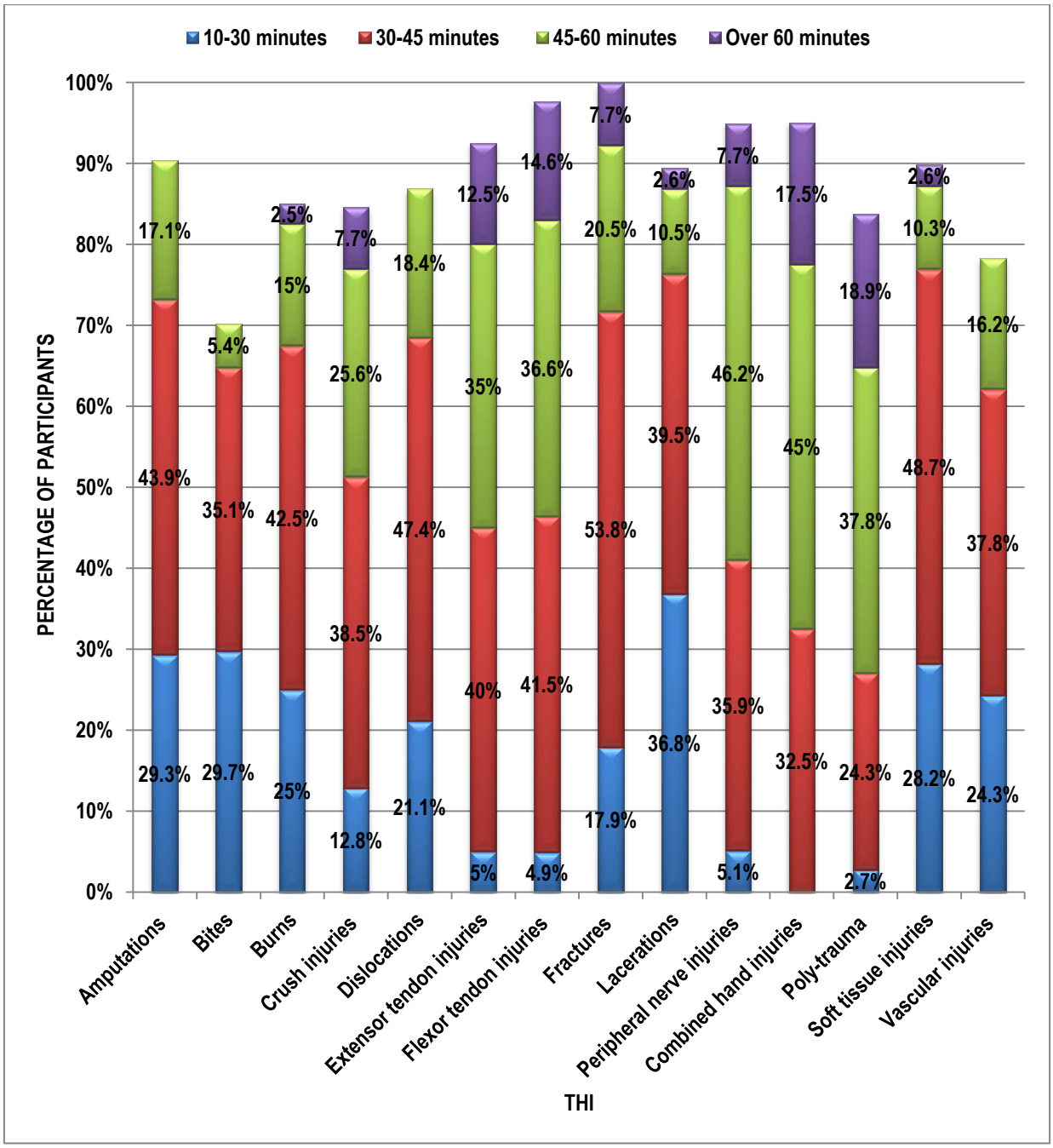

Figure 4.6 Treatment time of traumatic hand injuries (n=41)

The qualitative data showed similar findings with therapists noting the additional time spent making splints or pressure garments. Participants indicated that treatment time is dependent on the patient, complexity of the injury and the therapist.

> *"…general uncomplicated stuff, like plain flexor tendon or maybe a tendon and a fracture or something like that, would probably be like 45minutes to just over an hour. And the more complicated cases you sit with for maybe 2 hours, even 3."* (participant 5, focus group 2)

4.3.2.4.2 Follow up

Follow up appointments are essential in managing a traumatic hand injury; 38.5% (n=15) of the sample schedule follow up appointments within one week of the initial management, and 30.8% (n=12) scheduling it within two weeks. These decisions are based on the type and severity of the condition as well as patient availability. Participants of the focus group expressed their views on how treatment planning, including follow up appointments, should be based on the patient's needs; however occupational therapists level of interest in the condition also plays a role.

> *"If I am not interested in hands at all, I will just do the basics... So it's what interests me or what really drives me. If I thoroughly enjoy working with hands then I might just go all out with this patient, I'll be seeing this patient every 2 weeks or every week. Or if not, I will be like once a month is fine, you can come once a month."* (participant 1, focus group 1)

4.3.2.4.3 Current management of a THI

For this subtheme, data emerged from only the qualitative aspect of this study. Participants highlighted the inadequate management of some traumatic hand injuries by occupational therapists due to lack of knowledge and skill.

> *"I think there are a lot of patients coming back with severe deformities caused by therapists, especially from the outlying hospitals"* (participant 5, focus group 2)

> *"I think it's the hospitals where there are only com serves [community service therapists], mostly the outlying hospitals where there isn't any mentorship and maybe they just aren't interested in hands" (*participant 2, focus group 2)

> *"It appears to be varied depending on the institution. The more urban hospitals have a hub of knowledge that gets shared, and I'm not sure about the further rural hospitals"* (participant 4, focus group 1)

"… a doctor won't take out an appendix if he doesn't know how to do it, isn't it the same ethical dilemma? It's inadequate [the management]. I think everybody sees it, simple diagnosis that gets messed up and puts someone back for the next year of their lives" (participant 5, focus group 2).

The quotes above highlight some of the challenges therapist's experience due to a mismanaged hand injury by a colleague. However, participants expressed that not all hand injuries are ineffectively managed, with a select number of therapists providing appropriate treatment.

4.3.2.5 Challenges experienced with managing a THI

4.3.2.5.1 Resources

Resources were indicated as a major stumbling block with 87.8% (n=36) of the participants reported to have taken resources into consideration prior to managing a traumatic hand injury. Qualitative data shows that some participants feel limited in the treatment they can provide due to the lack of resources. This contradicts the views of other participants who feel that you can do '*amazing stuff*' without resources based on your clinical reasoning. The challenge with resources seems to be a problem in the public sector, more so with the lower level facilities such as community health centres, and district and regional hospitals, rather than tertiary institutions. The root of this problem has been highlighted as mismanagement of the facility, long waiting time for orders, and occupational therapy items are not recognised as a priority.

"It's the management of the clinic [community health care centre] and the fact that occupational therapy is not seen as a priority or a necessity. So hugely funds are given to other departments and things are always running out because we don't have proper management. So it's just poor management" (participant 3, focus group 1)

"The orders just take so long [to arrive] that we run out of material before the next batch comes and then we start turning patients away, not giving them splints or using plaster of paris, which isn't ideal. And so we are very limited in providing the treatment that we could do" (participant 4, focus group 1)

"We go through stages where we recycle splint material …. You have to be creative and think out of the box to try and stick to a protocol that you know is going to work just purely coz you don't have the resources to make it actually make it work" (participant 2, focus group 2)

4.3.2.5.2 Patient compliance factors

This subtheme emerged in the qualitative data as a significant challenge faced by majority of the participants. Compliance factors, as noted by the participants, were language barriers, defaulting appointments, disability grants, and difficulty attending therapy.

"…Coz as soon as people start talking about temporary disability grants, I want to say no. But yet I understand that most of our people are indigent and they need the money, but the moment you throw that grant into the mix, you can say goodbye to that hand. Because people will deliberately not do what they ought to do so that they can keep the grant" (participant 5, focus group 1)

"… the patients compliance to the protocol, sometimes they don't understand, language barrier and sometimes it can be complicated…" (participant 2, focus group 1)

4.3.2.5.3 MDT approach to THI

During the focus groups, participants were invited to comment on the challenges they face when managing a traumatic hand injury; a multidisciplinary team approach emerged as one of the many challenges. One of the major aspects that surfaced was the relationship and communication between the multidisciplinary team. It was found that therapists who had a good relationship with the orthopaedic surgeon had a better rehabilitation outcome than those who did not.

"I think if you have a good working relationship with the doctor, it's actually a huge asset. Coz then you can actually start thinking out of the box and be more creative in your approach" (participant 5, focus group 2)

Hand clinics were found to be particularly useful in a collaborative multidisciplinary team approach, however not every hospital has this service.

"I think a good relationship with the orthopaedic surgeons or doctors makes a big difference and I think that you can see it in those hospitals that have hand clinics where the OT's work together with the doctors, where the doctors are giving you information and you are discussing it openly" (participant 4, focus group 1)

Doctor's knowledge of occupational therapy and the role in hand therapy also poses a challenge. Some participants found communication with other team members to be challenging.

"… it's difficult with communication with the MDT to actually speak to someone on the phone that thinks you giving instructions but you actually just trying to get a multidisciplinary approach for the patient…" (participant 5, focus group 2)

4.3.2.5.4 Referral systems

An MDT approach is crucial as seen in the theme above. In order to have a collaborative approach, a good referral system is needed. Patients with traumatic hand injuries are mostly referred to occupational therapy as outpatients, as noted by 82.9% (n=34) of the participants. This is followed by referrals as an inpatient post-surgical management as reported by 68.3% (n=28) of the participants. Occupational therapists also refer patients to other members of the MDT; 82.9 % (n=34) refer to physiotherapists, 70.7% (n=29) refer to orthopaedic surgeons, 29.3% (n=12) refer to orthotists, and 24.4% (n=10) refer to plastic surgeons. A smaller percentage of the sample refers to other disciplines such as a general practitioner, dietician, psychologist and neurophysiology.

The challenges faced with referrals, which arose in the qualitative data, is that patients do not get referred at all, appropriately or they are referred late. Another challenge with referrals is that therapists prefer not to refer to colleagues at the clinics or rural hospitals due to lack of knowledge, skill and resources.

> *"Sometimes we refer some tendon injuries post op back to their base hospital and often at their base hospital there's com serve [community service] therapists and then they really not sure about the regime or like early complication signs and then when the patient comes back then you picking up contractures, just because maybe the knowledge and skill of the com serve [community service] therapist you sending you patient back to"* (participant 2, focus group 2)

4.3.3 Objective 3: The sources of knowledge as well as knowledge seeking trends of occupational therapists working in the field of hand rehabilitation

4.3.3.1 Sources of knowledge of occupational therapists

Occupational therapists reported having gained their knowledge of traumatic hand injuries from a wide range of sources (Figure 4.7). Hand therapy protocols (77.5%, n=31) and work experience (75%, n=30) were the most common source of knowledge. This was reiterated in the qualitative data where participants stated that they have gained knowledge from experience, trial and error, mentors, peers, postgraduate training, CPD courses, textbooks and protocols. Figure 4.7 portrays the sources of knowledge.

