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Factors influencing return-to-work for South African platinum mine workers following upper limb amputation and vocational rehabilitation

by

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Submitted in fulfilment of the requirements for the degree Master of Occupational Therapy in the Faculty of Health Sciences, University of Pretoria

April 2022

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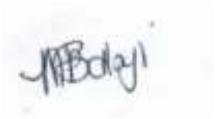

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The author, whose name appears on the title page of this dissertation, Portia Baloyi has obtained, for the research described in this work, the applicable research ethics approval from the University of Pretoria Research Ethics Committee: Approval number 57/2020.

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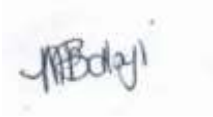

Portia Baloyi
April 2022

ACKNOWLEDGEMENTS

To my Heavenly Father, who enabled me to reach this great milestone, I say thank you Abba Father. It was through your strength, guidance, wisdom and unlimited grace that I gained perseverance to complete this study. Indeed, "*I can do all things through Christ who gives me the strength*." (Philippians 4:13)

I would also like to express my sincere gratitude to the following individuals:

- To the participants of this study, thank you for your willingness to participate and share your experiences. Without you, this study would not have been possible.
- A special thank you goes to Lindie Pieterse for granting permission to gain research participants from her practice.
- To Tania Buys and Eileen Du Plooy, my research supervisors, thank you for your invaluable advice, guidance, support, and inspiring motivation. You ushered me through every hurdle and encouraged me through every step in this research journey.
- I would also like to extend my appreciation to Prof Kitty Uys, for your valuable guidance and support.
- To my entire family, I thank you for always believing in me. A special thanks to my mother, Glory Duba, for her constant support and encouragement through this journey.
- Many thanks to my Editor, Gill Smithies, for the many hours spent reviewing my work and for your valuable input.
- I would also like to say thank you to Tebogo Selokela, who helped with translating.
- I can say with joy, "To God be the Glory for the things that He has done."

ABSTRACT

Introduction: Upper limb amputation leads to permanent physical change, which results in various functional limitations and return-to-work challenges. To better facilitate return-to-work following upper limb amputation, provision of vocational rehabilitation services, and a thorough evaluation of an individual's circumstances is necessary. Providers of rehabilitation services are required to understand a broad set of factors that impact on the injured worker following upper limb amputation. This understanding fosters the use of an individualised approach during treatment.

Aim: This study aimed to explore and describe the factors influencing return-to-work for South African platinum mine workers following upper limb amputation post-vocational rehabilitation.

Methodology: A qualitative, descriptive design was employed in this study. Participants were South African mine workers in the platinum mining industry, who returned to work following upper limb amputation post-vocational rehabilitation. Purposive sampling was used. Participants were selected from the database of an occupational therapy private practice in the North West Province. Data was collected from six platinum mine workers through telephonic, semi-structured interviews. Interviews were recorded and transcribed verbatim. Qualitative content analysis was implemented: Transcriptions were analysed inductively using Braun and Clarke's six phases of thematic analysis. Deductive analysis was also conducted for further content analysis with guideline from the Occupational Competence Model to effectively answer the enquiry under study.

Results: Four themes emerged from this study: '*Initial and ongoing difficulties,*' '*Colleagues' attitude and workplace responses,*' '*Things that helped during my return-to-work journey,*' and '*Change and return-to-work.*'

Conclusion: The factors influencing return-to-work for South African platinum mine workers following upper limb amputation and vocational rehabilitation were successfully explored and generated. The results of this study will serve to inform the development of interventions aiming to improve future vocational rehabilitation services and work reintegration after upper

limb amputation. To ensure that the upper limb amputee remains in the workplace, future research should focus on factors that will ensure maintenance of work.

Key words: Upper limb amputation; return-to-work; factors; vocational rehabilitation; platinum mining sector.

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
ADL	Activities of daily living
COIDA	Compensation for Occupational Injuries and Diseases Act
DIPJ	Distal interphalangeal joint
IADL	Instrumental activities of daily living
IF	Index finger
LF	Little finger
MF	Middle finger
MHSA	Mine Health and Safety Act
OCM	Occupational Competence Model
OHS	Occupational health and safety
PGM	Platinum Group Metal
PPE	Personal protective equipment
RF	Ring finger
RTW	Return-to-work

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1. CHAPTER 1: GENERAL ORIENTATION

1.1 INTRODUCTION

Upper limbs are required for communication, expression , showing affection and for most activities of daily living (ADL), including work.[1] Amputation of the upper limb is a life-changing occurrence that has extensive impact on the injured individual, leading to psychological difficulties and activity restrictions; it affects one's life and mental well-being.[1-2] According to Fitzpatrick,[1] the life-changing event of an amputation parallels the stages of grief after the death of a loved one, as amputees frequently manifest emotional reactions such as shock, grief, denial, anxiety and depression.[1] Furthermore, upper limb amputation profoundly changes an individual's sense of self-image, thus reducing one's life satisfaction.[1] The undesirable effect on life satisfaction is mediated by the reduced ability to work and the occurrence of post-amputation complications.[1]

The leading cause of amputation across the world is trauma (including war-related injuries) followed by disease (malignancies and arterial insufficiency), and congenital limb deficiencies.[3] Trauma accounts for 75% of upper limb amputations,[4] and occur in much younger and active working individuals. According to statistics on the population in the United States, 60% of upper limb amputees are between the ages of 21 and 65 years of age.[4] A higher number of trauma related amputations occur with men due to the higher risk of work-related accidents for this gender.[4]

The researcher works as an occupational therapist at a South African platinum mine, providing return-to-work (RTW) services and conducting pre-employment assessments for prospective mine employees. The mining industry is one of the largest components of South Africa's economy in terms of both employment and export earnings; it contributed 8.2 % of the country's total gross domestic product in 2020.[5-7] Statistics depict that by commodity, over 451,427 people were employed by South Africa's platinum mining industry in 2020.[7]

The mining industry dominates South Africa's political, social and economic landscape.[8] Platinum mining, or mining for Platinum Group Metals (PGM), is widespread on the African continent.[9] Platinum group metals are concentrated in South Africa's bushveld complex, particularly in Limpopo and the North West Province.[9]

Despite the excellent economic prospects that emerge from the mining industry, this sector accounts for a large number of accidents and fatalities globally each year.[10] Every day,

death occurs as a result of occupational accidents or work-related diseases; more than 2.78 million deaths occur per year.[10] The Mineral Council of South Africa revealed that over 72 fatalities were recorded in the year 2021, and during October 2021 alone, the council reported 55 fatalities, compared to 43 reported during the same period in 2020.[11]

The South African Department of Mineral Resources published a statement by Minister Gwede Mantashe on occupational health and safety, revealing statistics on the number of occupational injuries reported in the South African mining industry in 2019.[12] According to this statement, 2 406 injuries were reported in 2019, compared to 2 447 reported during 2018;[12] in more recent statistics, the provisional number of reported injuries in 2021 stands at 1810,[13] revealing a decline in the number compared to 2019. Most occupational injuries occur as a result of repeat accidents categorised as fall of ground, transportation and mining, and general types of accidents with no particular mention of the type of injury sustained.[12]

Occupational therapists work with people who have experienced, or are in danger of experiencing, significant occupational dysfunction due to physical, cognitive or emotional changes that occur as a result of injury or illnesss.[14] In the mining industry, occupational therapists conduct comprehensive interventions geared towards ensuring that employees resume work activities post illness, injury or disability. Occupational therapists conduct in-depth work evaluations to integrate information pertaining to the individuals physical, psychological and behavioural characteristics as well as the central relationship between the employee's motivation, work demands, work environment and psychosocial aspects.[15]

Occupational therapy, based on the concept of returning the injured worker back to work, was founded on the belief that merely providing immediate treatment for a traumatic injury is insufficient for facilitating the resumption of life roles. Instead, the individual should be guided through a physical and mental strengthening training process, this is in preparation for RTW and community re-integration.[14]

Occupational therapists form part of a rehabilitation team in fostering recovery following upper limb amputation.[2] The rehabilitation team includes the medical practitioner, surgeon, physiotherapist, psychologist, prosthetist and social worker.[16] The core objectives for the rehabilitation team are restoration of function and facilitation of independence.[17-18]

Following upper limb amputation, the process of rehabilitation begins as soon as a client enters the medical system for treatment; the injured individual receives medical

management, which involves medical and surgical treatment to regulate acute medical problems. Sub-acute rehabilitation naturally follows medical management when medical problems and their treatments have caused swelling, decreased sensation, muscle weakness, impaired range of motion in the joints, or other limitations in upper limb function.[14]

Upper limb rehabilitation for the amputee involves the use of physical agents, exercise and education to restore impaired abilities.[14] The primary goal for sub-acute rehabilitation is pain management, maintenance of range of motion and strength, and promotion of wound healing. As soon as the client is medically stable after the amputation, endurance and strengthening exercises are implemented, and a skin-desensitisation programme commences, which includes gentle tapping, massage, and soft-tissue and scar mobilisation.[19]

Medical management entails evaluation, diagnosis and implementation of treatment procedures. Sub-acute rehabilitation involves multidisciplinary intervention, which focuses on helping clients to regain function and independence in ADL. At the end of medical management and sub-acute rehabilitation, the client's potential for RTW and the need for further intervention is evaluated.[14] The need for further intervention arises when a barrier still exists for the client to return to or maintain employment, this will result in further intervention to facilitate a smooth RTW transition for the client.

As part of facilitating RTW, occupational therapists provide vocational rehabilitation services aimed at, "enabling individuals with either a temporary or permanent disability to access, return to, or remain in, employment."[20] This involves maximising the injured workers abilities to enable successful RTW.[20]

A boundary exists between vocational rehabilitation interventions and "sub-acute" rehabilitation interventions. Sub-acute rehabilitation is directed to, and has the primary goal of, treating pathology and/or relieving symptoms, and vocational rehabilitation is directed to, and has the primary goal of, improving capability for work and facilitating RTW.[17] It is seen as an integral part of all good clinical and workplace management.[17] Vocational rehabilitation is the final bridge to RTW facilitation, and is not necessarily a separate, second-stage intervention. It is seen as a process of active change, facilitating the journey from sickness to work.[17]

Vocational rehabilitation is individualised to meet the needs of the client and their health problems. A comprehensive assessment is conducted to assess the individual's capabilities

and needs; this is designed to enhance the client's skills and maximise their potential to ensure RTW.[17] It involves an active process that depends on the participation, motivation and effort of the individual, and is supported by workplace and healthcare professionals.[17]

Following upper limb amputation, it is vital to facilitate gradual re-integration of the amputee back into the workplace, with time and workload increasing over several weeks. The client participates in a weekly rehabilitation programme, two to three days a week, with grading to ensure that the client tolerates a full workday. Psychological services are available to ensure support during intervention. Emphasising measures that facilitate RTW in upper limb amputee rehabilitation is likely to be of importance for the amputees' well-being as well as for their physical functioning.[1]

The variations in work outcomes following amputation injuries are complex.[21] Return-to-work outcomes identified in literature are certainly dependent on various occurrences. Krause et al.[22] describe administrative outcomes, as whether or not the worker is working at a set time post-injury.[22] Franche et al.[22] called for a wider range of outcomes with RTW research and suggested inclusions such as; measures of re-injury, quality of life and work life, participation in other life and social roles, and use of medication and work limitations.[22]

With regard to work outcomes, RTW literature describes the criteria of a worker being back at work as a marker of success. The results from stakeholder's perspectives support that RTW success can be guided by the concept of worker performance;[23] as however, worker performance or ability to perform work was not the only domain,[22] two other concepts, worker job satisfaction and worker well-being, were also identified as important. All three of these concepts reflect the importance of looking beyond the worker's ability to physically or cognitively perform job related tasks.[22]

Understanding why some people RTW and others are unable to, requires a broad exploration of factors.[24] The exploration of these factors is vital in ensuring evidence-based practice in vocational rehabilitation.[25] Focus on the injured worker's view is critical as every injured worker has a completely different view throughout the rehabilitation process due to varying psychosocial perceptions as well as individualised behavioural choices.[24] A myriad of factors exist in work outcome literature for western country populations, with emphasis on factors related to predictors and non-predictors of RTW following injury.[2,26-27] The abundance of factors, their complex interactions and the diversity of human behaviour make it difficult to pinpoint those at risk in order to intervene and overcome problems efficiently

and effectively.[26] To the researcher's knowledge, there is a dearth of literature on the factors influencing RTW for upper limb amputees in the South African platinum mining context.