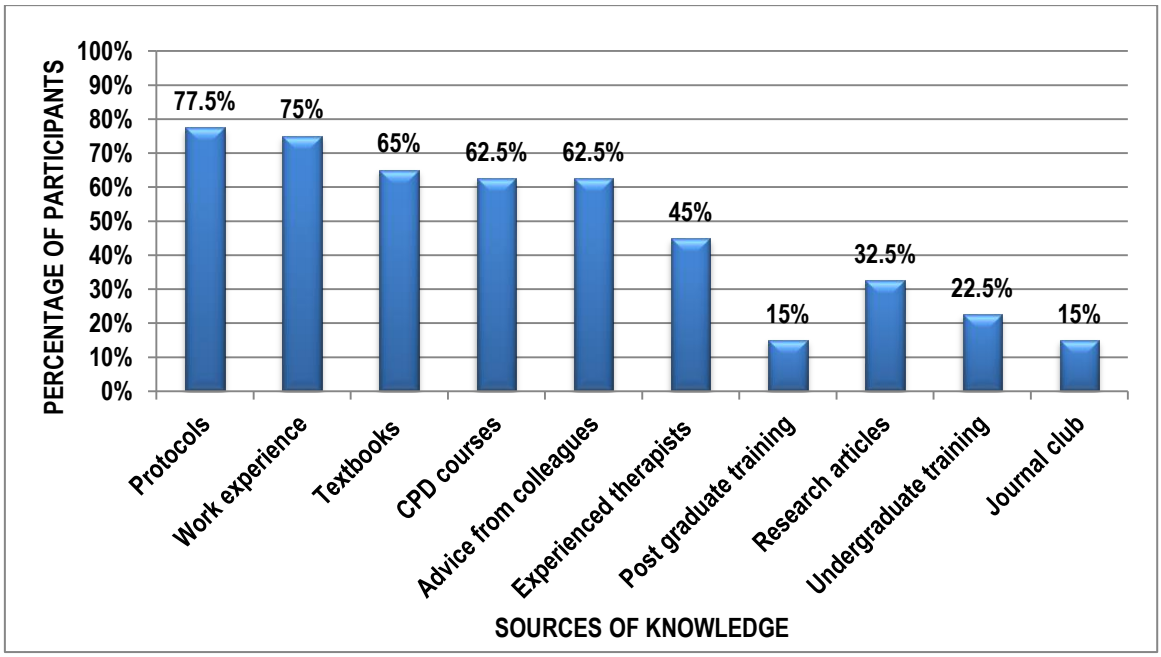

Figure 4.7 Sources of knowledge of occupational therapists (n=40)

4.3.3.2 Knowledge seeking trends of occupational therapists

This study also aimed to identify knowledge seeking trends of occupational therapists in relation to traumatic hand injuries (Figure 4.8). The majority of participants, 85% (n=34), attended workshops and courses to expand their knowledge. This was followed by reading of hand therapy protocols and conducting individual research to bridge knowledge gaps (70%, n=28). 65% (n=26) of the sample sought colleagues' advice when faced with a traumatic hand injury.

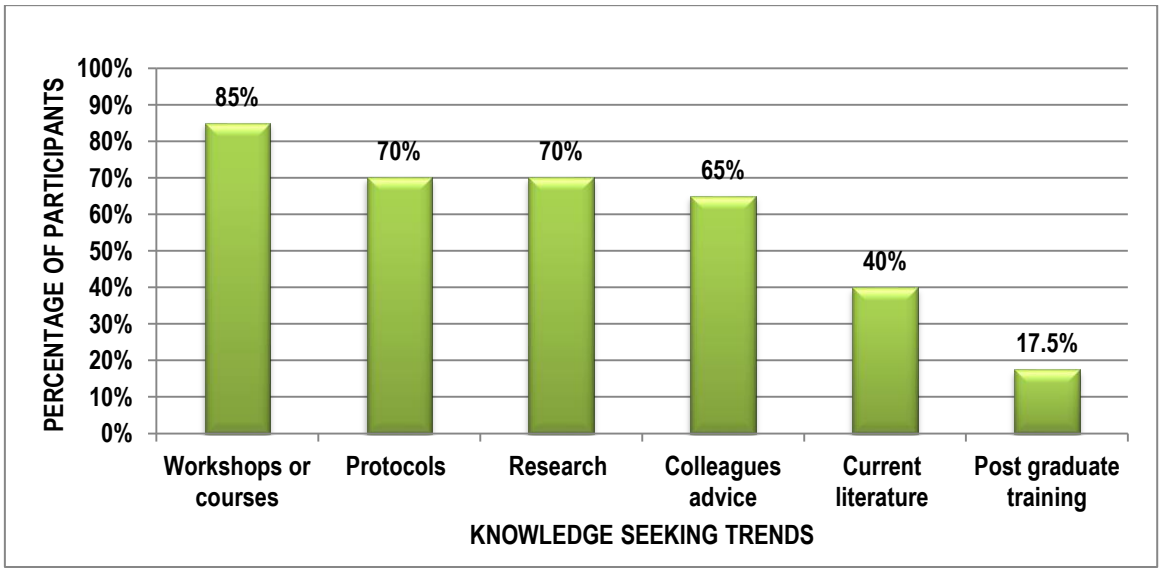

Figure 4.8 Knowledge seeking trends of occupational therapists (n=40)

4.3.4 Objective 4: The perceptions of occupational therapists of their undergraduate training in traumatic hand injuries

Undergraduate training emerged as a factor affecting occupational therapists preparedness for managing a traumatic hand injury. Majority of participants, 73.2% (n=41), perceived their undergraduate training to not have sufficiently prepared them to managed a traumatic hand injury. Participants of the focus group also felt that they were under prepared for independent practice after graduating from their undergraduate programme, especially in the field of hand rehabilitation.

> *"I just feel that varsity didn't teach us enough… it's quite a shame actually to think that OT's are known to treat hand injuries when we don't have enough coming out"* (participant 6, focus group 1).

> *"… during varsity we didn't know like how important OT was when it comes to hand injuries"* (participant 1, focus group 1)

> *"OT is very performance area based….and its difficult with an acute hand when you are working on performance components and not all those activities of daily living"* (participant 5, focus group 2)

There were concerns raised regarding time spent on other aspects with less emphasis placed on essential skills, such as splinting.

> *"Splinting is a unique speciality that forms part of our scope of practice… it's a shame to think how much time we spent on activities, crafts and woodwork when we could have been spending it on splinting"* (participant 4, focus group 1)

The lack of integration of theory into practice was another aspect of concern, where participants felt that study material was provided in separate modules or blocks and there was a gap in the integration.

> *"… I think the gap was, you would do splinting in one session and then you would do like the conditions. But you would never put them together… so maybe it's that practical aspect [that's lacking]"* (participant 2, focus group 2)

Some individuals (9.8%, n=41) were undecided about their preparedness and 17.1% (n=41) perceived their training to be adequate.

> *"I think it's good that they go through your splinting principles and all of those things"* (participant 5, focus group 2)

> *"…the theory was very good [at varsity]"* (participant 5, focus group 1)

> *"…I feel that my assessment of the hand was more or less adequate from my training"* (participant 4, focus group 1)

Although participants expressed both promotive and inhibitive views of the undergraduate training, they also suggested ways to enhance the programme in order to better prepare therapists for independent practice. An idea to merge theory and fieldwork was to teach theory on a specific condition, then have a patient come in for observation so as to provide a better understanding for students. Block placements, especially in hand rehabilitation, were noted as one of the ways forward. These will provide a solid foundation on which students may build on.

> *"… if they had a set up where you booked one of each condition for the day, the day before you do your theory and the next day the patient comes"*
> (participant 5, focus group 2)

> *"I think they need a one week block, like hand therapy block where you are just doing hands or you exposed to a hand clinic or some experienced hand therapists…"* (participant 2, focus group 2)

> *"…and that's why it's important to place students in settings where there are hand patients so in their fieldwork blocks, they are getting that exposure"*
> (participant 4, focus group 1)

> *"…prepare students for what is happening out there…"* (participant 2, focus group 1)

4.3.5 Objective 5: The perceptions of occupational therapists on their feelings of confidence and preparedness to assess and manage traumatic hand injuries

Occupational therapists were requested to rank their confidence levels on their abilities to assess and manage a common traumatic hand injury as well as an uncommon one; the majority of participants stated that they feel more prepared to manage a common injury, as depicted in figure 4.9. Furthermore therapists stated that most of their confidence has come from further training and experience rather than their undergraduate training.

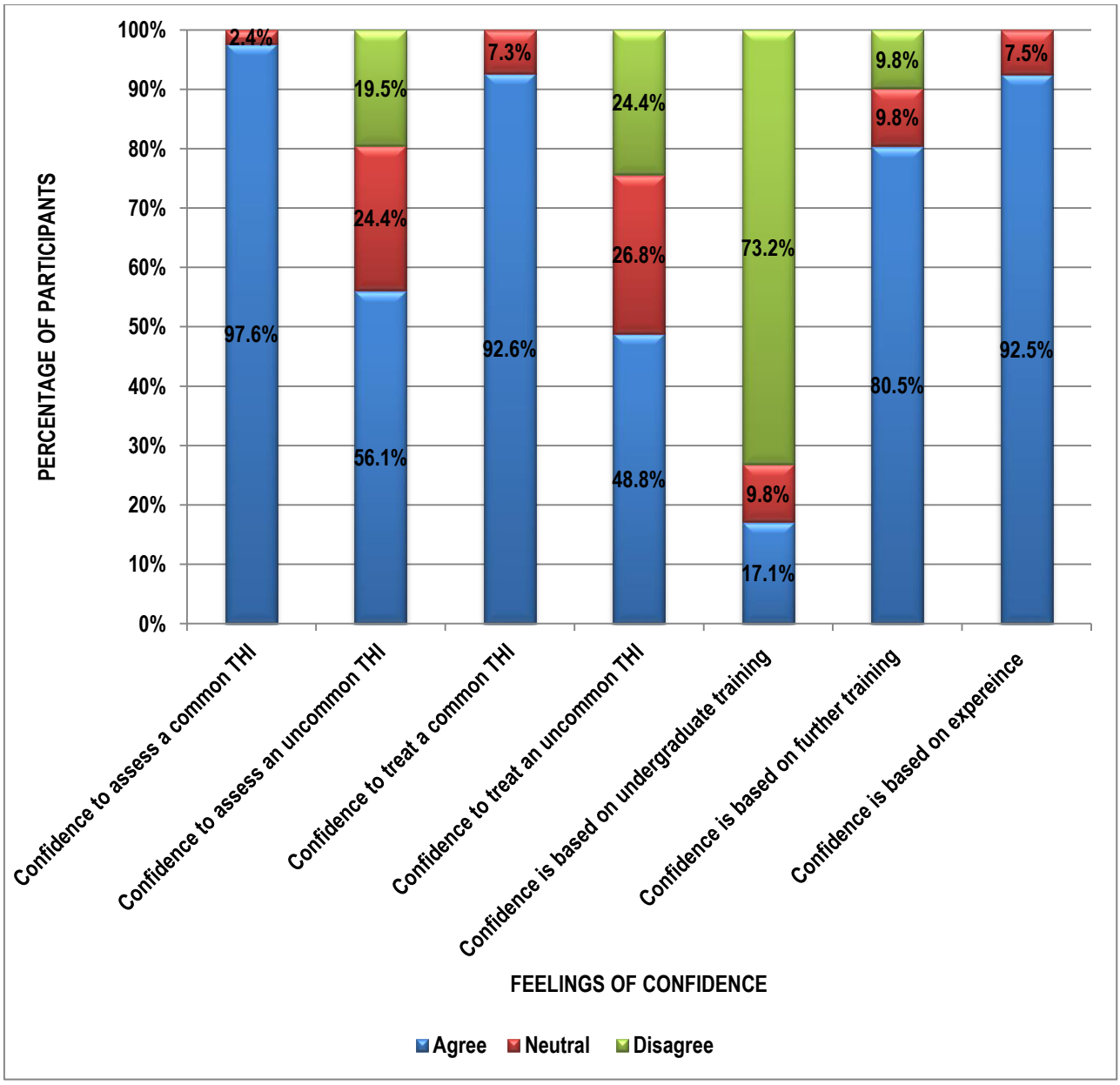

Figure 4.9 Feelings of confidence and preparedness for practice (n=41)

Facilitating and encumbering feelings emerged from the qualitative data regarding preparedness for practice. Participants were in agreement that confidence comes with experience.

> *"So I think that with time you get less anxious about it, it becomes more of an interesting challenge"* (participant 5, focus group 2)

> *"... you never get to a point where you know everything coz then you have to ask yourself, do you really know everything"* (participant 5, focus group 2)

4.3.6 Objective 6: What occupational therapists consider essential in the management of traumatic hand injuries

There were numerous elements outlined by therapists as being essential in practice; 87.8% (n=36) of the sample considered adequate theoretical knowledge, adequate practical experience and protocols, procedures and guidelines to be the most essential components in effectively managing a traumatic hand injury. This was followed by adequate training as noted by 78% (n=32) and adequate mentorship by 70.7% (n=29). Individual therapists also acknowledged adequate undergraduate training and a cautious attitude, communication with the MDT, adequate resources, adequate home programmes, patient compliance, good relationship with the referring specialist, and knowledge of evidence based practice as essential in the management of a traumatic hand injury. Figure 4.10 outlines what majority of occupational therapists in the sample consider essential in practice.

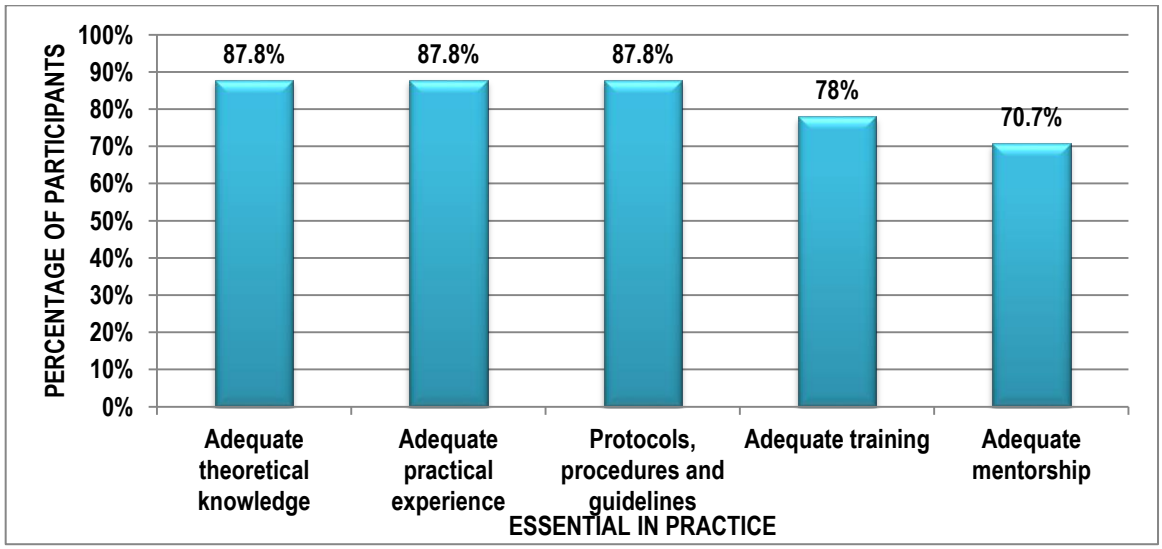

Figure 4.10 What occupational therapists consider essential in practice (n=41)

The qualitative data showed that participants saw basic splinting principles, assessment skills, knowledge of conditions, and extensive knowledge of anatomy as essential in the management of a traumatic hand injury.

> *"…knowledge is supposed to humble you, the more you know, the more you know you actually don't know much. So I think that continuous process, that you never get arrogant about it, that you always know that you are going to be surprised and the deeper you go in, the more surprises you are going to get, the more exceptions to the rules you are going to get, and get comfortable with that. And exactly that approach, that you need to just continuously go back to the protocols, go back to the research and try to integrate that with the patient in front of you"* (participant 5, focus group 2)

4.4 SUMMARY

Chapter 4 provided the integrated findings of both quantitative and qualitative data. Although participating therapists may represent a minority in KwaZulu-Natal, it is evident that traumatic hand injuries pose a major burden in the province despite the limited literature available.

Participants in this study were predominantly between the ages of 20 and 30, with one to five years of experience in the field of hand rehabilitation and had a bachelor's degree in occupational therapy. Flexor tendon injuries emerged as the most common traumatic hand injury seen by occupational therapists in KwaZulu-Natal, followed by fractures, extensor tendon injuries and combined hand injuries. Participants perceived that their undergraduate occupational therapy training did not sufficiently prepare them for clinical practice, especially in the field of hand rehabilitation. They felt more prepared to deal with common traumatic hand injuries and expressed that confidence comes with experience and further training. Therapists working with traumatic hand injuries rely on hand protocols, courses and experience to manage these cases. The management of these injuries differ between therapist's, however majority of the sample attended to a traumatic hand on the same day of referral, used informal assessments, spent 30 – 60 minutes with the patient and scheduled a follow up within 1 – 2 weeks. Conditional reasoning was the basis for most treatment planning, with other factors such as knowledge of the condition, resources,

experience and competency also being taken into consideration. Clinical judgement and protocols were used by most of the sample to guide treatment. Therapists also experience many challenges in this regard such as resources, patient compliance, multidisciplinary teams and referral systems. Occupational therapists in this study considered theoretical knowledge, practical experience, as well as protocols, procedures and guidelines to be essential in practice in the field of hand rehabilitation. The next chapter discusses the findings of this research whilst reflecting on published literature in the field.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

This chapter discusses the findings outlined in chapter four on traumatic hand injuries in KwaZulu-Natal and occupational therapists perceived ability to effectively manage these injuries. The findings will be discussed in context of the literature reviewed, and the theoretical framework. This chapter is presented according to participant demographics as well as the objectives of the study as outlined in Figure 4.1, which will allow interpretations from the findings to answer each objective and assist with appropriate recommendations.

5.2 PARTICIPANT INFORMATION

South Africa, in its diverse nature, is too broad an area to conduct such an in-depth study, hence one province was selected in order to gain a comprehensive understanding of the burden and challenges faced by occupational therapists working with hand trauma in that specific province.

Participants for both phases of the research fell into similar categories; the majority were between the ages of 20 and 30 years, with one to five years of experience as an occupational therapist, having obtained a bachelor's undergraduate degree from the University of KwaZulu-Natal and being predominantly employed in the public health care sector. This indicates that the majority of participants were fairly new to the profession with minimal experience in field, allowing a fairly recent and objective view of their undergraduate training experience and their perception of hand trauma rehabilitation. Within the public health care sector, participants were predominantly employed in regional and tertiary hospitals which offer specialised services, providing greater exposure to a wide range of conditions. The private sector was a minority in this sample which can be attributed to therapists being primarily employed in the public health care sector; with 245 occupational therapists recorded in this sector in 2015 (Watson, 2015). There was also a

connection identified between recent graduates and experienced therapists in terms of the management of a traumatic hand injury, confidence and experience. Experienced therapists appeared more confident in managing a traumatic hand injury as compared to new graduates. Although the response rate and participant categories may have influenced the study findings, it still contributes meaningfully to understanding traumatic hand injuries in KwaZulu-Natal from an occupational therapy perspective.

5.3 DISCUSSION UNDER STUDY OBJECTIVES

5.3.1 Objective 1: To determine the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal

Hand trauma is increasingly common as the hand is fundamental in daily activities and is thus easily exposed to injury. Hand trauma is under-researched in South Africa with limited literature available. The first objective of this study was to determine the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal in order to better inform practice of these injuries.

Hand trauma is rife in KwaZulu-Natal with participants employed in public regional hospitals attending to over 21 hand trauma patients per month. Of the 14 traumatic hand injuries presented in the survey, flexor tendon injuries emerged as the most common followed closely by fractures, extensor tendon injuries and combined hand injuries. Griffin et al. (2012) suggests that the reason flexor tendons are so frequently injured is due to their close proximity to the skin allowing ease of injury. Given the commonality of this injury, it is also considered to be one of the more complex hand injuries posing a challenge for both orthopaedic surgeons and occupational therapists (Griffin et al., 2012; Powell & von der Hyde, 2014). Flexor tendon injuries, however, did not emerge as the most common traumatic hand injury in the literature perused. Extensor tendon injuries were found to be more common in an American study, which contradicts the findings of this research which shows that flexor tendons are 14.6% more common than extensor tendons (De Jong et al., 2015). Given the violent nature of South Africa, it cannot be compared to America where violence only accounted for 6.4% of the tendon injuries (De Jong et al., 2015). Fractures, however, were found to be predominant in two studies which are in accordance with this research, but the least common in another (Angermann et al., 1993; Gupta et al., 2013;

Makobore et al., 2015). The variability of these statistics may be accounted for by the country or the time frame in which the sample was collected.

Traumatic hand injuries are also not found in isolation; combined hand injuries in the context of this study refers to damage to two anatomic structures (such as a tendon and a nerve, a bone and a tendon, etc.); which was found to be one of the more common injuries. Although participants did not comment on the type of combination injury, it can be assumed that it would be structures in close proximity to one another, which is supported by an Indian study which established that lacerations, tendon injuries, fractures and vascular injuries can be found together (Gupta et al., 2013).

South Africa has a history of turmoil and widespread violence (Hardcastle et al., 2013). In 2011, the leading causes of hospital admissions in KwaZulu-Natal were assault, accidental injuries and motor vehicle accidents; with the trauma load in the public sector approximately 120 706 in 2012 (KZN Department of Health, 2015). These statistics, however, are not specific to hand trauma but shows the burden of trauma in the province. Varying data regarding the prevalence of hand trauma emerged from the literature but it appears to be specific to each country, thus cannot be generalised to South Africa (De Jong et al., 2014; Gupta et al., 2013; Hardcastle et al., 2013; Makabore et al., 2015; Schöffl et al., 2012; Tuncali et al., 2005). The findings of this research are specific to KwaZulu-Natal and may assist in informing practice in the field of hand rehabilitation.

5.3.2 Objective 2: To determine what the current trends and practices are of occupational therapists working in the field of hand rehabilitation

The main aim of occupational therapy in the management of hand conditions is to rehabilitate the hand in order to enable functional independence and return to pre-morbid functioning (Case-Smith, 2003; De Klerk et al., 2006). Although occupational therapy training is similar, each therapist is unique and their practice styles differ. The second objective of this study was to determine the current trends and practices of occupational therapists working in the field of hand rehabilitation in KwaZulu-Natal.