Reviewed factors in literature include those related to physical functioning, amputation and prosthesis as well as the employment experience of people with amputations.[2] Factors have been grouped into various categories and domains corresponding to socio-demographic factors, clinical and medical findings, pain, physical functioning, work and sociological aspects.[2]

In a three-round Delphi study, consensus was sought from experts mostly in Europe and North America to seek agreement on important facilitators and barriers for RTW following surgery of non-traumatic upper limb conditions.[28] Consensus was reached on factors at the level of the worker and the workplace; these factors were considered to influence RTW following surgery for non-traumatic upper limb conditions.[28] In previous studies, researchers considered the severity of the amputation injury or disability as a variable for predicting RTW.[27] Moshe[26] et.al indicated that factors are described in literature as complex and interactive.[26]

The Occupational Competence Model (OCM) fosters the development of knowledge supporting evidence-based rehabilitation.[25] This conceptual model is said to advance the occupational perspective in studies relating to work and RTW factors.[25] Shaw and Polatajko[29] recommend the OCM be used for future research for factors (and their interrelationships) influencing work outcomes.[25,29] For the study of RTW, the OCM provides a framework for systematically exploring the multidimensional factors that contribute to and impact upon the variations in work outcomes.[25]

An understanding of RTW factors allows for improved insight on the barriers that limit functioning. The researcher wanted to investigate the reasons why clients with upper limb amputations experience RTW challenges in the South African platinum mining industry. By examining these experiences, the researcher hopes to learn more about clients' everyday life and rehabilitation involvements, which may, in turn, help future amputees.

1.2 BACKGROUND TO THE STUDY

The researcher works as an occupational therapist providing sub-acute and vocational rehabilitation services for upper limb amputees at a selected platinum mine hospital. In practise, the researcher observed that despite the provision of consistent vocational rehabilitation services following upper limb amputation, every client generally follows a unique recovery pathway with onset of varying influencing factors, amongst others, prolonged stump hypersensitivity. In the researcher's work setting, clients with upper limb amputation are seen for approximately six to eight weeks for sub-acute rehabilitation, with focus of restoring functional use of the affected limb. Upon discharge from sub-acute rehabilitation, clients are then referred for vocational rehabilitation in preparation for RTW. The researcher's experience in providing vocational rehabilitation services for clients who sustained upper limb amputation prompted the exploration of South African platinum mine worker's RTW experiences.

1.3 PROBLEM STATEMENT

To the researcher's knowledge, there is a paucity of evidence on RTW literature following upper limb amputation for the South African platinum mining population. Considering the lack of evidence-based knowledge on the different factors influencing RTW,[30] a need arose for gaining in-depth knowledge on these factors.

Improved insight on the factors influencing RTW following upper limb amputation will assist rehabilitation specialists in addressing important issues during RTW facilitation.[31] In addition, this will ensure the use of a client-centred approach in future treatment programmes by occupational therapists and other rehabilitation specialists; allowing the client to be viewed as the most important person in leading the intervention.[32] Shaw and Polatajko[25] detailed, "Ultimately, researchers and clinicians expect that the study of RTW factors will advance the knowledge base of RTW and improve the efficacy and effectiveness of vocational rehabilitation services and the rate of RTW, thus decreasing unemployment rates."[25]

The problem is that occupational therapists have limited knowledge regarding the factors influencing RTW for upper limb amputees in the South African platinum mining context. Return-to-work literature for the South African population is sparse. The need therefore

arose to explore the RTW experiences of South African mine workers in the platinum mining industry who sustained upper limb amputation and underwent vocational rehabilitation.

1.4 RESEARCH QUESTION

What are the factors influencing RTW for South African platinum mine workers who sustained upper limb amputation post vocational rehabilitation?

1.5 RESEARCH AIM

To explore and describe the factors influencing RTW for South African platinum mine workers following upper limb amputation post vocational rehabilitation.

1.6 RESEARCH OBJECTIVES

I. To explore and describe personal barriers and facilitators influencing RTW following upper limb amputation post vocational rehabilitation.
II. To explore and describe environmental barriers and facilitators influencing RTW following upper limb amputation post vocational rehabilitation.
III. To explore and describe occupational barriers and facilitators influencing RTW following upper limb amputation post vocational rehabilitation.

1.7 DELINEATION AND ASSUMPTIONS

1.7.1 Delineation

This study explores and describes the RTW experiences of South African platinum mine workers who returned to work after upper limb amputation, having undergone medical management, sub-acute rehabilitation and vocational rehabilitation. Participants were selected from the database of an occupational therapy private practice in the North West Province of South Africa.

This study focused on individuals who sustained their upper limb amputation at work in 2018-2020.The study excluded individuals with congenital or lower limb amputation, individuals with an additional injury in conjunction with the sustained upper limb amputation, and individuals with a history of sustained head injury or neurological condition present. The study aimed to gain insight on the facilitators and barriers influencing RTW to obtain

valuable insight from the injured worker's perspective of their RTW experience following upper limb amputation post vocational rehabilitation.

1.7.2 Assumptions

1.7.2.1 Paradigm

A paradigm is "a basic set of beliefs that guides action."[7] It alludes to the method or pattern for conducting a research study.[33] The research paradigm was qualitative. This approach guided the exploration of factors influencing RTW for South African platinum mine workers, following upper limb amputation and vocational rehabilitation.

1.7.2.2 Ontological assumption

Ontology is the study of being with what constitutes reality; it reveals what is known and what the real world is.[34] Realism was applied in this study.[33] "Realities are said to be influenced by senses, they emerge when consciousness engages with objects."[34] Language actively shapes our reality.[34] Reality is constructed through the collaboration between language and aspects of an independent world.[34] In this study, the ontological assumption was viewed from a literal description,[34] from the injured worker, to gain understanding of their RTW experiences following upper limb amputation post vocational rehabilitation.

1.7.2.3 Epistemological assumption

Epistemology is the relationship between the researcher and those being studied.[35] "Knowledge of reality from a naturalistic perspective as in the case of qualitative descriptive research is socially constructed not only by the participants but also by the researcher, and it is therefore recognized that an objective reality cannot be discovered or replicated by others."[34] The epistemology applied was constructionism.[33] The researcher, an occupational therapist in private practice, sought to understand the various factors influencing RTW, understanding that individuals experience different recovery trajectories following upper limb amputation.

1.7.2.4 Methodological assumption

Methodology is the overarching approach and rationale of the research study.[34] The methodological assumption considers how the researcher approached the inquiry of what

is believed and what can be known.[36] This study applied a qualitative, descriptive research design. Qualitative description research studies are those that seek to discover and understand a phenomenon, a process, or the perspectives and worldviews of the people involved.[34] Chapter 3 describes the methodology.

1.8 CLARIFICATION OF KEY CONCEPTS

For simplicity and consistency throughout this paper, there were the following key concepts defined:

Factors: Factors are defined as attributes that affect or influence a situation.[37] This study explored the influence of personal, occupational and environmental factors in relation to RTW following upper limb amputation.

Return-to-work : Return-to-work is defined as the outcome of being employed or to the process of returning to employment.[38] For the purpose of this study, this entails returning to the pre-injury occupation or an alternative occupation in the platinum mining sector following the completion of medical treatment, sub-acute rehabilitation, and vocational rehabilitation after upper limb amputation.

Upper limb amputation: This refers to the permanent loss of a part of the upper limb. Upper limb amputations are classified into two groups, below-the-elbow and above-the-elbow amputations.[14] For the purpose of this study, the description for below-the-elbow amputation was highlighted: "it includes trans-phalangeal, trans-metacarpal, trans-carpal, wrist disarticulation, trans-radial, elbow disarticulation and forearm amputation."[39-40] This includes, but is not limited to, partial hand amputation.[14] A partial hand amputation describes amputation of the fingers, which can occur over the fingertip or transversely through the distal, proximal or metacarpal phalangeal joints.[14,41] To maintain consistency with the study title, and for consistency in terms, the term upper limb amputation was used in this study.

Vocational rehabilitation: is defined as "enabling individuals with either temporary or permanent disability to access, return to, or remain in, employment."[20] Vocational rehabilitation services include functional restoration programmes, conducting work assessments, work re-training, education and providing work guidance and ergonomic modifications.[20] For the purpose of this study, the aim of vocational rehabilitation is to maximise the ability of an individual to RTW post upper limb amputation.

1.9 SIGNIFICANCE OF THE RESEARCH

People's ability to work may be interrupted by any changes in physical, psychological, or socioeconomic factors.[14] Successful planning and organising of future health services requires understanding of aspects, such as upper limb amputee population characteristics.[42] Multiple factors are likely to contribute to an individual's functional status; a single factor in itself is insufficient in predicting an outcome in rehabilitation.[2,43] "It is the combination of factors that each individual brings to his rehabilitation, together with the required services that will lead to success in rehabilitation."[43]

This study originates from the dearth of RTW literature and limited knowledge on the factors influencing RTW following upper limb amputation for the South African platinum mining population. The purpose of this research is reflected in the study aim (view Section 1.5).

With South Africa being the largest platinum producer worldwide,[44] it is valuable to explore the RTW representation of workers' in this South African context. The knowledge gained from this study will cultivate valuable insight for enhancing future treatment and rehabilitation programmes.[4]

The researcher hopes that this study will serve as a platform for more extensive research in other settings. The study will add value to the injured workers' and occupational therapy profession. Focus on the injured worker's RTW experiences will foster the use of a client-centred approach to improve RTW facilitation. This will assist the injured worker in pursuing a goal that has the integrity to withstand predictable stresses and strains in the RTW process as additional support is ensured.[45]

The researcher hoped that through this study, there could be effective vocational rehabilitation programmes designed, ensuring a smoother RTW course. Intervention to ensure a less time-consuming RTW course includes providing vocational rehabilitation services. Vocational rehabilitation may be a positive response to prolonged work disability, ensuring early intervention, fast-tracking return to meaningful work, minimising absenteeism, and increasing productivity of injured workers, reducing early retirement, promoting active involvement with the client and reducing general deconditioning.[45] With RTW related to quality of life, work resumption is the main aim for rehabilitation specialists and clients. Considering the current unemployment rate of 35.3%,[44,46] it is essential to assist in reducing unemployment by improving RTW facilitation in practice.

1.10 OVERVIEW OF CHAPTERS

Chapter 1 presented the introduction and background to the study, as well as a description of the problem statement, and significance of the study. It outlined the research question together with the aim and objectives of the study. Also included were the clarification of concepts, delineation and assumptions.

Chapter 2 presents a comprehensive literature review to gain insight on the theoretical base of the study, highlighting existing findings and seeking new lines of inquiry to determine areas needing more research.

Chapter 3 outlines the research methodology, including descriptions of the research design, population, sampling method and sample size, data collection and analysis, as well as the rigour and ethical considerations taken into account during this study.

Chapter 4 outlines the study findings with data extract quotes representing participants' experiences. Also included, is an outline of participant's descriptions and demographic information.

Chapter 5 presents the discussion of research findings with reference to the literature reviewed and verbatim quotes, which support the study findings.

Chapter 6 serves as a conclusion to the study. It highlights the study aim and objectives and presents a summary of the study findings as well as the recommendations and implications in practice. It also includes an evaluation of the study, and the researcher's personal reflection.

2. CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 1 introduced the study, including describing the research problem and outlining the aim and objectives as well as the significance of the study. This chapter presents a broad overview of reviewed literature, under three main themes: Work (which is limited to the platinum mining industry), upper limb amputations, and RTW and vocational rehabilitation.

2.2 PURPOSE OF LITERATURE REVIEW

A literature review provides structure for associating novel findings to 'past or existing' findings.[47] Without reviewing past research, it is impossible to establish how new research can advance preceding research.[47] A literature review demonstrates the researcher's knowledge of the subject, and positions the research project within the body of literature thus providing perspective for the reader.[48]

The researcher embarked on a literature review process with the intent of gaining insight into the various contributions made concerning the topic under study, as well as determining areas that need more research. This was to ensure a meaningful contribution to the existing body of knowledge. This literature review has outlined existing publications associated with RTW experiences and the factors influencing work outcome following upper limb amputation.

The literature search was done using a variety of search engines (e.g. Google scholar), data bases (e.g. PubMed, Ebscohost, SAGE) and applications (eg. WorldCat Discovery). In addition, specific journals were hand searched. Grey and peer-reviewed literature were included. Due to limited scientific journals and/or publications in the researched topic, grey and peer-reviewed literature were included for more information on the existing base of evidence regarding the factors influencing RTW following upper limb amputation and vocational rehabilitation. Search items included (but were not limited to) upper limb amputation, return-to-work, factors, vocational rehabilitation, and platinum mining sector, which were used in a variety of combinations to identify appropriate literature.

2.3 WORK

Work is defined as the physical or mental effort or activity directed toward the purposeful production or accomplishment of something.[14,49] It is seen as a significant domain in many individuals' lives – people engage in work to meet a number of needs.[14] Work fulfils basic human needs, such as financial, societal and intrinsic needs.[18] Throughout life, people strive to achieve a balance of meaningful work, as the use of ones time during the day provides a sense of purpose and structure.[49-51] Work is an important social and economic goal; it yields the means by which one earns a livelihood.[14]

South Africa holds one of the largest economies in Africa (second to Nigeria), and is the continent's most industrialised country, having a variety of key sectors including mining, vehicle manufacture, agriculture, financial services and banking.[52] South Africa boasts as being the world leader in mining and mineral processing.[52] Historically, the mining industry has been at the heart of the country's economic development, providing work for many individuals.[52-53]

2.3.1 South Africa's platinum mining industry

South Africa's political, social and economic landscape has been dominated by mining.[54] This industry, which includes underground and surface ore extraction, smelting and refining, remains a mainstay of the South African economy.[54-55]

The platinum mining sector is one of the largest components of the country's mining industry with regard to employment and export earnings, having for many years attracted valuable foreign direct investment. Platinum, which was first discovered in 1924, is one of the rarest metals on the planet.[54] It is used for platinum jewellery, given its value, purity, colour, malleability and resistance to fading.[54,56] This precious metal also serves various other purposes: it is used to help catalytic convertors remove pollutants from the exhaust gases of cars, in industry for manufacturing and electronics,[54,57] and in the petroleum industry to manufacture important primary feedstocks for the growing plastics industry.

2.3.2 Mining conditions and work environment

Mining platinum is an extremely challenging and laborious task.[54] Given the adverse nature of the mining environment, mine employees face a constantly changing combination of workplace circumstances; some are exposed to areas lacking in natural light or ventilation,

and others are exposed to confined work spaces with high exposure to dust, chemicals and noise, as well as wet and vibration conditions.[58]

Various mining occupations are hazardous and labour intensive, as they are physically demanding and repetitive in nature, especially those in a restricted underground work environment. Physical occupation demands include manual material handling, which involves lifting, lowering, pushing, pulling and holding loads without the help of mechanical tools.[55] These physical demands often require static and dynamic efforts, which mean excessive physical strain.[55] Prevalent evidence suggests that work tasks, techniques and postures present excessive risk of injury or illness.[59]

2.3.3 Legislation

In the mining industry, it is particularly important that occupational health management is prepared for routine issues in stable conditions as well as where challenges may arise- as these are known to have an impact on the physical and psychosocial wellbeing of mining employees.[55]

The Mine Health and Safety Act 29 of 1996 (MHSA) was promulgated to modernise occupational health and safety practice in the mining industry; it was regarded as a new constitution in this industry. [60] The Occupational Health and Safety Act 85 of 1993 regulates occupational health and safety practice in South Africa.[55] To protect the health and safety of employees and other individuals at all mines, the MHSA necessitates a risk assessment, exposure measurements and risk control.[55] Part of risk control is medical surveillance, which ensures that employees meet the minimum standards of fitness to work, and identifies signs of occupational disease.[55,61]

The MHSA directs the establishment of a code of practice for medical surveillance at mining establishments.[55] Mine employees involved in risk work have to undergo an initial medical examination and need to be certified fit for work by an occupational medical practitioner prior to their engagement in risk work. Medical examinations are to be prescribed and repeated at different intervals; these processes are legally prescribed in both the Occupational Diseases in Mines and Works Act and in the MHSA.[55,62]

Principal features of the MHSA include primary responsibility of the employer in ensuring a healthy and safe mining work environment. The employer's responsibility is to ensure adequate supply and maintenance of health and safety equipment and sufficient protective

equipment (PPE). It is the employer's responsibility to ensure instruction in the proper use of PPE, and the employees responsibility to take proper care of the protective clothing and other health and safety equipment provided by the employer.[55] Personal protective equipment includes the use of goggles and skin protection, which includes guarding the hands, feet and body by use of safety boots, safety gloves and overalls.[55] The MHSA institutes basic worker rights, most particularly, the right of employees to participate in health and safety, the right to receive health and safety information, the right to training and the right to withdraw from a working environment when danger arises.[55]

Whilst it is binding that the employer reduces or minimises the hazards to which employees are exposed, in mining conditions, inherent health and safety risks remain.[55] The MHSA contains innovative approaches to the investigation of injuries, diseases and other occurrences that threaten health and safety.[55]

2.3.4 Occupational injuries

As mining remains one of the most hazardous occupations, considering the number of people exposed to occupational risks, sudden injury or death remains the most feared consequence of mining operations.[55,58] According to International Labour Organisation, people die as a result of occupational injuries or work-related diseases on a daily basis; more than 374 million non-fatal occupational injuries occur worldwide every year, resulting in more than four days of absenteeism from work.[58] The human cost of this daily adversity is immense with substantial economic burden.[58] Occupational injuries and diseases predominantly affect developing countries, where large numbers of workers are concentrated in primary and extractive activities.[58]

The upper limb is the most common location for work-related injuries.[63] With regard to upper limb amputation, the most common cause of injury is due to trauma at work.[64] Upper limb amputees account for up to eight percent of 1.5 million individuals living with limb loss worldwide.[65-66] Recent and reliable statistics on the prevalence of upper limb amputation in the South African mining industry is scarce.[10,40,42,67] The Department of Mineral Resources released a Mine Health and Safety Inspectorate Report for 2017/2018, which revealed a 2.75% rate of injuries in the South African mining industry, with a total of 2664 injuries reported.[68] There was no specific mention with regard to the number of amputation injuries recorded.[68]

An occupational injury or occupational disease is defined as “an unexpected occurrence, at a specific date, time and place and arising out of and in the course of the employee's employment, resulting in personal injury or death, or when an occupational disease is contracted due to exposure at the workplace.”[55,69] The Compensation for Occupational Injuries and Diseases Act (COIDA), Act 130 of 1993, is the governing Act that deals with occupational injuries and diseases.[70] This Act provides compensation for disablement caused by occupational injuries or diseases sustained or contracted by employees in the course of their employment, or for death resulting from such injuries or diseases.[69] In the case of a permanent injury, such as amputation, the injury is assessed and a disability percentage is calculated.[70] For any disability assessed at 30% or less, then a lump sum is paid out, this is a once-off payment to the injured worker.[70] If a disability is assessed at more than 30%; a monthly pension fee is payable to the worker for life.[70]

Rand Mutual Assurance is a company established by the mining industry to provide worker’s compensation for occupational disease and occupational accident claims. Rand Mutual Assurance insures approximately 78% of all mines in South Africa.[55] It assures over 350 000 mine workers and receives approximately 53 000 claims per annum;[55] of these claims received by Rand Mutual Assurance, approximately 85% are for occupational injuries and 15% are for occupational diseases.[55,68]

2.4 UPPER LIMB AMPUTATION

Upper limb amputation is the partial or total removal of a part of the upper limb in order to save the life of an individual or improve function in the remaining part of the limb.[71-72] Upper limbs are essential in defining us as human beings.[41] According to Saradjian,[42] upper limbs are essential in fulfilling ADL; they are of great importance in expressing feelings, showing affection and in non-verbal communication.[42,71] Upper limbs enable participation in work, leisure and social interactions.[41]

Upper limb amputation has a major effect on individuals life, resulting in extensive restriction in function and sensation, disfiguration, as well as a mutilated body image.[42] Upper limb amputation affects activity performance and role resumption as a spouse, caregiver, friend, and worker.[40] Participants in a study by Shier and Chan[41] expressed that they experienced profound changes in their ability to perform their pre-injury life roles.[41] With spousal relationships, participants reported increased dependence on their partners, both physically and emotionally.[41]

Family income and participation in family activities can be negatively affected.[19] Loss of income creates significant personal and relational stress due to changes resulting in breadwinner roles being adopted by another family member.[41] Role change also occurs when adults require assistance from a child to perform intimate self-care tasks such as bathing or shaving, this is often accompanied by feelings of guilt, anger, and frustration, from both the child and parent, which can further cause strain on relationships.[19]

Social isolation after upper limb amputation is common.[41] People report avoidance of meeting with friends because conversation tends to focus mostly on their injury.[41] Participation in social activities, such as sports and recreational activities, become limited.[41] With substantial changes in routines, and roles lost or interrupted, individuals report minimal contact with co-workers.[73] Life goals are placed on hold, resulting in a continuous sequence of isolation and decreased social confidence, leading to depression, irritability, anger, and further stress on family and friends.[74]

2.4.1 Classification of upper limb amputation

Upper limb amputations are known by the level at which they have been performed (see Figure 2.1). As outlined earlier (Section 1.8), upper limb amputation is typically divided into two groups: below-the-elbow and above-the-elbow amputation.[39] Below-the-elbow amputations include trans-phalangeal, trans-metacarpal, trans-carpal, wrist disarticulation, trans-radial, elbow disarticulation and forearm amputations.[39-40] Above-the-elbow amputations include trans-humeral amputations, shoulder disarticulations, and forequarter amputations.[39]

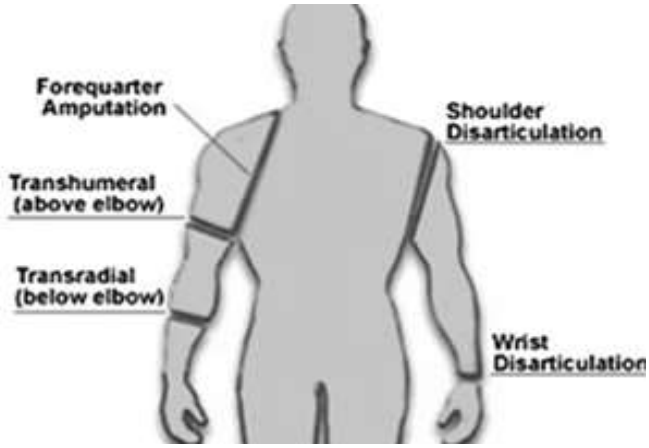


Figure 2. 1 : Levels of upper limb amputations[19]

The most common levels of amputations for the upper limb are the trans-radial and the trans-humeral amputations.[40] Forearm-level amputations tend to occur with young, working age individuals.[40] Although these amputations are the most likely to result in phantom limb pains and require neuropathic pain medications, individuals with these amputations are most likely to remain in the workforce.[41]

An amputation through or proximal to the wrist level is referred to as a major amputation; this amputation has significant functional limitation as it results in total loss of grip on the affected side.[42] A finger amputation occurs over the fingertip or transversely through the distal, proximal or metacarpal phalangeal joints.[41] Although the finger forms a small part of the entire body surface, injury to this part can result in neuropathic pain, increase in pain with activity, reduction in dexterity, weakness, restriction in function, loss of sensation, change in appearance and altered abilities to achieve important goals.[41-42]

2.4.2 Occupational therapy intervention

Occupational therapy is an influential means for enhancing participation in everyday life activities; it reveals a direct link to health and well-being.[75] Occupation embraces ADL, instrumental activities of daily living (IADL), rest and sleep, education, work, play, and social participation.[75] Occupation-based practice is a core principle of occupational therapy.[75] Occupation-based practice refers to occupation as a means and an end in utilising meaningful and purposeful activities based on the individual's needs, health, and engagement in daily activities.[14]

The use of occupation as a 'means' is simply a process or method of intervention, while the "end" is the outcome of the intervention.[75] Present paradigms encourage the reintegration of occupation as the core of therapeutic interventions, thus ensuring the provision of clinical reasoning in practice.[75] This paradigm shift focusing on occupation-based practice has led to the utilisation of a more client-centred approach in treatment.[75] The World Federation of Occupational Therapists has adopted the position that occupational therapy is a client-centred profession.[76]

Occupational therapy has long proclaimed its commitment to a client-centred philosophy of practice; this assumption that occupational therapists consistently practice in a client-centred manner has become central to the professions self-image.[77] Client-centred practice is characterised by reducing power inequalities, listening to the client, assisting the client to

make choices and decisions about their lives, and working with clients toward goals that are of importance to them.[77]

Client-centred practice advocates for shared power between the client and professional, with the client's perspective forming the focal point around which occupational therapy revolves.[75] Occupational therapists treat the whole person and collaboratively develop client-centred goals, thus resulting in improved outcomes.[76-77] Key conceptual elements of client-centred practice include power, partnership, listening and communicating, as well as choice and hope.[75] Client-centred practice aims to equalise the power differential between the occupational therapist and client by viewing the relationship as a partnership.[75] Partnership necessitates a transfer of power to the client, which changes the interaction from a medical perspective to one focused on the client's functional and occupational needs.[75]

The core competency in occupational therapy is fostering "enablement."[77] Moyers[14] states that occupational therapy services are aimed at improving, maintaining and restoring occupational performance after injury.[14] Due to the effect of upper limb amputation, a disruption in function and occupational performance occurs.[14,19,49] In the context of rehabilitation of the upper limb amputee, the occupational therapist is involved in treating the physical, psychological and psychosocial problems arising as a result of injury.[49]

According to Tipton-Burto et al., [78] the occupational therapist is involved with the co-ordination of evaluation and goal setting in conjunction with the interdisciplinary team inclusive of the client's family. Intervention strategies involve the use of therapeutic daily activities in treating the upper limb amputees' functional limitations.[78] Occupational therapy treatment is individualised and orientated toward functional outcomes that are meaningful to the client.[78]

2.4.3 Rehabilitation of the upper limb amputee

Rehabilitation is a crucial step in optimising long-term function and quality of life after upper limb amputation.[79] This step should be viewed as a process that has the main objective of ensuring the achievement of independence.[18] Psychosocial problems after upper limb amputation can create barriers to successful re-adjustment and should therefore be addressed in conjunction with the physical recovery of upper limb amputation.[41] While cognitive and psychological evaluations are crucial during the rehabilitation process, the

client's willingness and ability to acquire new insights is also important to enable active participation during the rehabilitation programme.[80]

Rehabilitation of the upper limb amputee begins prior to the amputation surgery and is provided by a specialist treatment team.[19] Treatment by the multidisciplinary team is essential to achieving an optimal outcome. Rehabilitation after amputation is generally divided into nine distinct phases of evaluation and intervention (see Table 2.2).[19] The stages of amputation rehabilitation and the types of interventions are outlined according to specific rehabilitation goals.[19] For the purpose of this study, this literature review highlights the phases of amputation rehabilitation specifically for the upper limb amputee.