Assessment, treatment planning and treatment are all integral steps in the management process. Participants in this research reportedly attend to each traumatic hand injury on the same day of the referral for the initial management. Informal assessments are carried out

on that initial visit and on all subsequent sessions in order to determine progress, with the occasional standardised test being administered. Once the initial assessment is completed, treatment planning can commence with the appropriate approach and all contributing factors being taken into consideration.

Treatment planning can be daunting, and therapists are occasionally apprehensive about the rehabilitation process (Mncube & Puckree, 2014). Clinical reasoning is a thought process therapists engage in so as to integrate information and compose specific treatment plans (Royeen et al., 2001). It is used by health professionals to deal with complex, unique or ambiguous cases presented to them (Creek & Lawson-Porter, 2007). Conditional reasoning, a type of clinical reasoning, was found to be the most common amongst therapists in KwaZulu-Natal. Conditional reasoning is a multidimensional process, considering a patient in their physical and social context within the constraints of their injury, taking into account their premorbid functioning, current condition as well as their expected prognosis (Coppard and Lohman, 2008). With traumatic hand injuries, therapists using this form of reasoning will consider the current condition of the hand and the impact it has on the patient's life, foresee the possible outcome of the hand injury after the acute stage, and predict the result of the treatment plan.

Ideal treatment planning based on clinical reasoning is not always possible; certain factors need to be taken into consideration prior to implementation of treatment. Participants in this study took knowledge and experience of the condition, competency in managing the condition, as well as available resources, and time available into consideration as part of their treatment planning. Correspondingly, Mncube & Puckree (2014) found that therapists considered availability of protocols, experience of the therapist, needs of the patient and demands of the employment setting.

The treatment of hand injuries should consider a person holistically, taking into account their roles, needs and goals (De Klerk et al., 2016). Participants primarily use clinical judgement and hand therapy protocols to guide their treatment approach. A combination of these two would be ideal; with protocols providing the outline of treatment and clinical judgement assisting with adapting the protocol to the patient's individual needs. Therapists reported to spend an average of 30 to 60 minutes on the treatment of a hand injury, which is dependent on the type of injury, the severity of the injury, the stage of recovery the patient is in and devices that need to be fabricated. Case-Smith (2003) indicated that

patients in her sample received approximately 13 hours of occupational therapy intervention. Follow up intervention is a necessity when managing a traumatic hand injury, as once off treatment is not sufficient to rehabilitate a hand. Participants in this study generally schedule repeat appointments between one to two weeks from the initial assessment, taking into consideration the patient's needs, financial constraints, and work load of the therapists. In another South African study, therapists believed that appointments should be scheduled bi-weekly but this was identified as a challenge (Mncube & Puckree, 2014). In an ideal situation, bi-weekly or even daily appointments will be extremely beneficial to patients but this is not possible in the South African context due to time, resources and financial constraints.

Hand injuries are complex on their own, but the occupational therapy management of these injuries come with their own set of challenges. Therapists identified some of the challenges they experience as limited resources, patient compliance factors and the multidisciplinary team. Resources in terms of equipment, consumables and staff compliment were raised as a major concern with therapists as this impacts service delivery. South African therapists are faced with large caseloads, swift turnover of referrals, limited space and resources (De Klerk et al., 2016). Precise treatment planning, effective implementation as well as fabrication of devices will all be unsuccessful unless the patient is compliant. Compliance is affected by numerous factors such as the patient-practitioner language barrier, difficulty attending therapy due to financial constraints, possibility of receiving a disability grant, as well as patient attitudes. Similarly, De Klerk et al. (2016) found that financial constraints and difficulty with transport affected follow up appointments, and language is definitely a contributing barrier. Effective care is also dependent on a multidisciplinary team approach. Participants expressed communication to be the underlying problem with team care; as each department, be it orthopaedics, occupational therapy, physiotherapy or others, have their own set of procedures and these may not necessarily be in accordance with the others. Although many of the institutions that participants are employed at have orthopaedic clinics, there is no collaboration with the multidisciplinary team resulting in poor team management of the traumatic hand injury. De Klerk et al. (2016) indicated that one of the challenges with the multidisciplinary team was the expectations and dictations from doctors regarding occupational therapy intervention. Despite the challenges, participants report to provide efficient management within their constraints.

The current trend and practices of occupational therapists working in hand rehabilitation appears to differ between therapists, showing that there is not necessarily one correct method of intervention, however a few common trends have emerged in this study. The best outcome for the patient is dependent on appropriate planning and implementations of treatment, taking into account the relevant protocols and precautions.

5.3.3 Objective 3: To determine the sources of knowledge as well as knowledge seeking trends of occupational therapists working in the field of hand rehabilitation in KwaZulu-Natal

Occupational therapy practice of traumatic hand injuries is influenced by intrinsic and extrinsic factors, as outlined in the PEOP model in chapter 2. Intrinsic factors in this context refers to the sources of knowledge of traumatic hand injuries as well as the knowledge seeking trends, and extrinsic factors to opportunities available to improve knowledge such as undergraduate training, further training and CPD activities (Figure 2.1). The third objective of this study was to explore both intrinsic and extrinsic factors, by determining the sources of knowledge and knowledge seeking trends of occupational therapists working in the field of hand rehabilitation in KwaZulu-Natal.

Of the ten sources of knowledge presented in the survey, hand therapy protocols and work experience were rated as the most common amongst participants. Hand therapy protocols are essential for practice, especially for inexperienced or novice therapists. These protocols outline treatment strategies as well as precautions to be taken with each injury. It is therefore important to have updated protocols using the foundation of evidence based practice. Some participants noted that accessible protocols are out-dated and they had increasing difficulty in attaining current ones. Participants are therefore using protocols that are available to them, which may not necessarily be the most current or best possible option for the patient. Health care is constantly developing with regular advancements being made in the field, it is thus imperative for therapists to keep updated with these developments in order to provide optimum patient care (Jiandani et al., 2015). Participants ranked undergraduate training as one of the lowest sources of their knowledge of traumatic hand injuries, suggesting that their undergraduate training did not adequately prepare them for the management of these injuries.

Knowledge seeking trends varied amongst therapists, with different individuals preferring different learning styles. The most common knowledge seeking trend, however, was attending workshops or courses related to hand rehabilitation. CPD is a valued activity; it is a way for therapists to satisfy their personal and professional needs in order to meet their career goals (Fleet et al., 2008; Schostak et al., 2010). This may possibly be the reason why therapists choose to engage in CPD courses above all else to gain knowledge. The least common trend was post graduate training and the reason for this was not clear. It may be due to the time required to complete the training, cost of the training or minimal opportunity for growth in the public health care system once qualified.

Knowledge is powerful, especially so when it improves ones clinical ability and interpersonal skills. The choice of how to gain and expand on knowledge is personal, but it should form a part of everyday practice in order to provide the best possible care and achieve individual fulfilment.

5.3.4 Objective 4: To describe the perceptions of occupational therapists of their undergraduate training in traumatic hand injuries

Undergraduate training is the foundation upon which therapists build their careers. It allows for opportunities to learn, think critically and guides towards the development of competence (Alsop & Lloyd, 2002). If they perceive their training to be inefficient in certain areas, therapists will lack confidence and be reluctant to practice in those areas. A lack of confidence is an area of concern, as there is a direct relationship between confidence and competence as an occupational therapist (Holland et al., 2013). Doherty et al. (2009) speculated that employment choices were directly related to an individual's fieldwork experiences. The fourth objective of this study was to examine and describe occupational therapists perceptions of their undergraduate training in traumatic hand injuries.

It was established that confidence and ease of management of a traumatic hand injury comes with experience and adequate clinical reasoning, but the root of knowledge emerges from the undergraduate training. The perception of most of the participants was that their undergraduate training did not adequately prepare them for the management of traumatic hand injuries and felt that more emphasis should be placed on hand therapy in the

undergraduate curriculum. Other studies found that the students perceptions of their professional training was satisfactory and prepared them to fulfil their work requirements, with confidence in their clinical reasoning abilities (Doherty et al., 2009; Gray et al., 2012; Hodgetts et al., 2007). However, this is a reflection on occupational therapy as a whole and not purely hand rehabilitation. Gray et al. (2012) also established that hand rehabilitation was the practice area that graduates felt least prepared in. A portion of participants in this research, however, perceived their training to be adequate in hand rehabilitation. This discrepancy may be accounted for by the institute in which they completed their undergraduate training or the period in which they trained. Although the WFOT has standards for training institutes, the amount of time that should be spent on conditions are not specified, and each occupational therapy programme in South African has a unique curriculum.

Participants in this research perceived the gaps in hand therapy in their undergraduate training to be a lack of integration of theory into practice and less emphasis on essential skills. Similarly, Doherty et al. (2009) found that time spent on developing practical skills was restricted which was a limitation in the curriculum. Integration of theoretical knowledge and clinical practice is therefore imperative, and will assist with feelings of confidence upon graduation (Hodgetts et al., 2007). Novice occupational therapists in South Africa are required to fulfil a year of community service at a facility within the Department of Health; they may be placed at a facility with one or more occupational therapists, or will be required to function on their own with minimal mentorship (Holland et al., 2013). If these new graduates are placed in a facility on their own, they need to be efficiently prepared to deal with a wide variety of conditions, especially in hand therapy.

Participants suggested ways in which the curriculum could be possibly adapted, such as block placements, patient observation and more emphasis on hand rehabilitation, in order to better prepare them for the context awaiting them. This is in keeping with views of other researchers who proposed that on-going curriculum reviews and evaluations are crucial in the development of the profession (Hodgetts et al., 2007; Naidoo et al., 2014).

5.3.5 Objective 5: To describe the perceptions of occupational therapists of their feelings of confidence and preparedness to assess and manage traumatic hand injuries

Confidence and preparedness are necessary in any profession, but especially so in health care. Although undergraduate training plays an important role in the development of these attitudes, it is only properly established after qualification. Confidence may be gained through further academic training, fieldwork education, lecturing, engaging in research opportunities as well as other educational tasks (Alsop & Lloyd, 2002). The fifth objective of this study was to describe the perceptions of occupational therapists regarding their feelings of confidence and preparedness to assess and manage a traumatic hand injury.

Assessment and management of traumatic hand injuries were examined in terms of common and uncommon injuries seen by occupational therapists. Participants felt more confident in their abilities to manage the more common injuries that formed basic practice which is similar to another South African study where participants were more confident with basic practice (Naidoo et al., 2014). Hand therapy, however, is not considered basic practice; it is a specialist area in occupational therapy (Amini, 2011).

Undergraduate training was not flagged as a key area in developing confidence and preparedness in the current study. Participants in this research indicated that their confidence comes from further training and experience. Similarly, Hodgetts et al. (2007) found that feelings of confidence in clinical skills were only being established between six months and two years after qualification with a steady increase thereafter. Experience appears to be essential in the development of confidence and preparedness. Experience is, however, only gained with time and working in a setting with a high exposure to different conditions. It is thus expected that newly qualified therapists experience feelings of inadequacy especially if placed in an unsupported environment for their community placement. The Department of Health considers new occupational therapists as qualified and competent to assume their role in the community, hence no formal mentorship is offered (Holland et al., 2013). If a mentorship or support programme was put into place by the Department of Health, it would ease the transition from student to therapist and assist with developing feelings of confidence and preparedness for practice.