Table 2.2:Phases of amputee rehabilitation[19]

Phase	Phases of amputee rehabilitation
Preoperative	Assessment of body condition; patient education; determination of surgical level of amputation; development of postoperative prosthetic plan
Amputation surgery and reconstruction	Optimisation of residual limb length, closure technique, soft tissue coverage, and nerve handling; application of rigid dressing
Acute post-surgical	Wound healing measures; pain control; confirmation of proximal body–joint motion; emotional support to patient and family
Pre-prosthetic	Soft tissue shaping; volume control; increased muscle strength; restoration of patient locus of control
Prosthetic prescription	Patient-centric focus; team consensus on prosthetic prescription and fabrication
Prosthetic training	Increased prosthetic functional utilisation
Community integration	Resumption of roles in family and community, with focus on recreational activities, emotional equilibrium, and coping strategies
Vocational rehabilitation	Assessment and planning of vocational activities for the future Patient may need further education, training, or job modification
Follow-up and preventive care	Lifelong prosthetic, functional, and medical assessment; emotional support; joint protection

The preoperative phase requires careful consideration to maximise function of the affected limb.[41] Surgical options for the treatment of upper limb amputations should ultimately be based on the client's needs.[77] Essential goals for surgical management include preservation of functional length, secure coverage, protection of useful sensibility, and prevention of symptomatic neuromas, avoidance of adjacent joint contractures and early RTW or recreation.[41]

Evaluation of upper limb amputation injuries includes taking a detailed history describing the method of injury and operative treatment.[19] Access to radiographic and operative reports is helpful for in-depth assessments.[21,41] The client's medical history is reviewed with focus

on any factors that may interfere with healing, such as diabetes mellitus or smoking, which prolong wound healing.[74] Obtaining occupational and social history will assist the healthcare provider in gaining insight into the amputees' goals for RTW, leisure, and ADL.[41,49]

Rehabilitation goals during the acute post-surgical phase of upper limb amputation include oedema and pain management, maintenance of range of motion, and promotion of wound healing.[80] Upper limb amputations, specifically in the case finger amputation, require referral to an occupational therapist at a hand therapy department for optimisation of functional outcome and minimisation of long-term secondary complications.[41]

Hypersensitivity is a common consequence of upper limb amputation, it is typically addressed following wound healing.[41] This involves desensitisation to decrease the painful response to touch over the stump, thus improving tolerance in order to regain functional use.[41] A skin-desensitisation programme is provided and includes gentle tapping, exposure of the stump to graded textures and gentle massage.[41] General endurance and strengthening exercises are implemented during hand rehabilitation.[41] Strengthening materials include the use of putty and functional grasp, and pinch exercises. In addition to strengthening, occupational therapists assist with anticipated RTW by incorporating work simulation activities.[41]

2.5 RETURN-TO-WORK AND VOCATIONAL REHABILITATION

Within any private or public healthcare facility, occupational therapists are the team members who identify and promote the need requiring intervention.[81] The Occupational Therapy Association of South Africa states that the occupational therapist's role in vocational rehabilitation is justified by their knowledge of development, pathology, injury, illness, impairment and/or disability, and their knowledge of the functional requirements of work.[81]

Occupational therapists have a vital role in facilitating a safe, effective and timely RTW.[82] Return-to-work is the primary rehabilitation goal following upper limb amputation.[18,83] The RTW process is seen as a complex, dynamic, long, and resource consuming process.[84] Advancement along this process typically does not occur in a linear fashion.[85] To better facilitate RTW following upper limb amputation, vocational rehabilitation services are necessary with inclusion of a bio-psychosocial and holistic evaluation of an individual's circumstances.[2]

To provide a common basis of understanding, the definition of RTW as drawn from Holmlund et al.,[24] is "the outcome of being employed or the process of returning to employment."[24] Unsuccessful RTW is defined as not returning to work as expected, resulting in unemployment.[10]

Limited studies were found regarding RTW experiences of upper limb amputees.[86] The evidence in medical and rehabilitation literature on acquired upper limb amputation and work, [23,32,87] and the consequences of failing to successfully RTW for workers who have experienced an occupational injury, remain poorly understood.[2]

Predominant studies primarily use retrospective data, existing questionnaires or surveys to study the various factors influencing RTW.[31-32,42] Existing studies focus on specific western country populations. To the knowledge of the researcher, existing RTW studies were conducted on populations in Australia,[23,31,84] Canada,[86] Norway,[42] Sweden[38] and the United States.[85] Ostlie et al.[42] conducted a cross-sectional study on individuals who sustained upper limb amputation in Norway; the study described it's population with regard to demographic and amputation specific aspects and the prevalence of upper limb amputation injuries.[42] Bai et al.[27] explored the predictors of RTW in terms of various levels of disability on a South Asian, Chinese population.[27] Employment patterns have differed among studies, with fluctuating RTW rates across studies and populations.[2] To the researcher's knowledge, there is a dearth of RTW literature for upper limb amputees in the South African platinum mining context.

Conceptualised as a developmental process, RTW has four phases: (I) off work, (II) work re-entry, (III) maintenance and (IV) advancement.[88] Despite numerous supports and services aimed at helping injured workers RTW, this support often wanes and the worker can struggle.[88] The notion that process is inseparably linked to RTW is consistent with the writings of Young et al.[89] Some author groups have defined RTW as both a process and an outcome; the authors asserted that RTW requires continuous measurement during and upon completion of the process.[89] To be successful, the RTW process alone needs to be characterised by a continuous method that is simple for worker's to participate in and one that emphasises a collaborative approach.[89]

Figure 2.3 illustrates the normal course from acute care after injury, to returning to the open labour market.[20]

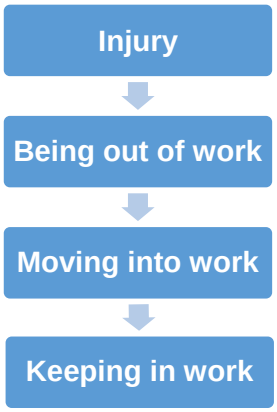


Figure 2.3: The phases of a person-centred continuum of vocational rehabilitation services[20]

The initiation of this continuum is the concept of being out of work due to a disruption in normal functioning, as in the case with upper limb amputation; following with a range of rehabilitation services that take place to assist the individual in regaining the worker role, and lastly the final phase involves interventions that ensure an individual remains in the workforce. Services can be viewed in a continuum, where an individual may move between these distinct phases.[17,20]

Historically and in most literature, vocational rehabilitation has been about RTW.[17,20,90] Vocational rehabilitation is the process of overcoming the barriers that an individual faces when accessing, remaining or returning to work following injury, illness or impairment.[82] Vocational rehabilitation is not a matter of healthcare alone, but a central part of all clinical and workplace management.[17] It provides improvements to the quality of life and well-being of individuals, vocational rehabilitation can also have a positive effect on economic and political structures.[20]

The process of vocational rehabilitation consists of the following steps: Prevention, Screening, Assessment and Evaluation, Intervention, Placement, Follow-up.[81] (see Figure 2.4)

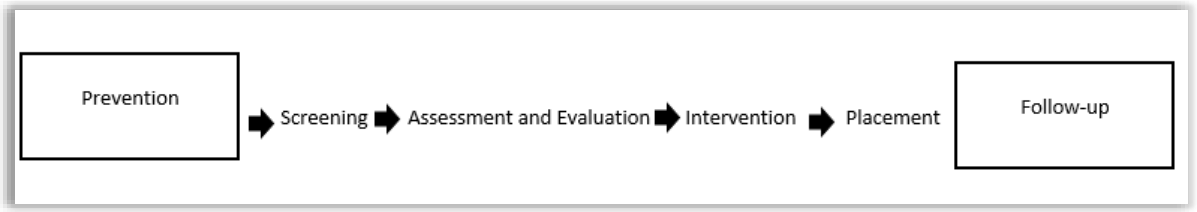


Figure 2.4: The vocational rehabilitation process[81]

Figure 2.4 Illustrates that vocational rehabilitation consists of a systematic process which enables guidance for RTW facilitation. An essential element of the vocational rehabilitation process is helping the individual come to terms with their injury, and to understand, and manage, the ways in which it impacts on their participation in work.[82]

Prevention is a professional educative service for the prevention of injury and maintenance of physical and mental well-being at work, as well as creating an awareness of good work practice, preventing the development of pathology.[81] Assessment and evaluation services involve the assessment of the ability of an individual following injury, to determine their ability to work.[81]

Intervention services are programmes aimed at correcting, adapting or compensating for deficits that interfere with work ability.[81] Placement services are efforts aimed at the actual work site and are focused on RTW;[29] it involves the returning of clients to their own, alternative or new occupation in the open labour market.[81] Work site visits would be essential and could include services such as job analysis, accessibility, ergonomic audits and advice to managers and employers.[81] Follow-up is done post vocational rehabilitation by the therapist with employers, referral sources, family members and the clients themselves, either telephonically, electronically or during physical work visits.[81]

The organisation and provision of vocational rehabilitation services differ between countries, and even between regions within individual countries, however the objectives are always "to maximise the ability of an individual to return to meaningful employment".[20] Vocational rehabilitation in the South African public sector is fragmented between the Departments of Health, Transport, Labour, Correctional Services, Social Welfare and Basic Education.[81] Vocational assessments, and to a lesser extent rehabilitation, is provided in the private sector and funded by insurance and commercial enterprises.[81]

Vocational rehabilitation services include vocational assessment, work re-training, disability awareness as well as education and counselling, ergonomic modifications and psycho-social intervention, job modification, case management, pain management, work trials, work hardening, work preparation or readiness, work visits, work guidance, reasonable accommodation, work adaptation, support groups and other RTW efforts.[20,81-82,91]

Vocational rehabilitation focuses on identifying and addressing health-related, personal or psychological and social or occupational obstacles that hinder RTW.[17] A number of

vocational rehabilitation work outcomes exist and their representation can be in a hierarchy (Figure 2.5), which allows for the exploration of each option until a suitable one is determined for a particular individual. Vocational rehabilitation is seen as an active process of change, facilitating the journey from injury to work.[17] It is goal directed, with the core objective of restoring capacity for work and translating that into active participation.[17]

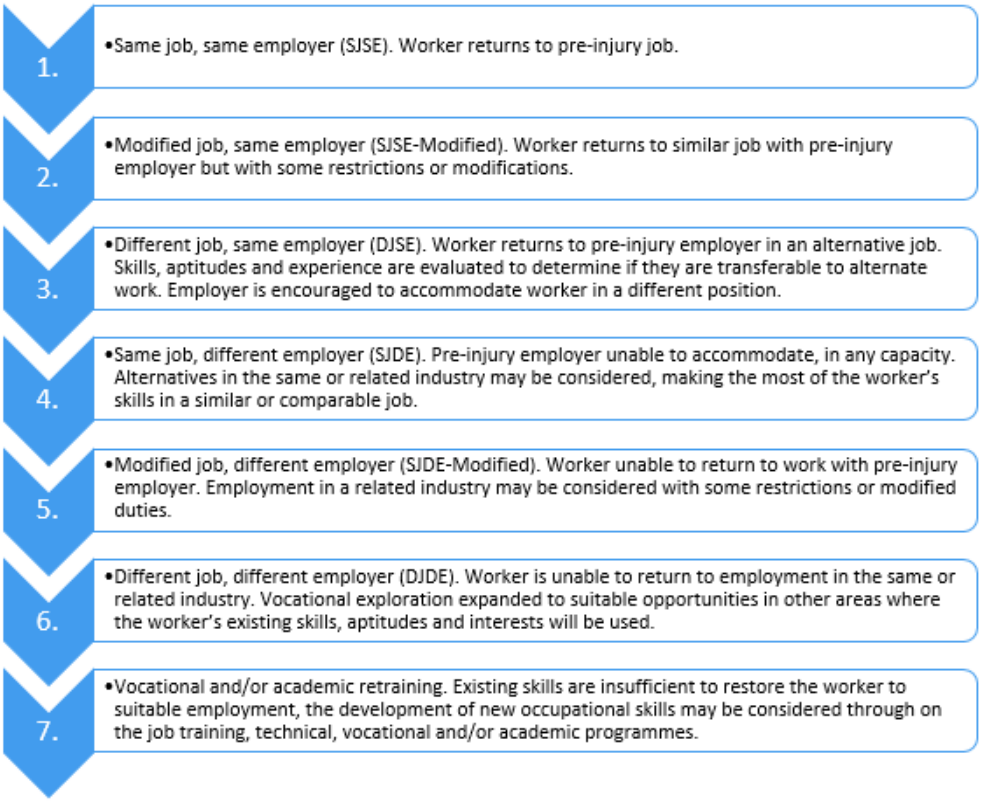


Figure 2.5: Hierarchy of occupational outcomes[17]

The concept of early intervention is fundamental in vocational rehabilitation, as the longer one is off work, the greater the barriers to RTW.[17] Early intervention, after sufficient time for healing of injured structures, and the individual's active involvement is said to reduce general deconditioning and illness behaviour, thus fostering higher RTW rates.[20] Effective vocational rehabilitation depends on communication and involvement between key role players – including the participation, motivation and effort of the individual, as well as the healthcare provider, and the workplace to ensure successful intervention.[17]

2.6 SUMMARY

Initially, there was an outline of the purpose of this literature review, followed by a delineation of the literature review content to display understanding of the research subject as well as the various contributions concerning the subject in study, and the methods used for obtaining literature.