5.3.6 Objective 6: To determine what occupational therapists consider essential in the management of traumatic hand injuries

Rehabilitation is undoubtedly important in the management of traumatic hand injuries, but therapists may be daunted by the intervention plan, skills required and clinical reasoning (Powell & von der Hyde, 2014). There are certain skills an occupational therapist ought to have, that are deemed necessary in the effective management of these injuries. The sixth objective of this study was to determine what occupational therapists consider essential in the management of traumatic hand injuries.

Participants in this study considered adequate theoretical knowledge, practical experience, protocols, efficient training, and mentorship as prerequisites for working with a traumatic hand injury. Although some of these skills form the foundation of practice, others are gained over time. It is thus important for therapists to not engage in tasks that are beyond their current competence (Hodgetts et al., 2007). Although patients cannot be turned away, as patient care is the utmost priority, there are many options for therapists who are overwhelmed by these injuries such as referring to more qualified practitioners, liaising with an experienced therapist or adequately researching the appropriate management. Clinical competence may be developed by knowing ones limitations and accepting that one cannot know everything (Hodgetts et al., 2007).

Knowledge, the basis of all treatment, is the core of the management of traumatic hand injuries. De Klerk et al. (2016), looking at occupation based hand therapy, found that there may be limitations in therapists knowledge of assessment and treatment approaches. Therapist's knowledge is constantly expanding; with theory being an important factor in guiding practice (Hodgetts et al., 2007).

Second to knowledge, practical experience is essential in treating a traumatic hand injury. Practical skills are constantly developing, commencing from fieldwork as a student to independent practice as a qualified therapist. Fieldwork placements are crucial in providing practical experience, with acute and block placements proving to be more beneficial (Doherty et al., 2009; Mulholland et al., 2004). Students were found to be lacking practical skills due to limited time spent on developing these skills (Doherty et al., 2009; Gray et al., 2012). It is thus important to place students in fieldwork settings that allow for exposure to a wide range of conditions, especially hand injuries so that they may gain skills in a protected environment.

Participants further expressed views that they would prefer less focus on theory and more on intervention strategies in their undergraduate training; and although educational programmes cannot fully prepare them for practice; it is their responsibility to integrate them into the profession (Hodgetts et al., 2007; Mulholland et al., 2004). Through an improved curriculum, occupational therapists confidence in their practice can be improved (Naidoo et al., 2014).

Participants in this study reasoned that these are the necessary skills for the effective management of a traumatic hand injury. However, every therapist is unique and may consider additional abilities as essential. These skills should form the basis of hand therapy rehabilitation with the opportunity to develop further skills in this specialised area of practice.

5.4 SUMMARY

Confidence, efficacy and preparedness to manage a traumatic hand injury appear to emerge with experience in the field. Experience, exposure to new trends, continuous professional development, use of established protocols and compliance to minimal standards forms the baseline of management (Mncube & Puckree, 2014). This chapter has discussed flexor tendon injuries as the most common traumatic hand injury in the province, the current assessment, clinical reasoning and treatment practices of occupational therapists, hand therapy protocols as the greatest source of knowledge, workshops as the activity of choice to gain knowledge, therapists perceptions of their undergraduate training in traumatic hand injuries, and the essential skills deemed necessary to efficiently manage a traumatic hand injury. All objectives were discussed in terms of the findings of this study, literature perused and framework utilised. In chapter six, the conclusion and recommendations on the study will be presented.

CHAPTER 6

CONCLUSION

6.1 INTRODUCTION

This study titled "*Taking a hold of hand trauma in KZN*" explored the most common traumatic hand injuries in the province and occupational therapists perceived preparedness to manage these injuries effectively. This chapter outlines the conclusions drawn by the researcher, limitations of the study and recommendations made based on the evidence gathered in the research.

6.2 OVERVIEW AND SUMMARY OF KEY FINDINGS

The intention of this study was to explore traumatic hand injuries in KwaZulu-Natal from an occupational therapy perspective as well as occupational therapists perceptions of their training, experience and needs. A mixed methods study was undertaken in order to explore these areas, so as to gain an overview from the occupational therapy population in the province, as well as a comprehensive understanding from a select sample of therapists. Therapists working in the field of hand rehabilitation were recruited to participate in this study.

Tendon injuries, fractures and combined hand injuries were found to be more common in the province as compared to other traumatic hand injuries, possibly due to the widespread violence in KwaZulu-Natal. With trauma being so prevalent in the province, hand trauma is inevitable and thus hand therapy should be an area of focus for occupational therapists and occupational therapy training programmes. However, participants believed that their undergraduate training programme insufficiently prepared them in the field of hand rehabilitation. This impacted their feelings of confidence and preparedness in managing a traumatic hand injury, affecting overall patient care. Although undergraduate training provided the baseline of knowledge, therapists rated it as the least sources of knowledge in traumatic hand injuries, with them relying on hand therapy protocols, CPD training and work experience to advance their knowledge. The current practices of these injuries vary

depending on patient as well as therapist factors. Therapists appeared to predominantly use conditional reasoning whilst considering the challenges experienced, in order to provide optimum patient care. Sufficient theoretical knowledge, suitable practical experience, hand therapy protocols, efficient training, and adequate mentorship were identified as essential in the management of a traumatic hand injury. Experience in hand rehabilitation emerged as the main theme from this research, proving its imperative role in the development of a confident and competent occupational therapist.

6.3 SIGNIFICANCE OF STUDY

Based on the literature reviewed, there has been a lack of research on hand trauma in the province. Statistics available on trauma as a whole are substantial, but no South African study was found on the burden of hand trauma. This study will contribute to literature on hand trauma in the province, and although it does not provide statistics, it shows the descriptive nature of these injuries and how they are managed.

Occupational therapists in KwaZulu-Natal appear underprepared to manage a traumatic hand injury. By identifying the common traumatic hand injuries in the province as well as therapists perceptions of their undergraduate training, educational curriculum may be adapted so as to produce more competent therapists and better prepare them for practice.

Experience is essential; however there are other skills that therapists require in the management of these injuries. By exploring what therapists working in the field of hand rehabilitation consider essential in practice, therapists can engage in further educational activities in order to develop these skills believed to be necessary.

This research provides valuable information to literature on hand trauma in the province and could be used to inform undergraduate curriculum reviews and occupational therapy management of traumatic hand injuries.

6.4 STUDY LIMITATIONS

Although the aim of the study was achieved, there were significant limitations experienced during the research process. These were as follows:

- This study only considered occupational therapists in KwaZulu-Natal; and although this provides a comprehensive understanding of hand trauma in the province, it cannot be generalised to other provinces in South Africa.
- The exact number of therapists working in hand rehabilitation could not be established as there is no data base providing these statistics. Consequently, the target population could not be ascertained, affecting the calculation of the sample size.
- There are many occupational therapists in KwaZulu-Natal, as outlined in chapter 3, but the participation rate was poor affecting the sample size. And although occupational therapists may have worked with traumatic hand injuries at some point in their career, it was important to gauge what is currently occurring in the province, in terms of hand rehabilitation, therefore a stipulated time frame of one year was appointed to questions in the survey, which also affected the sample size. A combination of these factors resulted in a small sample size.
- Due to the broad nature of the study, the survey used was extensive and therapists may have been unwilling to complete it due to time restrictions.
- Only two focus groups were conducted in two districts which limit the findings in other districts.
- For the focus groups, only therapists employed in the public health sector were used due to convenience sampling, which may have skewed the study findings.

6.5 RECOMMENDATIONS

A number of recommendations are made based on the outcomes of the study:

- This research provided valuable information on hand trauma but is only specific to the context of KwaZulu-Natal. Similar research in other provinces in South Africa may be beneficial to inform practice.

- A review of the undergraduate occupational therapy hand rehabilitation curriculum is recommended based on the findings of this study, to include more theoretical information as well as supervised practical experience with traumatic hand injuries.
- Occupational therapy students to be placed predominantly at acute institutions with exposure to hand injuries for their practical training, especially in their final year of study, in order to gain practical experience.
- Mentorship or support programmes for novice occupational therapists by the Department of Health, so as to better prepare them for practice.
- Clinical guidelines or protocols for the management of traumatic hand injuries should be updated and readily available to occupational therapists.

6.6 CONCLUSION

This study provided greater insight into traumatic hand injuries and their occupational therapy management in the province. It showed the common traumatic hand injuries seen by occupational therapists in the province and their perceived preparedness to manage these injuries. Challenges facing therapists in the province were explored and possible strategies to improve occupational therapy management were suggested, for therapists as well as the undergraduate training programmes, in order improve the outcome of traumatic hand injuries. Hand trauma is rife in KwaZulu-Natal and occupational therapists, being known as hand therapists, need to be prepared to deal with such injuries, either from their undergraduate training or further studies. Occupational therapists, working in a collaborative team, can make a difference in the lives of patients with traumatic hand injuries.

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ANNEXURES

Annexure 1: UKZN ethical clearance: The Biomedical Research Ethics Committee

Annexure 2: KwaZulu-Natal Department of Health ethical clearance: R.K.Khan Hospital

Annexure 3: KwaZulu-Natal Department of Health ethical clearance: Greys Hospital

Annexure 4: Gatekeeper permission: R.K.Khan Hospital

Annexure 5: Gatekeeper permission: Greys Hospital

Annexure 6: Ethics certificate: The National Institute of Health Office

Annexure 7: Information document for survey

Annexure 8: Information document for focus groups

Annexure 9: Survey

Annexure 10: Focus group schedule

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Annexure 1: UKZN ethical clearance: The Biomedical Research Ethics Committee

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

06 May 2016

Ms J Naidoo (208501399)
Discipline of Occupational Therapy
School Of Health Sciences
jenousha@yahoo.com

Protocol: Taking a hand of hold trauma in KwaZulu-Natal.
Degree: M Occupational Therapy
***BREC reference* number:** BE203/16

The Biomedical Research Ethics Committee has considered and noted your application received on 04 March 2016.

The study was provisionally approved pending appropriate responses to queries raised. Your response received on 21 April 2016 to queries raised on 14 April 2016 have been noted and approved by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given **full ethics approval**.

This approval is valid for one year from **06 May 2016.** To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be **RATIFIED** by a full Committee at its meeting taking place on **14 June 2016.**

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely

Professor J Tsoka-Gwegweni
Chair: Biomedical Research Ethics Committee

cc supervisor: Naidoopg@ukzn.ac.za
cc postgrad: nenep1@ukzn.ac.za

Biomedical Research Ethics Committee
Professor J Tsoka-Gwegweni (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 2486 **Facsimile:** +27 (0) 31 260 4609 **Email:** brec@ukzn.ac.za
Website: http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx

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Annexure 2: KwaZulu-Natal Department of Health ethical clearance: R.K.Khan Hospital

health
Department
Health
PROVINCE OF KWAZULU-NATAL

330 Langalibalele street,
Private Bag X9051 PMB, 3200
Tel: 033 395 2805/3189/3123 Fax: 033 394 3782
Email: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

DIRECTORATE:
Health Research & Knowledge Management (HKRM)

Reference: **HRKM212/16**
KZ_2016RP10_311

25 July 2016

Dear Jenousha Naidoo
(University of KwaZulu-Natal)

Subject: Approval of a Research Proposal

1. The research proposal titled **'Taking a hold of hand trauma in KwaZulu-Natal'** was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at RK Khan Hospital.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Ms G Khumalo on 033-395 3189.