To gain insight into the study subject, the literature review covered the definition and roles of work, background on the South African platinum mining industry, legislation and occupational injuries in the mining sector, upper limb amputation, occupational therapy intervention, upper limb rehabilitation, as well as RTW and vocational rehabilitation. This literature review has outlined existing publications associated with RTW experiences and factors influencing RTW following upper limb amputation. The above creates a firm foundation for this study and clearly illustrates the gap in literature that this study will contribute towards filling.

The following chapter will present the methodology used in this study, and discuss the research design and approach, followed by a description of the population and the sample, as well as the processes followed in data collection and analysis, and trustworthiness and ethical considerations.

3. CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

Research methodology is described as the systemic process applied to solve a specific problem. It is comprised of the research design, and method or tools used to conduct a research study.[92] The research methodology enlightens the reader on how the study was conducted; in other words, it explains the techniques that the researcher used to systematically implement the study. It further provides details on how information was gathered and analysed to effectively answer the research question.[35] In this chapter, the research approach and design will be discussed after which the population and sampling method will be presented. A detailed discussion regarding data collection, data analysis and the ethical considerations of this study will constitute the final section of this chapter.

3.2 RESEARCH APPROACH AND DESIGN

A qualitative description approach was used to explore and describe the RTW experiences of South African platinum mine workers' following upper limb amputation and vocational rehabilitation.[34] Qualitative descriptive research generates data that describe the 'who, what, and where of events or experiences' from a subjective perspective.[93] It represents the unique characteristics of qualitative research with a naturalistic enquiry; this reasons a commitment to studying something in its natural state.[34] This creates an understanding of a phenomenon through accessing the meanings participants ascribe to them. The study of phenomena in their natural context is central, along with the acceptance that the researcher cannot evade affecting the phenomenon under investigation.[34]

In this study, the RTW experiences of South African mine workers, working in the platinum mining industry was sought. From a philosophical perspective, this approach allowed the researcher to develop an understanding, and describe the subjective RTW experiences of individuals who sustained upper limb amputation injury. The researcher played an active role in the research process by directly interviewing participants to gain the perspectives and words of the research participants as well as with analysing and interpreting these findings.

A qualitative descriptive design[34] was applied. A research design refers to the overall strategy that the researcher employs to incorporate the different components of the study

in a coherent and logical way, this is to ensure that the research problem is addressed effectively.[92] It considers the final product of the study, and it serves as the blueprint for data collection and analysis, through a structured set of rational guidelines, to assist in generating reliable findings.[92,94] The rationale for using a qualitative descriptive design, was to gain first-hand descriptions of participants experiences and perceptions of the phenomenon under investigation.[93]

3.3 RESEARCH SETTING

The research setting was a selected occupational therapy practice in the North West Province where the researcher previously worked. The occupational therapy practice provides sub-acute rehabilitation and vocational rehabilitation services for individuals who sustained general and work-related upper extremity injuries.

3.4 POPULATION AND SAMPLE

3.4.1 Population

A population is described as a large collection of individuals or objects that are the main focus of a study.[95] In this study, the population consisted of South African mine workers in the platinum mining industry.

3.4.2 Sampling method

According to Polit and Beck,[35] sampling is the process used by the researcher to obtain a representation of a whole population by selecting a portion of the represented population.[96-35,97] It is important to determine a representative sample of a population, one in which the same choice of characteristics can be found in similar portions as in the population to ensure depth in the data.[97-98]

Purposive sampling[99] was applied in this qualitative descriptive study. This technique is based entirely on the judgement of the researcher, in that participants and sites are selected that can purposely inform and meaningfully contribute to yielding desirable outcomes, which are in line with the research aims and purpose of the study.[93,99-100] Purposive sampling is a non-random technique that does not need underlying theories or a set number of participants; it is generally used in descriptive qualitative research. [93,100]

For this study, the selection of potential research participants was from client files at the selected occupational therapy private practice, using the inclusion criteria of the study.

The following are the inclusion and exclusion criteria applied:

I. Inclusion criteria for participants

- Adults, age 18 and older who are South African citizens, working at a platinum mine in South Africa
- Individuals with a minimum of Grade 10 level of education
- Individuals who are literate, have a basic understanding of English, and can communicate in English, Tswana or Zulu. Having a basic understanding of English was an inclusion criterion because the researcher is not articulate in Zulu and Tswana
- Individuals sustaining an upper limb amputation on their dominant upper limb. The minimum level of amputation for inclusion is a full or partial loss of one or more fingers; amputations at wrist disarticulation, trans-radial and elbow disarticulation level[86]
- The upper limb amputation resulted from an injury on duty, and sustained no longer than three years ago
- Individuals who underwent medical, sub-acute and vocational rehabilitation services and have returned to work following injury
- Individuals who underwent sub-acute rehabilitation at the selected occupational therapy private practice, and vocational rehabilitation at an occupational therapy practice or at a platinum mine hospital

II. Exclusion criteria for participants

- Individuals with congenital amputation or lower limb amputation
- Individuals with an additional injury, in conjunction with the upper limb amputation, affecting upper limb hand function
- Individuals with a history of sustained head injury or a neurological condition

3.4.3 Sample size

In qualitative research, the researcher usually focuses on a small sample size that is representative of the whole population; although small sample sizes are common in qualitative descriptive research, researchers need to ensure that enough data is collected

to meet the study aims.[93,97,99] The expected sample size for a qualitative study, as proposed by Creswell, is approximately four to five participants.[3]

The researcher reviewed client files, sourced from the occupational therapy practice, to identify eligible participants who sustained upper limb amputation and were seen for vocational rehabilitation. The researcher identified a sample of 17 potential participants from physical records at the selected occupational therapy practice.

Potential participants were telephonically contacted by the researcher for invitation to take part in the study. Five of the 17 potential participants contacted could not be reached due to outdated contact details, and two could not be reached as there was no answer. The researcher successfully reached 10 of the potential research participants, and six of these participants voluntarily agreed to participate in the study. Refer to Chapter 4, Section 4.2 for more details on the participants' demographic information.

3.4.4 Informed consent

Informed consent, as a concept, consists of three elements: information, comprehension, and voluntariness.[101] The goal is to "ensure that people understand what it means to participate in a particular research study so they can decide in a conscious, deliberate way whether they want to participate."[101] On initial telephonic contact with the researcher, potential research participants received an explanation and information about the study purpose, process and procedures so that they could make a voluntary decision about taking part in the study. They were given an opportunity to ask question to ensure understanding of the study process and procedures. An informed consent form was sent to potential participants as an attachment via email. Participants who had no access to email facilities met with the researcher to sign the consent form in-person.

The consent form included aspects of voluntary participation and the freedom to withdraw at any stage.[101] Please view Annexure A for the informed consent letter. In order for participants to disclose fully, the researcher was obliged to describe the participant's rights and the risks of participation in the study.[35]

3.5 DATA COLLECTION

Data collection refers to a detailed, organised process whereby the researcher gathers information from all relevant sources in order to find answers to the research problem.[99] In

the context of the current study, telephonic semi-structured interviews were used as a method of exploring "the RTW experiences" of six individuals who returned to work following upper limb amputation and vocational rehabilitation. Telephone interviews were more appropriate as the study took place during the COVID 19 pandemic; by conducting telephone interviews the researcher ensured adherence to social distancing regulations. This method of data collection also offered greater flexibility and ease of access to research participants and reduced costs for the researcher.[93]

Semi-structured interviews were conducted using an interview schedule. The interview schedule was used as guideline for asking questions and facilitating prompting during the interview session.[23,86] Semi-structured interviews were conducted until there was a level of saturation reached. Data saturation entails collecting data up to the point at which new data no longer emerges during the data collection process.[101] In this study, data saturation was reached at the point when additional coding was no longer feasible and enough information was obtained to answer the research question.[34]

3.5.1 The interview schedule

To ensure relevant data was collected, the interview schedule was informed by the research aim and objectives as well as relevant literature and personal experience of the researcher working with upper limb amputees.[25,86,90,102-104] The researcher gathered information to gain insight on the structure and content of the interview schedule.[104]

The interview schedule contained three main sections: The opening section, the body which contained a list of topics and questions and a closing section.[104] The following topics were included in the body section of the interview schedule:

- Injury; Rehabilitation
- Pre-injury life
- Return-to-work and work history
- Return-to-work barriers
- Return-to-work facilitators
- Support systems

Each topic contained a set of open-ended questions followed by probing questions, such as: "*What were the challenges you encountered when returning to work,*" followed by probing questions such as: "What was the hardest thing for you?" "What were the *personal*

challenges you encountered when returning to work (Physical ability, physical characteristics, Pain, hypersensitivity, emotional aspects such as fear)?"[25] and "what were the *environmental challenges* you encountered when returning to work (Social relationships both external and internal to the workplace)?"[25] and "What were the *occupational challenges* you encountered when returning to work (Physical demands of work)?"[25] Please view Annexure B for the interview schedule in English.

Data needed to be collected through direct descriptions and the questions needed to be generally open-ended,[99] so that participants could have sufficient opportunity to express their viewpoint regarding their RTW experiences.[99,105]

The interview schedule was translated to Zulu and Tswana to accommodate potential research participants who would not be articulate in English. The interview schedules were translated by an interpreter. Please see Annexure C for the translated interview schedule in Tswana and Annexure D for the interview schedule in Zulu.

In preparation for data collection, the interview schedule was refined by means of piloting and pretesting of the interview schedule.

3.5.1.1 Piloting of the interview schedule

Piloting of the interview schedule was done to gain constructive feedback on probable adaptions to the interview schedule in order to detect possible flaws in the interview questions or interview structure.[96-97] The pilot study sampling[96] was purposive and included two qualified occupational therapists experienced in the field of vocational rehabilitation in the South African platinum mining sector. The occupational therapists were identified by the researcher; one was from an occupational therapy practice and the second from a platinum mine hospital. Both signed consent prior to completion of the pilot interview schedule form. Refer to Annexure E for a template of the consent form provided for the occupational therapists.

The occupational therapists provided written feedback by completing an evaluation form for the interview schedule. See Annexure F for the completed interview schedule evaluation forms. Feedback was aimed at evaluating the applicability of the interview questions in relation to the study aim, ensuring that the interview questions were well-described and clear, and evaluating the effectiveness and appropriateness of the probing questions. There

was consideration of this feedback and a final interview schedule was drafted by the researcher.

3.5.1.2 Pretesting the interview schedule

To test the feasibility of using the interview schedule, the researcher pretested the interview schedule with an individual who was not fluent in English. The researcher identified the pilot member from client records at the selected occupational therapy practice; this pilot member gave voluntary consent to participate in the study by completing written consent.

Pretesting of the interview schedule was conducted telephonically with a Tswana speaking individual on 31 October 2020. The researcher obtained the services of an interpreter to assist with translation for this session. Prior to commencement of the date of the interview, the researcher contacted the interpreter for a briefing on the purpose and process of the research and pretesting of the interview schedule. The interpreter signed confidentiality and consent to assist in translating.

Prior to commencing the interview schedule pretesting session, an explanation was provided on the expectations during the interview and the rights of withdrawal. The pilot member received information about the purpose of the study and the duration of the interview. The interview session consisted of two sections: Obtaining demographic and background information (Annexure G), and conducting the semi-structured interview with use of the interview schedule. At the end of the session, the researcher thanked the participant and interpreter for their time and contribution to the study. The session was recorded on a cell phone by the researcher; the telephonic interview session lasted 1 hour and 22 minutes.

Following piloting and pretesting of the interview schedule, the researcher considered the following modifications to the interview schedule:

- An additional question was included in the demographic and background section to obtain participants level of education
- An explanation was included on the purpose of collecting background information for the interview
- Questions 2 and 3 were merged under Support systems due to repetition of information

- An additional question was included at the end of the interview schedule to ask if participants required supportive services post interview.

Refer to Annexure H for the revised interview schedule.