Yours Sincerely

Dr E Lutge
Chairperson, Health Research Committee
Date: 25/07/16

Fighting Disease, Fighting Poverty, Giving Hope

Annexure 3: KwaZulu-Natal Department of Health ethical clearance: Greys Hospital

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

330 Langalibalele street,
Private Bag X9051 PMB, 3200
Tel: 033 395 2805/3189/3123 Fax: 033 394 3782
Email: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

DIRECTORATE:
Health Research & Knowledge Management (HKRM)

Reference: **HRKM212/16**
KZ_2016RP10_311

26 July 2016

Dear Jenousha Naidoo
(University of KwaZulu-Natal)

Subject: Approval of a Research Proposal

1. The research proposal titled **'Taking a hold of hand trauma in KwaZulu-Natal'** was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at Greys Hospital.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Ms G Khumalo on 033-395 3189.

Yours Sincerely

Dr E Lutge
Chairperson, Health Research Committee
Date: 02/08/16.

Fighting Disease, Fighting Poverty, Giving Hope

Annexure 4: Gatekeeper permission: R.K.Khan Hospital

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

GATEKEEPER PERMISSION

To: CEO, R.K.Khan Hospital

Re: Permission to conduct focus group at R.K.Khan Hospital

My name is Jenousha Naidoo, an occupational therapist at R.K.Khan Hospital and a masters student at the University of KwaZulu-Natal. I am currently in the data collection phase of my research, titled "Taking a hold of hand trauma in KwaZulu-Natal". This study aims to identify the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal and their perceived ability to treat these injuries effectively.

I seek your permission, as gatekeeper at R.K.Khan Hospital, to conduct the focus group in the occupational therapy department. The focus group will be on the 15th of July 2016 and will run for approximately 60 minutes; it will not disrupt the running of the department.

I anticipate that this study will contribute towards knowledge and practice of traumatic hand injuries, provide feedback to training institutions regarding curriculum, inform of further training requirements in hand therapy and ultimately improve service delivery.

This study has been ethically approved by the UKZN Biomedical research Ethics Committee (Approval number: BE203/16). If you have any further concerns, please feel free to contact this committee:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Tel: 27 31 2604769 - Fax: 27 31 2604609
Email: BREC@ukzn.ac.za

If you have any queries, please contact me on 078 207 9701 or jenousha@yahoo.com.

CONSENT:

I fully understand the procedure and purpose of the above mention study conducted by Jenousha Naidoo.

I hereby **consent** for the focus group to be conducted at R.K.Khan Hospital	✓
I **do not** consent to this study	

P.S. Subbiah — CEO, R.K.Khan Hospital

Signature

1-7-2016 — Date

HOSPITAL C.E.O.
R.K. KHAN HOSPITAL
01-07-2016
PRIVATE BAG X004

Annexure 5: Gatekeeper permission: Greys Hospital

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

GREYS HOSPITAL
OFFICE OF THE CEO
Private Bag X 9001, Pietermaritzburg, 3200
Town Bush Road, Chase Valley, Pietermaritzburg, 3201
Tel.:033 – 897 3321 Fax.: 033 - 8973398
www.kznhealth.gov.za

To:	**Ms. Jenousha Naidoo** **Occupational Therapy** **R K Khan Hospital**
From:	**Dr. K. B. Bilenge** **CEO - Greys Hospital**
Date:	**25 July 2016**
Re:	**Request for permission to conduct research at Grey's Hospital: *Taking a hold of hand trauma in KwaZulu-Natal***

Dear Ms. Naidoo

Your request to conduct research at Grey's Hospital refers.
Permission to conduct the above study is hereby granted under the following conditions:

- Your ethics approval and research protocol are assumed to be valid;
- You are also required to obtain approval for your study from the Provincial Department of Health KZN Health Research Unit prior to commencing your study at Grey's Hospital. You will find more information on their website: *http://www.kznhealth.gov.za/hrkm.htm*
- Confidentiality of hospital information, including staff and patient medical and/or contact information, must be kept at all times; Patient records are **not** to be removed from the hospital premises nor are you allowed to photocopy/ photograph them.
- You are to ensure that your data collection process will not interfere with the routine services at the hospital;
- You are to ensure that hospital resources are not used, e.g. staff collecting data; photocopying; telephone; facsimile, etc.;
- Informed consent is to be obtained from all participants in your study, if applicable;
- Policies, guidelines and protocols of the Department of Health and Grey's Hospital must be adhered to at all times;
- Professional attitude and behaviour whilst dealing with research participants must be exhibited;
- The Department of Health, hospital and its staff will not be held responsible for any negative incidents and/or consequences, including injuries and illnesses that may be contracted on site, litigation matters, etc. that may arise as a result of your study or your presence on site;
- You are required to submit to this office a summary of study findings upon completion of your research.
- You are requested to make contact with the HoD of Occupational Therapy, **Mrs. Angela Chetty**, at Grey's Hospital once you are ready to commence data collection.

Recommended by:

Dr L. Naidoo
Senior Manager: Medical Services

Approved by:

Dr. K. B. Bilenge
Hospital CEO

Annexure 6: Ethics certificate: The National Institute of Health Office

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Jenousha Naidoo** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 11/14/2015

Certification Number: 1914273

INFORMATION SHEET AND CONSENT TO PARTICIPATE IN RESEARCH

Dear Colleague

My name is Jenousha Naidoo, a masters student at the University of KwaZulu-Natal and you are invited to participate in my study titled "Taking a hold of hand trauma in KwaZulu-Natal". This study aims to identify the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal and their perceived ability to treat these injuries effectively.

There is a gap in literature in KwaZulu-Natal regarding hand trauma and occupational therapy management of it. In this study, I would like to hear from you, occupational therapists working in the field of hand rehabilitation.

You are invited to participate in the first part of this two phased study; a short surveywhich can be filled out electronically or manually. This surveyfocuses on common traumatic hand injuries, knowledge of hand injuries, as well as skills and attitude toward assessing treating hand traumatic injuries.

Participating in this study is completely voluntary and you may withdraw at any time, should you choose to. There will be no compensation or costs involved in this study. Confidentiality will be maintained at all times; no identifying information will be published in the final report, data will be kept on password protected laptops and locked cupboards, and data will be deleted and incinerated after 5 years.

I hope that this study will contribute towards our knowledge and practice of traumatic hand injuries, provide feedback to training institutions regarding curriculum as well as inform of further training requirements in hand therapy.

If you have any queries, please contact me on 078 207 9701 or jenousha@yahoo.com.

This study has been ethically approved by the UKZN Biomedical research Ethics Committee (Approval number: BE203/16). If you have any further concerns, please feel free to contact this committee:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604769 - Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

Thank you for your consideration to participate in this study.

INFORMATION SHEET AND CONSENT TO PARTICIPATE IN RESEARCH

Dear Colleague

My name is Jenousha Naidoo, a masters student at the University of KwaZulu-Natal and you are invited to participate in my study titled "Taking a hold of hand trauma in KwaZulu-Natal". This study aims to identify the most common traumatic hand injuries seen by occupational therapists in KwaZulu-Natal and their perceived ability to treat these injuries effectively.

There is a gap in literature in KwaZulu-Natal regarding hand trauma and occupational therapy management of it. In this study, I would like to hear from you, occupational therapists working in the field of hand rehabilitation.

You are invited to participate in the second part of this two phased study; a focus group looking at the common traumatic hand injuries, occupational therapists knowledge and skills in dealing with these injuries as well as attitude regarding preparedness for practice.

Participating in this focus group is completely voluntary and you may withdraw at any time, should you choose to. There will be no compensation or costs involved in this study, however light snacks will be provided. Confidentiality will be maintained at all times; no identifying information will be published in the final report, data will be kept on password protected laptops and locked cupboards, and data will be deleted and incinerated after 5 years.

I hope that this study will contribute towards our knowledge and practice of traumatic hand injuries, provide feedback to training institutions regarding curriculum as well as inform of further training requirements in hand therapy.

If you have any queries, please contact me on 078 207 9701 or jenousha@yahoo.com.

This study has been ethically approved by the UKZN Biomedical research Ethics Committee (Approval number: BE203/16). If you have any further concerns, please feel free to contact this committee:

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Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604769 - Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

Thank you for your consideration to participate in this study

BIOGRAPHICAL INFORMATION

Participant number: _____ (For office use)

Name: _____

Years of experience as an OT: _____ Age: _____

Highest level of education: _____

Facility predominantly employed at: _____

CONSENT FOR PARTICIPATION

I, _____, hereby consent to participate in the above mentioned study and confirm the following:

- The researcher has informed me of how the study will be conducted and the possible risks involved
- My participation is completely voluntary and I may leave when I choose to
- I understand that the focus group discussion will be recorded and may be replayed for data collection purposes
- I understand that I will be anonymous in the study as I will not be identified by name
- I understand that the findings of this study will be published in a research report and may possibly be published
- I understand that if I have any queries, I may contact the researcher or the Biomedical Research Ethics Administration

Participants full name: _____ Signature: _____

Witness full name: _____ Signature: _____

Researcher's name: _____ Signature: _____

Date document was signed by all parties concerned: _____

TAKING A HOLD OF HAND TRAUMA IN KWAZULU-NATAL SURVEY

SECTION A: CONSENT

A1: Do you agree to voluntarily participate in this survey, after reading the attached informed consent letter?

1	Yes	
2	No	

ONLY <u>PROCEED</u> IF YOU HAVE ANSWERED <u>'YES'</u> TO QUESTION A1

SECTION B: DEMOGRAPHIC DATA

Please tick [√] one box only

B1: Are you currently registered with HPCSA?

1	Yes	
2	No	

B2: How old are you? ☐

B3: How many years of experience do you have as an occupational therapist? ☐

B4: What is your highest level of education? *(Tick only the highest level completed)*

1	Diploma in occupational therapy	
2	Bachelor degree in occupational therapy	
3	Bachelors (other)	
4	Postgraduate Diploma	
5	Master's Degree	
6	PHD	

B5: Which University did you complete your undergraduate OT degree at?

1	University of Cape Town	
2	University of Free State	
3	University of KwaZulu-Natal/UDW	
4	University of Limpopo/SMU	
5	University of Pretoria	
6	University of Stellenbosch	
7	University of Western Cape	
8	University of Witwatersrand	
9	Other, please specify:	

B6: What facility do you **predominantly** (>50%) work in? *Please tick [√] one box only*

1	Regional Public Hospital	
2	District Public Hospital	
3	Quaternary/Tertiary Public Hospital	
4	Private Hospital/ Rehabilitation facility	
5	Private Practice	
6	Community Health Centre/ Community Clinic	
7	School	
8	Academic facility/Higher Education Facility	
9	NGO/NPO	
10	Other, please specify:	

SECTION C: TRAUMATIC HAND INJURIES

C1: On average, how long have you worked with traumatic hand injuries in your career?

1	Never	
2	Under 1 year	
3	Between 1 – 5 years	
4	6– 10 years	

5	11 – 15 years	
6	16 – 20 years	
7	21 years and more	

C2: On average, how many traumatic hand injuries do you treat a month?