3.5.2 Preparation for data collection

- The researcher obtained signed permission from management at the occupational therapy practice prior to piloting and pretesting of the interview schedule. The researcher described the purpose and process of the study to the manager and that which would be expected from potential participants for piloting and conducting of the semi-structured interviews. The researcher also emphasized that the study received approval from the Research Ethics Committee, and affirmed the guarantee of anonymity and privacy of the potential research participants and occupational therapy practice.
- The researcher purchased data packages and voice calling minutes with a preferred network provider in preparation for contacting research participants for the interviews. A conference calling facility package was selected to allow for telephonic interviewing with the researcher, participant and interpreter present.
- Following the receipt of signed consent, the researcher made telephonic arrangements with each participant to establish a convenient date and time for the interviews to be conducted.
- The interpreter was informed than an arrangement would be made in advance for her to assist in translating when required.
- The researcher ensured the availability of a working cell phone, which was required for recording interview sessions. The researcher ensured the availability of required stationary such as pens, paper and highlighters.
- Electronic reminders via WhatsApp were went to research participants a day prior to the scheduled interview dates.

3.5.3 Data collection procedures

Six semi-structured telephonic interviews were conducted. Data collection for the study commenced on 16 November 2020 and ended on 20 December 2020 when data saturation was reached. Each telephonic interview was recorded by the researcher on a separate cell phone other than the one that was used for calling. Translation was required for one research participant who was Sepedi-speaking. In this session, the interpreter was not

required to lead the interviews as interviewing required skill by an occupational therapist with experience in the field of vocational rehabilitation.

The semi-structured interviews were conducted as follows:

- At the beginning of the session, the researcher collected demographic information. Please see the demographic information form in Tswana (Annexure I), and in Zulu (Annexure J). Provision of detailed information about participant characteristics allows for researchers to lean toward a position of "universalism," which identifies that there may be universal psychological processes that occur differently depending on the culture, ethnicity, and or the level of education of an individual.[106] Inclusion of demographic and/or background information contributed to ensuring richness of the data.[106]
- The interview schedule commenced with an opening section where the researcher explained the purpose and motivation of the semi-structured interview as well as the estimated duration of the interview session. There was a reminder to participants about the recording of the interviews. The researcher then commenced with interview questions under each topic from the body of the interview schedule.
- The researcher took notes and utilised several communication techniques, such as those advocated by Greeff,[107] including paraphrasing and clarification to ensure the researcher understood the participant correctly, reflection, encouragement and probing to ensure a comprehensive response.[95]
- In closing, the researcher took the opportunity to thank everyone for his/her engagement and input at the end of each interview session; this was to demonstrate cooperation and to show respect. Participants were asked if they required any psychological or counselling services to ensure support.
- Each participant received the contact details for the counsellor. The researcher encouraged participants to call if they required counselling or supportive services; however, no participant reported the need for supportive services post interview. All participants were reassured they would be informed about the findings of the study and that anonymity and confidentiality would be maintained.[35]

3.5.4 Data organisation

All recorded interviews were transcribed verbatim by the researcher's for analysis. Each participant was randomly assigned a pseudonym; the researcher searched for common

unisex South African names on Google search to allocate to participants. Pseudonyms were used in the transcription documents to protect participants' confidentiality. The recordings, as well as the transcriptions, were saved on two separate password-protected hard drives. All documents and external hard drives were kept in a locked office at the University of Pretoria, Prinshof Campus. Data organisation and analysis commenced directly after the interviews.

3.6 DATA ANALYSIS

Data analysis is essential to credible qualitative research.[108] The data analysis process involves "a constant moving back and forward between an entire data set and coded extracts of the analysed data."[109] The researchers ability to understand, describe and interpret experiences and perceptions is vital in uncovering meaning in specific contexts.[108]

In this study, qualitative content analysis was carried out by using an inductive approach initially, and thereafter a deductive approach in content analysis. [110] An inductive approach, is characterised by a search for codes and patterns from collected data, where the researcher looks for similarities and differences in the data, which are categorised as themes and sub-themes.[110] This approach is subjective, in that each participant has their own perspective and each perspective counts, it recognizes the subjectivity of the experience of not only the participant, but also the researcher and it is designed to develop an understanding as well as describe the phenomenon under study.

A deductive approach involves applying or examining the implications of existing theories or models against the collected data of the phenomenon under study.[110] The epistemological basis of qualitative content analysis is that data and interpretation are co-creations of the interviewee and the interviewer, and interpretation during the analysis phase is a co-creation of the researcher and the text.[110] Both inductive and deductive analysis was applied to gain meaning of participant's RTW experiences following upper limb amputation and vocational rehabilitation.

This section describes the inductive analysis ensued, the deductive content analysis process is detailed in Chapter 5.

Transcriptions were analysed inductively using Braun and Clarke's six phases of thematic analysis (Figure 3.1).[109] Application of each phase is detailed below:

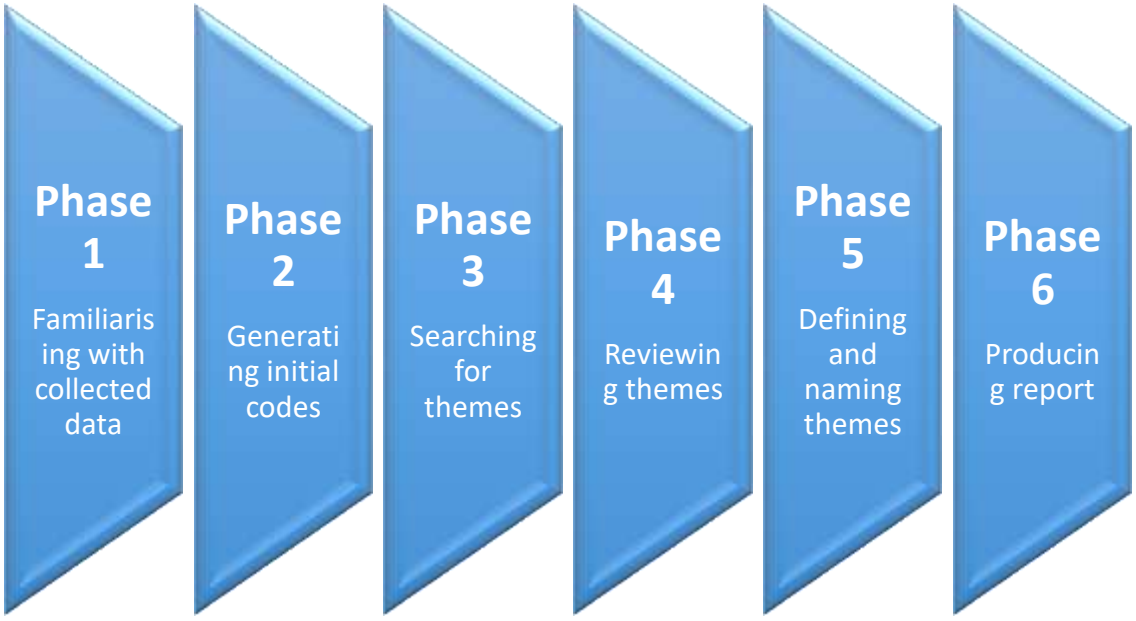


Figure 3.1: Braun and Clarke's six phases of thematic analysis[109]

i. Familiarising with collected data

This process involves "immersing oneself in the data." Immersion is a vital process that involves repeated listening and writing, and re-reading of written data to the extent of gaining the depth of the content and allowing familiarity with it.[109] Combining and transcribing of the data into written form is necessary to conduct a thematic analysis. Transcribing the interviews and listening to the voices of the participants repeatedly enables the transcriptions to come alive during the analysis in the quest for themes and subthemes.[34] A transcript is defined as "the verbatim account of all verbal and sometimes non-verbal (e.g., clearing throat) utterances."[8] The transcribed information retains the required information from the verbal account in its true and original nature. In this phase, the researcher transcribed all six interviews in Microsoft Word format, using the recorded material and notes made during the interviews. The researcher and research supervisors reviewed the transcribed information.

ii. Generating initial codes

The second phase of Braun and Clarke's thematic analysis involves the production of initial codes from the data. Codes reflect "the most basic element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon."[7] The coding process is said to be part of analysis;[6] it involves organising data into meaningful groups.[109] For this study, there was manual generation of codes by making notes using data extracts

from the interview transcripts. Codes were highlighted to indicate potential patterns and segments of data.[7] Identified codes were matched with equivalent data extracts that determined and described the code; data extracts were copied from individual transcripts and coordinated with a generated code that well described the copied extract.[109]

iii. Searching for themes

Theme development commences once there has been coding and collating of the data with a list of codes identified from the data set. Phase three involves sorting of codes into similar/different codes to potential themes and sub-themes, and collating all the relevant coded data extracts within the identified themes.[109] The researcher arranged groups using coloured paper for visual representation to sort codes into themes.[109] Figure 3.2 and 3.3 show examples of visual representations.

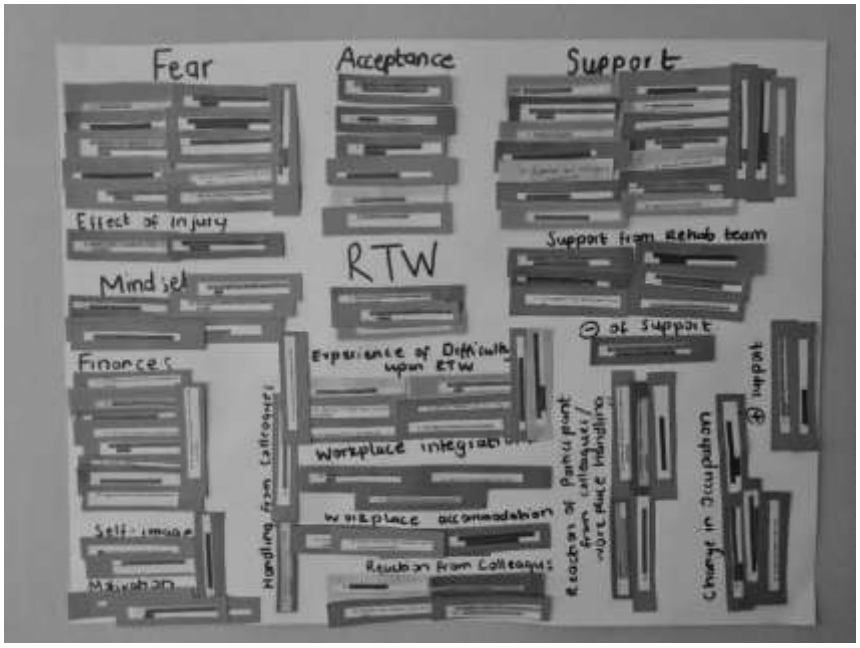


Figure 3.2: Image 1 depicting a visual representation of theme development

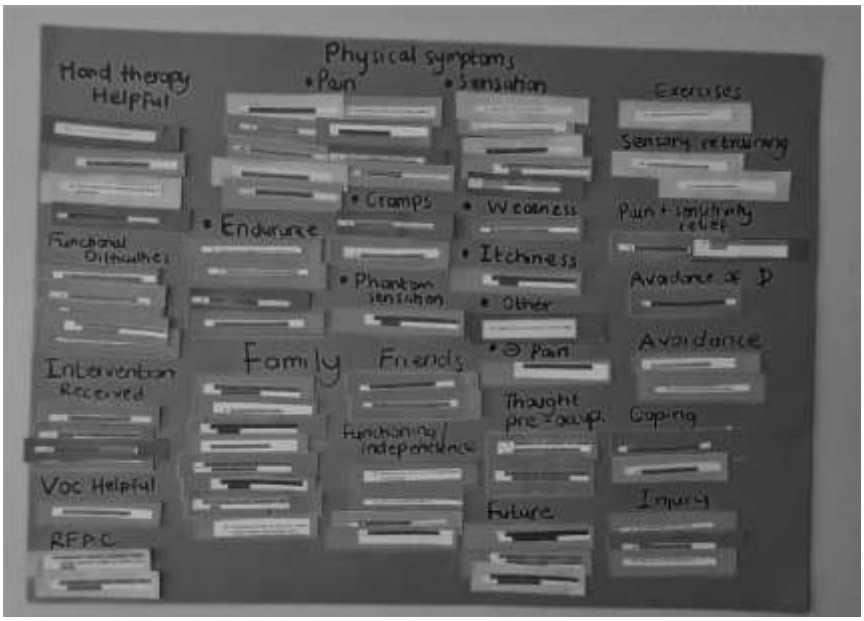


Image 3.3: Image 2 depicting a visual representation of theme development

iv. Reviewing themes

Two levels exist in the process of theme review and refinement.[109] Level one requires the researcher to read all collated extracts for succeeding themes to determine whether they form a coherent pattern, thus creating a "thematic map" with adequately captured contours of the coded data. Once there is a coherent pattern formed, the researcher will proceed to the second level of this phase. Level two involves considering the validity of individual themes in relation to the data set;[109] it also takes into account whether the main thematic map accurately reflects the evident meanings in the entire data set;[109] The researcher developed a thematic map in table form, to capture the coded data with their matching themes.

v. Defining and naming themes

Conducting a detailed analysis develops the "final themes" as well as sub-themes. In this phase, initial themes are defined and refined for analysis.[109] In the process of "defining" and "refining," the following is determined: the essence of the themes overall meaning and the aspects of data captured by each theme.[109] The researcher reviewed developed themes from the thematic map and established an overarching theme (with guidelines from the OCM), main themes and sub-themes.