1	None	
2	< 5 patients per month	
3	6– 10 patients per month	
4	11 – 15 patients per month	
5	16 – 20 patients per month	
6	21 or more patients per month	

<u>DO NOT PROCEED</u> IF YOU HAVE ANSWERED <u>'NONE'</u> TO QUESTION C2. PLEASE RETURN THE SURVEYTO THE RESEARCHER WITH SECTIONS A AND B COMPLETED

C3: What are the **most** common traumatic hand injuries that you see in your current practice (within the last year)? *Please tick [√] all that apply*

1	None	
2	Amputations of the hand	
3	Bites	
4	Burns	
5	Crush Injuries to the hand	
6	Dislocations of the hand	
7	Extensor Tendon Injuries	
8	Flexor Tendon Injuries	
9	Fractures of the hand	
10	Lacerations	
11	Peripheral Nerve Injuries (Including Brachial Plexus Injury)	
12	Combined Hand Injuries (damage to 2 anatomic structures, such as bones, tendons, nerves, etc., in the hand)	
13	Poly-trauma to the hand (damage to 3 or more anatomic structures, such as bones, tendons, nerves, etc., in the hand)	

14	Soft tissue injury	
15	Vascular injuries	
16	Other Please specify:	

C4: What are the **most** common hand amputations that you see (within the last year)?

Please tick [√] all that apply

1	None	
2	Wrist Disarticulation	
3	Metacarpal Amputation	
4	Proximal Interphalangeal Joint Amputation	
5	Distal Interphalangeal Joint Amputation	
6	Other Please specify:	

C5: What are the **most** common hand bite injuries that you see (within the last year)?

Please tick [√] all that apply

1	None	
2	Cat Bite	
3	Dog Bite	
4	Human Bite	
5	Rodent Bite	
6	Snake Bite	
7	Other Please specify:	

C6: What are the **most** common hand burn injuries that you see (within the last year)?

Please tick [√] all that apply

1	None	
2	Chemical burns	
3	Electrical burns	
4	Flame burns	
5	Hot Liquid burns	

6	Other Please specify:	

C7: What are the **most** common combined hand injuries that you see (within the last year)? *Please tick [√] all that apply*

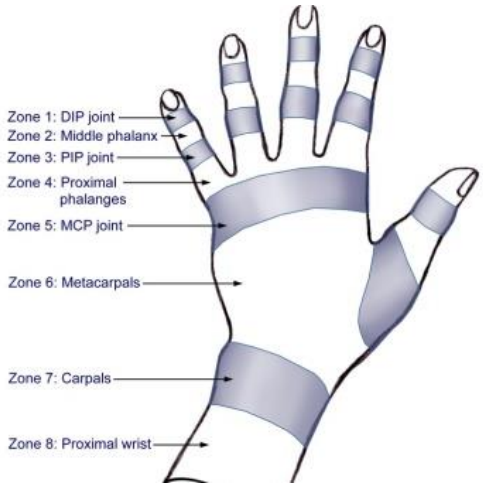
1	None	
2	Combined Flexor Tendon & Extensor Tendon Injury	
3	Combined Flexor Tendon & Peripheral Nerve Injury	
4	Combined Extensor Tendon & Peripheral Nerve Injury	
5	Combined Fractures & Flexor Tendon Injury	
6	Combined Fractures & Extensor Tendon Injuries	
7	Combined Fractures & Peripheral Nerve Injuries	
8	Combined Vascular & Peripheral Nerve Injuries	
9	Combined Fractures & Dislocations of the hand	
10	Other Please specify:	

C8: What are the **most** common hand dislocations that you see (within the last year)? *Please tick [√] all that apply*

1	None	
2	Carpal Dislocation	
3	Carpal Metacarpal Dislocation	
4	Metacarpal Phalangeal Dislocation	
5	Proximal Interphalangeal Dislocation	
6	Distal Interphalangeal Dislocation	
7	Other Please specify:	

C9: What are the **most** common extensor tendon injuries that you see (within the last year)? *Please tick [√] all that apply*

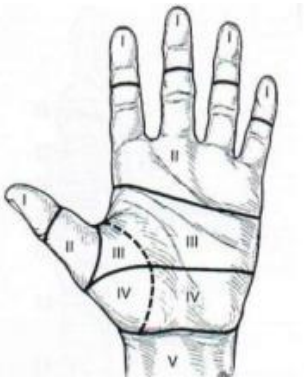
1	None	
2	Zone 1	
3	Zone 2	
4	Zone 3	
5	Zone 4	
6	Zone 5	
7	Zone 6	
8	Zone 7	
9	Zone 8	
10	Combined Please specify	



https://www.pinterest.com/pin/89016530111617371/

C10: What are the **most** common flexor tendon injuries that you see? (within the last year) *Please tick [√] all that apply*

1	None	
2	Zone 1	
3	Zone 2	
4	Zone 3	
5	Zone 4	
6	Zone 5	
7	Combined Please specify	



http://image.slidesharecdn.com/gps flexor-tendon-talk-130123204953

C11: What are the **most** common hand fractures that you see (within the last year)? *Please tick [√] all that apply*

1	None	
2	Distal Radius	
3	Distal Ulnar	
4	Carpal Bones	
5	Metacarpals	
6	Proximal Interphalangeal Joint	
7	Distal Interphalangeal Joint	
8	Other Please specify:	

C12: What are the **most** common peripheral nerve injuries that you see (within the last year)? *Please tick all that apply*

1	None	
2	Brachial Plexus Injury	
3	Median Nerve Injury	
4	Radial Nerve Injury	
5	Ulnar Nerve Injury	
6	Combined Median & Radial Nerve Injury	
7	Combined Median & Ulnar Nerve Injury	
8	Combined Radial & Ulnar Nerve Injury	
9	Combined Median, Radial & Ulnar Nerve Injury	

SECTION D: KNOWLEDGE OF TRAUMATIC HAND INJURIES

D1: What is the source of **most** of your knowledge of traumatic hand injuries? *Please tick [√] all that apply*

1	Advice from colleagues	
2	CPD courses	
3	Hand therapy textbooks	
4	Journal club	
5	Observing experienced therapists	

6	Protocols relating to traumatic hand injuries	
7	Post graduate training	
8	Research articles	
9	Undergraduate occupational therapy training	
10	Work experience	

D2: What effort do you make to expand your knowledge on traumatic hand injuries? *Please tick [√] all that apply*

1	Attend post graduate training	
2	Attend workshops or courses	
3	Keep updated with current literature in the field	
4	Keep updated with protocols	
5	Research different conditions	
6	Seek colleagues advice	

D3: What aspect in the management of traumatic hand injuries would you like to personally improve on? *Please tick [√] all that apply*

1	Anatomy of the hand	
2	Assessment (formal or informal)	
3	Awareness of different protocols	
4	Fabrication of items (pressure garments, assistive devices, etc.)	
5	Scar management	
6	Splinting (thermoplastic and soft splints)	
7	Other, please specify	

SECTION E: ATTITUDE TOWARD TRAUMATIC HAND INJURIES

Please tick [√] one box per row only

		Strongly Agree	*Agree*	*Un-decided*	*Disagree*	*Strongly Disagree*
E1:	I feel confident in my abilities to **assess** a **common** traumatic hand injury					
E2:	I feel confident in my abilities to **assess** an **uncommon** traumatic hand injury					
E3:	I feel confident and sufficiently prepared to adequately **treat** a **common** traumatic hand injury					
E4:	I feel confident and sufficiently prepared to adequately **treat** an **uncommon** traumatic hand injury					
E5:	I feel confident and prepared to assess and treat a traumatic hand injury due to my undergraduate training					
E6:	I feel confident/prepared to assess and treat a traumatic hand injury due to further training (postgraduate studies, CPD courses, etc.)					
E7:	I feel confident and prepared to assess and treat a traumatic hand injury due to my experience in the field					

SECTION F: PRACTICE/MANAGMENT OF TRAUMATIC HAND INJURIES

F1: When are traumatic hand injuries **mostly** referred to occupational therapy? *(please tick [√] all that apply)*

1	From trauma/casualty/ER	
2	As an inpatient prior to surgery/management	
3	As an inpatient post-surgery/management	
4	Prior to discharge	

5	As an outpatient	
6	None of the above	
7	Other Please specify:	

F2: When an acute traumatic hand injury (within 6 weeks of injury) is referred, when do you **usually** attend to them? *(please tick [√] one box for each condition only)*

		On the same day	*1 day later*	*Within 1 week*	*1 month later*	*Other, please specify*	*N/A*
1	Amputations						
2	Bites						
3	Burns						
4	Crush Injuries						
5	Dislocations						
6	Extensor Tendon Injuries						
7	Flexor Tendon Injuries						
8	Fractures						
9	Lacerations						
10	Peripheral Nerve Injuries (Including Brachial Plexus Injury)						

11	Combined Hand Injuries (damage to 2 anatomic structures, such as bones, tendons, nerves, etc., in the hand)						
12	Poly-trauma to the hand (damage to 3 or more anatomic structures, such as bones, tendons, nerves, etc., in the hand)						
13	Soft tissue injury						
14	Vascular injuries						

F3: When required to assess a traumatic hand injury, what assessments do you use? *(please tick [√] one box only)*

1	Formal (standardized) assessments	
2	Informal assessments	
3	Both formal and informal assessments	
If box 1 or 3 were ticked, please state what types of formal tests are used:		

F4: When do you assess a traumatic hand injury? *(please tick [√] one box only)*

1	On the initial visit only	
2	On an on-going basis, prior to commencement of treatment	
3	On an on-going basis, on completion of a treatment session	
4	On initial visit and on an on-going basis	
5	None of the above, I don't assess a traumatic hand injury	

F5: When required to manage a traumatic hand injury, what factors do you take into consideration? *(please tick [√] all that apply)*

1	Knowledge of the condition	
2	Experience with the condition	
3	Competency in dealing with the condition	
4	Resources available	
5	Time available	
6	Other, please specify:	

F6: When faced with a traumatic hand injury, what do you **mostly** use to determine your treatment approach? *(please tick [√] all that apply)*

1	Hand protocols	
2	Department protocols	
3	Clinical judgement	
4	Colleagues advice (rehab or medical)	
5	Internet sources	
6	Literature/text books	
7	Past experience	
8	None of the above	
9	Other Please specify:	

F7: When treating a patient with an acute traumatic hand injury (within 6 weeks of injury), how long do you **usually** spend with them? *(please tick [√] one box for each condition only)*

		10-30 minutes	*30-45 minutes*	*45-60 minutes*	*Over 60 minutes*	*Other, please specify*	*N/A*
1	Amputations						
2	Bites						
3	Burns						
4	Crush Injuries						
5	Hand Dislocations						
6	Extensor Tendon Injuries						
7	Flexor Tendon Injuries						
8	Fractures						
9	Lacerations						
10	Peripheral Nerve Injuries (Including Brachial Plexus Injury)						
11	Combined Hand Injuries (damage to 2 anatomic structures, such as bones, tendons, nerves, etc.)						