vi. Producing the report

Braun and Clarke[109] explain the task of write-up as communicating a complicating story of research data in a way that convinces the reader of the merit and validity analysis.[109] The write-up process provides a concise and coherent, non-repetitive and a detailed account of the interpretation of the data across themes. Sufficient data extracts are required to provide sufficient evidence of themes.[109] In the course of data analysis, the OCM was used as a guideline in organising and synthesising the RTW experiences of individuals to gain understanding of the factors that influence RTW;[25] the organisational component of this framework is said to foster a better understanding of factors studied.[25]

3.7 RIGOUR/QUALITY CONTROL

Trustworthiness is examined as a way of ensuring data quality in qualitative research.[96] The researcher ensured trustworthiness of the study by applying the following: credibility, dependability, authenticity, confirmability and transferability.[96]

Credibility refers to: "confidence in the truthfulness of the data and interpretation thereof."[96] To ensure credibility for the study, there was prolonged engagement in the study setting implemented to gain in-depth understanding of the phenomena. The researcher engaged with participants on more than one occasion, even prior to the scheduled interview sessions, to build trust and rapport.[96]

To ensure dependability, the process and procedures of the study were peer reviewed to determine whether they were acceptable; the study process was reviewed by an independent occupational therapist and research supervisors.[96] Dependability provides evidence that should the study process and procedures be repeated with the same participants in the same context, the findings would be similar; dependability alludes to the data's stability over time.[96]

Authenticity was applied to indicate the range of realities from participant's responses in a true and fair manner.[96] The researcher expressed the experiences and emotions of the participants as they occurred by including direct quotations of specific responses. The researcher provided detailed descriptions of data and apply self-reflection with interpretation of responses in Chapter 4 to clarify possible biases.[96]

Confirmability refers to the extent to which the results of a research study are a true reflection and can be confirmed by other researchers;[111] it also refers to " the objectivity and neutrality of the collected data and its interpretation."[35] "Confirmability is concerned with the fact that generating data and interpretations of findings is not a creation of the researcher's imagination, but clearly derived from the data."[111] Confirmability was remaining objective when analysing data, and ensuring an independent occupational therapist and the research supervisors reviewed the research data and interpretations. The researcher kept the research data for reference.

Transferability refers to the extent to which the research findings can be applied to other contexts with other respondents.[112] The transferability of the study findings is shown when there is a probability that the same findings can have meaning and be applied to others who may be in the same situation.[35] Although this inquiry is focused on upper limb amputees working in the platinum mining industry in the North West Province, it can also be applied to upper limb amputees in other platinum mine contexts. The researcher provided background to the study, the research method used, and information regarding the participant characteristics, therefore other researcher's would be able to use the study findings for future research studies.

3.8 ETHICAL CONSIDERATIONS

The Faculty of Health Sciences Research Ethics Committee granted ethical clearance for this study to commence, and a certificate with ethical clearance number 57/2020 was issued (Annexure K). The researcher obtained permission from management at the selected occupational therapy practice to access research participants for the study (Annexure L). In any research study, the researcher must adhere to the principles of ethics as stated in ethical codes, such as the Nuremberg Code and the Declaration of Helsinki.[96] Invasive and insensitive questions were avoided in order to adhere to the following ethical principles: beneficence, confidentiality, and human dignity.[35]

3.8.1 Beneficence

Beneficence was ensured by protecting participants from harm and discomfort during the study process.[35] The researcher ensured that research questions were not personal or unsettling in order to prevent psychological harm; research questions were reviewed during piloting of the interview schedule to ensure they did not provoke any harm.[35] Participants

were given the right not to answer any questions they perceived as uncomfortable. Psychological services were available for participants if the need arose post interviewing.

3.8.2 Confidentiality and human dignity

Ensuring non-maleficence was by not posing any harm to the participants during the research. No questions within the study scope infringed any human rights or caused discrimination towards any participant on the basis of race, language, gender, age, culture and financial status.[35] Maintaining confidentiality was by keeping all personal information as well as the name of the selected occupational therapy private practice anonymous throughout the study and reporting; the researcher also made use of pseudonyms to ensure anonymity.[86,35]

3.9 SUMMARY

This chapter discussed the research methodology and data collection and analysis process used for the study. Throughout the study process, there was consideration of and adherence to ethical principles. Chapter 4 outlines the results obtained in this study.

4 CHAPTER 4: RESEARCH FINDINGS

4.1 INTRODUCTION

In this chapter the researcher outlines the study findings with verbatim transcribed quotes of the qualitative data to support the results of the study.[35] Included in this chapter is an overview of the demographic profile of participants with a description of the research participants' and their characteristics. Subsequently, an overview of the emergent study themes and subthemes are reported based on generated codes from inductively analysed data.[35]

4.2 DEMOGRAPHIC PROFILE OF THE STUDY

4.2.1 Description of participants

This study engaged the population of South African platinum mine workers who returned to work following upper limb amputation and vocational rehabilitation. Six participants agreed to participate in this study. Table 4.1 provides the demographic information of participants with pseudonyms.[97]

Table 4.1: Demographic information of participants

Participants	Gender	Age	Socio-cultural group	Experience in mining sector
Andile	Female	37	Tswana	13 Years
Tumelo	Male	30	Isizulu	4 Years
Thato	Male	30	Tswana	2 Years
Simphiwe	Male	48	Sepedi	24 Years
Bandile	Female	30	Sesotho	10 Years
Tshepiso	Male	37	Tswana	12 Years

Six participants who met the inclusion criteria agreed to participate in the study; four were males and two were females. The participant's ages ranged between 30 and 48 years, with an average age of 35 years Participants' sociocultural groups were isiZulu, Tswana, Sepedi and Sesotho. Three out of six of the participants were Tswana speaking; this particular dialect is the dominant language spoken in the region where the study was conducted

(North-West Province).[113] The years of experience participants had working in the mining sector ranged between two and 24 years with an average of 10.8 years of experience.

4.2.2 Participant characteristics

Participants' background and clinical information was collected, Table 4.2 provides a summary of this information. Gathering of this information aided the facilitation of follow-up questions during the interviews to gain more insight into participant's subjective experiences of the factors influencing RTW following upper limb amputation and vocational rehabilitation.

Table 4.2: Summary of background and clinical information

Clinical background and history	Andile	Tumelo	Thato	Simphiwe	Bandile	Tshepiso
Level of amputation	Single Ray amputation right LF	Single Ray amputation left RF	Partial digit amputation Right MF, RF and IF	Amputation at DIPJ right LF and RF	Single Ray amputation right LF	Partial digit amputation at DIPJ left IF
Presence of comorbidities	No	No	No	No	HIV	Hypertension
Previous injuries	No	No	No	No	No	No
Vocational rehabilitation services received	Yes	Yes	Yes	Yes	Yes	Yes
RTW motivation according to the participant	Motivated	Motivated	Motivated	Motivated	Motivated	Motivated
Change of occupation upon RTW	No	Yes.	No	No	No	No
Coping upon RTW	"Yes, I feel like I have adjusted now."	"Yes, my job is not difficult."	"Yes, I am coping fully."	Yes	"Coping perfectly"	"Coping 100%"
Any pressure experienced to RTW	No	Yes: Need to continue supporting himself.	No	Yes	Pressure: Due to finances	No

Table 4.2 and Figure 4.3 (below) provide an overview of the types and levels of amputation sustained by participants.

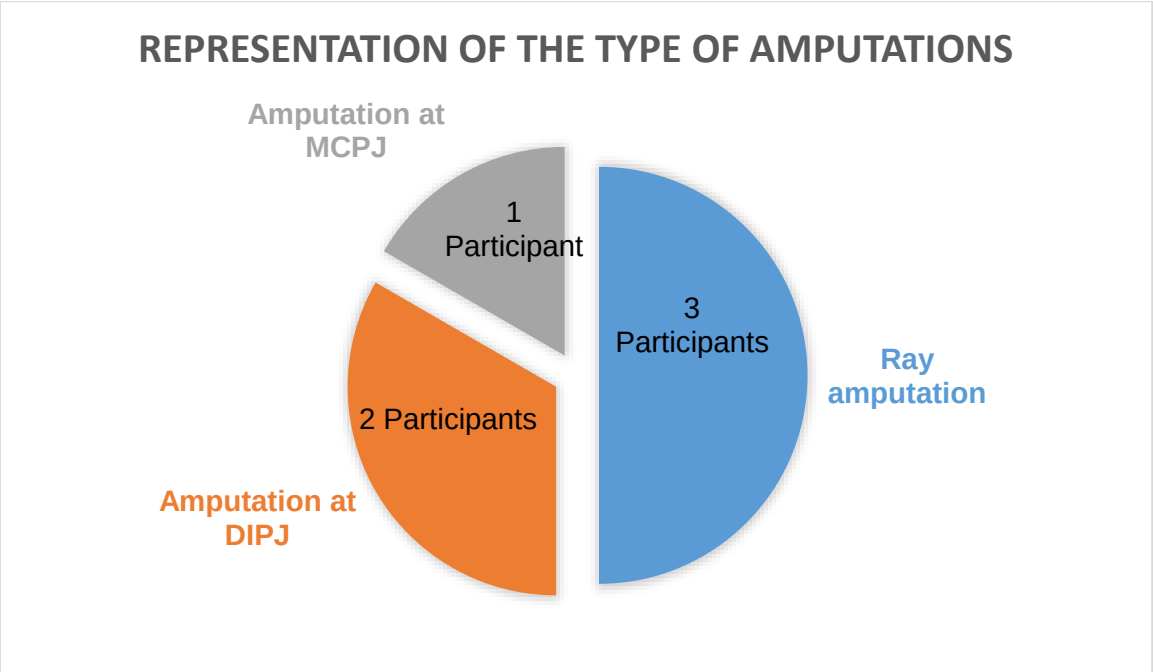
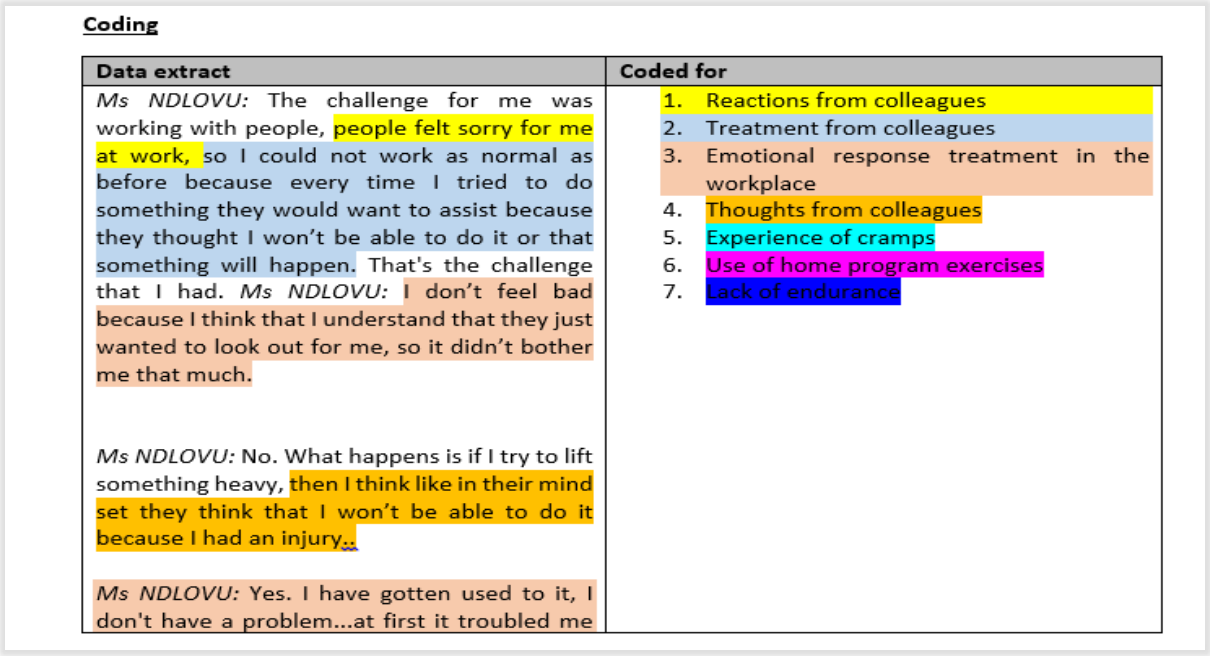


Figure 4.3 Representation of the types of amputation

Participants had a range of one to three fingers involved following amputation. The most prevalent type of amputation amongst participants was a single digit ray amputation, followed by amputation sustained at the distal interphalangeal joint (DIPJ) level. Only one participant sustained amputation at the metacarpophalangeal joint (MCPJ) level.

4.3 OVERVIEW OF RESEARCH FINDINGS

The researcher applied Braun and Clarke's[109] six phases of thematic analysis (see Chapter 3, Section 3.6) to inductively analyse interview data from six participants. Firstly, there was the transcription of the participants' recorded interviews, and then the researcher read and reflected them; this was to gain familiarity with the collected data.[96] Subsequently, the researcher manually generated codes by using data extracts from transcribed interviews. Figure 4.4 illustrates an example of the coding process. The same colour was used to match each code with the equivalent data extract that determined the specific code.