12	Poly-trauma to the hand (damage to 3 or more anatomic structures, such as bones, tendons, nerves, etc., in the hand)						
13	Soft tissue injury						
14	Vascular injuries						

F8: After the initial management of an acute traumatic hand injury, how often do you schedule a follow up appointment? (post discharge). *(please tick [√] one box only)*

1	Every 1 week	
2	Every 2 weeks	
3	Every 3 weeks	
4	Every 4 weeks	
5	Every 6 weeks	
6	None, I don't follow up with the patient	
7	Other Please specify:	

F9: When treating a patient with a traumatic hand injury, which members of the multidisciplinary team do you refer to? *(please tick [√] all that apply)*

1	Physiotherapist	
2	Orthotist/Prosthetist	
3	General practitioner	
4	Orthopaedic surgeon	
5	Plastic surgeon	
6	Dietician	
7	Other Please specify:	

F10: When planning treatment for a traumatic hand injury, which approach do you use?
*(please tick [√] the approach that is **predominantly** used)*

1	Interactive reasoning (persons perspective: considering the impact the injury has on the individuals life)	
2	Narrative reasoning (persons perspective: considering the individuals life, daily activities, habits and roles)	
3	Pragmatic reasoning (practicality: consider factors such as reimbursement, documentation, resources available, discharge environment, therapists knowledge and skill)	
4	Conditional reasoning (looking at a person holistically: premorbid functions, current status, prognosis, social and physical environment as well as cooperation of the individual)	
5	Procedural reasoning (problem solving approach: considering the individuals diagnostically related performance components and areas)	
6	None of the above	

Coppard B.M., Lohman H. (2008). Introduction to splinting, a clinical reasoning and problem solving approach. United States of America. Mosby.

F11: What do you consider essential in effectively treating a traumatic hand injury?
(please tick [√] all that apply)

1	Adequate theoretical knowledge	
2	Adequate practical experience	
3	Adequate mentorship	
4	Adequate training (undergraduate, post graduate, courses, etc.)	
5	Protocols, procedures and guidelines	
6	Other Please specify:	

If you have any further comments regarding traumatic hand injuries or preparedness for the management of it, please note it in the box below

Thank you for taking the time to complete the survey. Your input is highly appreciated. Please return the survey to jenousha@yahoo.com. If you have any queries, please contact the researcher on 078 207 9701

FOCUS GROUP SCHEDULE

INTRODUCTION:

A. Greeting and thanks

- Thank you for attending this focus group. My name is Jenousha and I will be the facilitator of this group

B. Topic

- My topic is directed at traumatic hand injuries: your experience with it and your preparedness for assessing and treating it. So I would like you to share your experiences with me

C. Confidentiality

- will be maintained at all times
- have the right to leave the group at any time

D. Ground rules

- Kindly switch of all cell phones as this group is audio recorded
- Please ensure that one person speaks at a time
- The group should run for approximately 45 minutes and I will try to stick to the time

E. Introduction

I would like everyone to get acquainted in the group before we begin. Please could you introduce yourself, tell us where you are currently employed and how many years of experience you have as an occupational therapist.

F. QUESTIONS:

I have a guide of questions that I will be asking, but please feel free to elaborate on experiences you have had. If all issues weren't covered in the questions, there will be an opportunity for you to bring them up towards the end. Please relax and answer questions freely.

1. Can you tell me about your experiences of working with hand injuries?
   - *Approximately, how many hand injuries do you see a day?*
   - *Traumatic vs non-traumatic- which is more common?*
   - *Off those hand injuries, approximately how many are traumatic?*

2. Can you tell me about the most common traumatic hand injuries that you treat currently?
   - *Tendon injuries (ETR, FTR, Combined)*
   - *Fractures (which bone)*
   - *Burns (what type?)*
   - *Peripheral nerve injuries (which one?)*
   - *Lacerations (where about?)*
   - *Dislocations (which bone?)*
   - *What challenges do you experience, if any, with these injuries?*

3. Can you elaborate on where have you gained most of your knowledge about traumatic hand injuries?

   - *Advice from colleagues*
   - *CPD courses*
   - *Hand therapy textbooks*
   - *Journal club*
   - *Observing experienced therapists*
   - *Protocols relating to traumatic hand injuries*
   - *Post graduate training*
   - *Research articles*
   - *Undergraduate occupational therapy training*
   - *Work experience*

4. Can you explain what methods you use to expand your knowledge on traumatic hand injuries

   - *Attend post graduate training, workshops or courses*
   - *Keep updated with current literature in the field (How? Research different conditions)*
   - *Keep updated with protocols*
   - *Seek colleagues advice*

5. Has undergraduate occupational therapy training prepared you for the treatment of traumatic hand injuries? Can you explain how it has prepared you for dealing with traumatic hand injuries?

   - *Do you feel equipped to deal with traumatic hand injuries with your undergraduate training*
   - *What could of better prepared you for practice?*
   - *Do you feel you need further training or postgraduate education in order to effectively treat traumatic hand injuries*

6. Can you please explain why you feel skilled or not to manage a traumatic hand injury?

   - *What has prepared you for the management?*
   - *What aspects do you feel you need to improve on?*

7. Can you describe how you feel when you assess and treat a traumatic hand injury

   - *Scared*
   - *Confident*
   - *Unprepared*
   - *Which traumatic hand injury are you most comfortable treating?*
   - *Which injuries do you feel inadequately prepared to treat?*

8. Tell me about the assessment of a traumatic hand injury?

   - *How do you assess?*
   - *Formal vs informal. Types?*
   - *When are patients assessed? Initially, ongoing, etc.*

9. What methods do you use to guide your decisions about treatment of traumatic hand injuries?

   - *Hand protocols*
   - *Department protocols*
   - *Clinical judgement*
   - *Colleagues advice (rehab or medical)*
   - *Internet sources*
   - *Literature/text books*
   - *Past experience*
   - *What factors do you take into consideration before treating a traumatic hand injury? Knowledge of the condition, experience with the condition, resources and time available*

10. Tell me about your treatment of a traumatic hand injury?

    - *How quickly are they attended to? Same day, week later, month later*
    - *On average, how long do you spend with an acute traumatic hand injury?*
    - *Does treatment usually involve splinting, making pressure garments or assistive devices? How does that affect treatment time?*

11. Can you tell me what knowledge and skills that therapists should have in order to adequately manage a traumatic hand injury

    - *Skills which a therapist needs- splinting, appropriate handling, etc.*
    - *Adequate theoretical knowledge- anatomy, protocols, etc*
    - *Adequate practical experience*

- *Adequate training (undergraduate, post graduate, courses, etc.)*
- *Is there anything else they require? Mentorship, training, etc.*

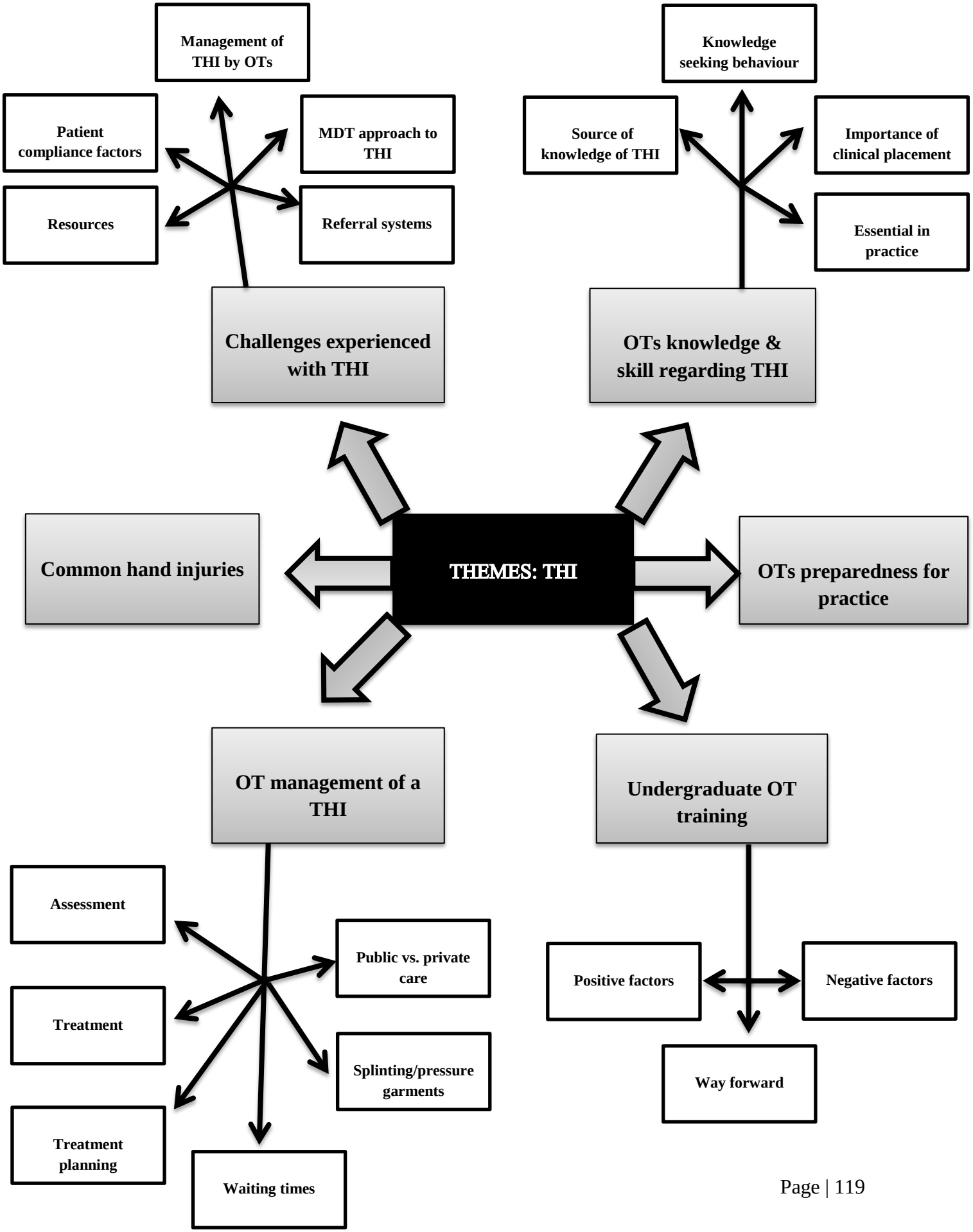
12. Can you tell me about your view on the current management of traumatic hand injuries by occupational therapists?
    - *Is there a difference in the public and private sector? Why?*
    - *Not managed appropriately?*
    - *Lack of skills*
    - *Lack of resources*
    - *Limited knowledge*
    - *Inadequate training*
    - *Lack of interest*

13. The purpose of this focus group was to explore the experiences of therapists dealing with traumatic hand injuries and their perceived preparedness for practice. When you heard about this tropic, you may have had preconceived idea of questions to be asked. If any of those haven't been covered, please feel free to discuss it now

G. Summarise salient points

H. Thank you for your participation in this focus group, your input is highly valued

Annexure 11: Themes emerging from focus groups



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Reference: **HRKM212/16**
KZ_2016RP10_311

25 July 2016

Dear Jenousha Naidoo
(University of KwaZulu-Natal)

Subject: Approval of a Research Proposal

1. The research proposal titled **'Taking a hold of hand trauma in KwaZulu-Natal'** was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at RK Khan Hospital.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Ms G Khumalo on 033-395 3189.

Yours Sincerely

Dr E Lutge
Chairperson, Health Research Committee
Date: 25/07/16