Coding

Data extract	Coded for
Ms NDLOVU: The challenge for me was working with people, people felt sorry for me at work, so I could not work as normal as before because every time I tried to do something they would want to assist because they thought I won't be able to do it or that something will happen. That's the challenge that I had. *Ms NDLOVU:* I don't feel bad because I think that I understand that they just wanted to look out for me, so it didn't bother me that much. *Ms NDLOVU:* No. What happens is if I try to lift something heavy, then I think like in their mind set they think that I won't be able to do it because I had an injury.. *Ms NDLOVU:* Yes. I have gotten used to it, I don't have a problem...at first it troubled me	1. Reactions from colleagues 2. Treatment from colleagues 3. Emotional response treatment in the workplace 4. Thoughts from colleagues 5. Experience of cramps 6. Use of home program exercises 7. Lack of endurance

Figure 4.4: Example of coding

The interview data extracts yielded 237 codes, which the researcher grouped and collapsed by grouping similar codes, then into 104 and finally into 47 codes. With the use of a thematic map, the researcher went through the collapsed codes and explored the meaning contained within them; these codes were sorted into themes and subthemes. From the collapsed codes, four themes emerged together with their respective subthemes.

Table 4.5 presents detailed information on how the following four themes emerged from collapsed codes:

- ***Theme 1:*** *Initial and ongoing difficulties*
- ***Theme 2:*** *Colleagues' attitude and workplace responses*
- ***Theme 3:*** *Things that helped during my return-to- work journey*
- ***Theme 4:*** *Change and return-to-work*

Table 4.5: Overview of themes, subthemes and codes

Theme		Sub-themes	Codes
Theme 1	Initial and ongoing difficulties	**1. Residual physical difficulties**	1.1 Experience of pain by participant 1.2 Experience of decreased physical endurance by participant 1.3 Experience of cramps by participant 1.4 Experience of phantom sensation by participant 1.5 Experience of altered sensation by participant

Theme		Sub-themes	Codes
			1.6 Experience of stump itchiness by participant
		2. Emotional responses	2.1 Experience of fear 2.2 Experience of hopelessness by participant
		3. Altered self-image	3.1 Altered self-image experienced by participant
Theme 2	Colleagues' attitude and workplace responses	**1. Workplace reactions**	1.1 Colleagues were empathetic 1.2 Reactions from managers upon return-to-work
		2. Handling from colleagues	2.1 Treatment from colleagues 2.2 Dealing with handling from colleagues
Theme 3	Things that helped during my return- to- work journey	**1. Support received**	1.1 Family support 1.2 Support from friends 1.3 Support from a partner 1.4 Support from the workplace 1.5 Support from rehabilitation team
		2. Positive attitude and mind-set	2.1 Applying a positive mind set 2.2 Correct mind-set helpful
		3. Motivation and drive	3.1 Motivation from therapist 3.2 Participant had the drive to resume breadwinner role 3.3 Participant motivated by family to return-to-work
		4. Professionals who helped	4.1 Hand rehabilitation 4.2 Vocational rehabilitation 4.3 Social worker services
		5. Assistance from the workplace	5.1 Colleagues helpful

Theme		Sub-themes	Codes
Theme 4	Change and return- to- work	**1. Workplace reintegration experience**	1.1 Difficulty facing colleagues after injury 1.2 Difficulty showing colleagues injured finger 1.3 Difficulty talking about injury to colleagues 1.4 Talking about injury helpful
		2. Difficulties experienced when performing work tasks	2.1 Discomfort when working with grinder 2.2 Participant unable to lift more than 15kg 2.3 Poor physical endurance when lifting 2.4 Poor physical endurance when welding
		3. Adaptation to work tasks	3.1 Discovering new ways to grasp 3.2 Rest breaks implemented when grasping
		4. Personal protective equipment: Gloves	4.1 Problem with work gloves 4.2 Work gloves not comfortable 4.3 Work gloves causing pain and sensitivity 4.4 No difficulty using soft gloves during training (vocational rehabilitation) 4.5 Using adjusted glove at work
		5. Alternative occupation	5.1 Employer allowed change of occupation 5.2 Change of occupation after injury
		6. Accommodation upon return-to-work	6.1 Managers unsure with accommodation of injured worker upon return to work 6.2 Managers were open to accommodating participant

A delineation of each theme is provided below with representative subthemes and quotes from data extracts to illustrate the key features of the themes and subthemes.

4.3.1 Theme 1: Initial and ongoing difficulties

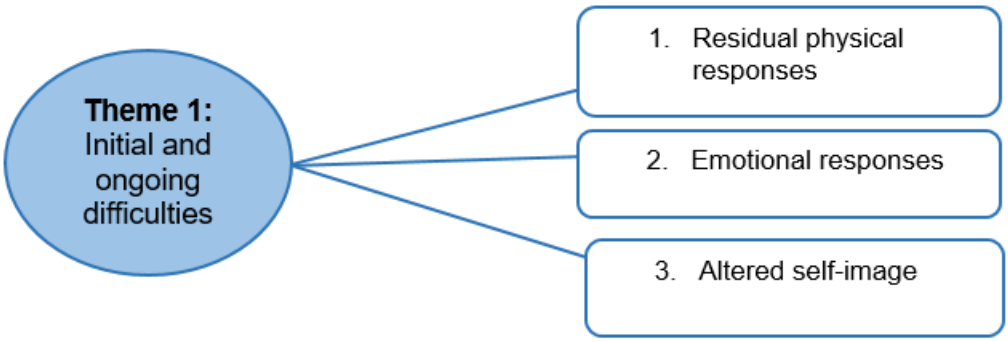


Figure 4.6 Representation of Theme 1 with subsequent subthemes

The first theme that emerged from this study was initial and ongoing difficulties. Most participants viewed their upper limb amputation injury as a life-changing occurrence, which greatly affected their appearance and normal functioning. The following quotes encapsulate the impact of upper limb amputation:

- *"This injury has changed my life, I don't see myself the same again…I feel like I am disabled, I don't feel like I am normal anymore."* (Tumelo)
- *"For now I can roughly say that 90% of my life I can still do it, it's just that 10% that I cannot do."* (Thato)

Participants described an array of ongoing difficulties experienced from the time of injury to hospitalisation and outpatient rehabilitation as well as upon RTW. Some participants gave an account of how their injury still affect them, even at the time of the interview.

- "*Even now, I can feel the pain, even from the shoulder*." (Andile)
- "*Even now, I still think too much about this when I am alone and not around people."* (Tumelo)

Participants reported physical, psychological and emotional difficulties. These difficulties reflect in the following subthemes: residual physical responses and emotional responses (4.3.1.1- 4.3.1.2).

4.3.1.1 Subtheme 1.1: Residual physical responses

Table 4.7: Subtheme 1.1 with codes

Residual physical difficulties
Codes
1. Experience of pain by participant
2. Experience of decreased physical endurance by participant
3. Experience of cramps by participant
4. Experience of phantom sensation by participant
5. Experience of altered sensation by participant
6. Experience of stump itchiness by participant

Participants reported difficulties with pain, cramps, stump itchiness, decreased physical endurance, altered sensation and experience of phantom sensation. Some participants reported the experience of pain and hypersensitivity concurrently, for instance, Simphiwe described "*…I experienced a lot of pain and sensitivity (over the stumps).* Most participants reported altered sensations, such as decreased sensation and hypersensitivity. Here are some extracts of their descriptions:

- *"My finger could not feel anything…"* (Tshepiso)
- "*There is sensitivity."* (Andile)
- *"It was choking over the stumps..."* (Simphiwe)

One participant reported the experience of phantom limb sensation. This participant described the phantom sensation as:

- *"I feel itchy over the area and I want to scratch but then I remember that the finger is no longer there."* (Bandile)

4.3.1.2 Subtheme 1.2: Emotional responses

Table 4.8: Subtheme 1.2 with codes

Emotional responses
Codes
1. Experience of fear
2. Experience of hopelessness by participant

Participants reported the experience of fear and hopelessness as:

- *"I was really afraid of how I will go back to work…"* (Tumelo)
- *"I am just afraid, I feel that it is too risky to work such a heavy job (rock drill operator), I don't want anything to happen…"* (Tumelo)
- *"I was afraid that if I can't go back to work, what will my kids eat, I knew that I had to go back because I am the main provider of my family."* (Simphiwe)

One participant's fear emanated from having an uncertainty on their ability to RTW post injury; this participant further expressed fear of returning to their *"risky"* pre-injury occupation. Fear also emerged with the possibility of not returning to work and the consequence of losing the breadwinner role. One participant reflected on the experience of hopelessness resulting from the uncertainty of RTW following upper limb amputation injury; this participant said:

- *"I was thinking of giving up and just going back home to the Eastern Cape, because I was not sure if I would be able to return to work."* (Tumelo)

In addition to the physical and emotional difficulties described, participants also reported a change in self-image following upper limb amputation, as explained below:

4.3.1.3 Subtheme 1.3: Altered self-image

Table 4.9: Subtheme 1.3 with codes

Altered self-image
Codes
1. Altered self-image experienced by participant

Self-image is defined as one's view or concept of oneself.[114] Two participants reported a change in self-image, describing a change in how they see themselves following upper limb

amputation injury. Both participants expressed they no longer felt *"normal."* Participants echoed:

- *"I feel like I am disabled*" (Tumelo)
- *I feel like, like I am no longer normal, like not complete." (*Bandile)

4.3.2 Theme 2: Colleagues' attitude and workplace responses

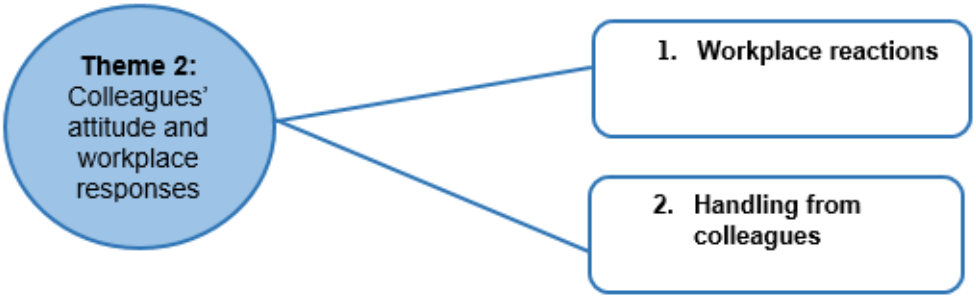


Figure 4.10: Representation of Theme 2 with subsequent subthemes

The second theme from this study was colleagues' attitude and responses. Participants described becoming aware of managers and colleagues' responses upon RTW following prolonged absence. One participant described how he observed a change in attitude from his colleagues upon RTW; he expressed:

- "*One thing that I have noticed is the attitude. When I talk about the attitude, it's the attitude from people towards you…"* (Thato).

Thato conveyed how it was a difficult experience for him to experience the change in people's attitude towards him due to his injury. Despite his negative experience, Thato described how he learnt to react to colleagues who called him names:

- *"I had to learn to control my temper."* (Thato)
- *"What I have learnt is to ignore a person…they will never understand the situation until it happens to you."* (Thato)

Two subthemes were identified under this second theme, namely workplace reactions and handling from colleagues. Presented below are examples of data extracts from the interviews.

4.3.2.1 Subtheme 2.1: Workplace reactions

Table 4.11: Subtheme 2.1 with codes

Workplace reactions
Codes
1. Colleagues were empathetic
2. Reactions from managers upon return-to-work

Two participants described the reactions they received from the workplace upon RTW. One participant described that her colleagues were empathetic towards her upon RTW; she expressed*"…people felt sorry for me at work"* (Andile). This participant indicated that colleagues frequently offered assistance with work tasks due to their assumption that she could no longer work normally. Interestingly, this participant expressed that she had no problem with colleagues showing empathy because she understood that her co-workers wanted to "*look out for her.*" She said they were protecting her.

Another participant described how startled his managers were after seeing him for the first time following his injury:

- *"My managers, first time when I returned to work, they were shocked"* (Thato).

This participant conveyed his understanding of his managers reactions, that they were unsure of where he could *"fit in"* and which work tasks he could perform with his residual functioning following upper limb amputation. This participant said:

- *"They didn't know where they could accommodate me… so they just said let us give you a chance and try different things out."* (Thato)

4.3.2.2 Subtheme 2.2: Handling from colleagues

Table 4.12: Subtheme 2.2 with codes

Handling from colleagues
Codes
Treatment from colleagues
Dealing with handling from colleagues

One participant gave an account of the handling he encountered upon RTW; he reported the experience of name calling by colleagues. This participant said:

- "*There will always be those people who call you names because you got injured"* (Thato).

As expected, this participant expressed that this experience was difficult for him. According to the participant, this was a learning experience as he learnt to control his emotions and ignore the undesirable treatment from colleagues.

4.3.3 Theme 3: Things that helped during my return-to-work journey

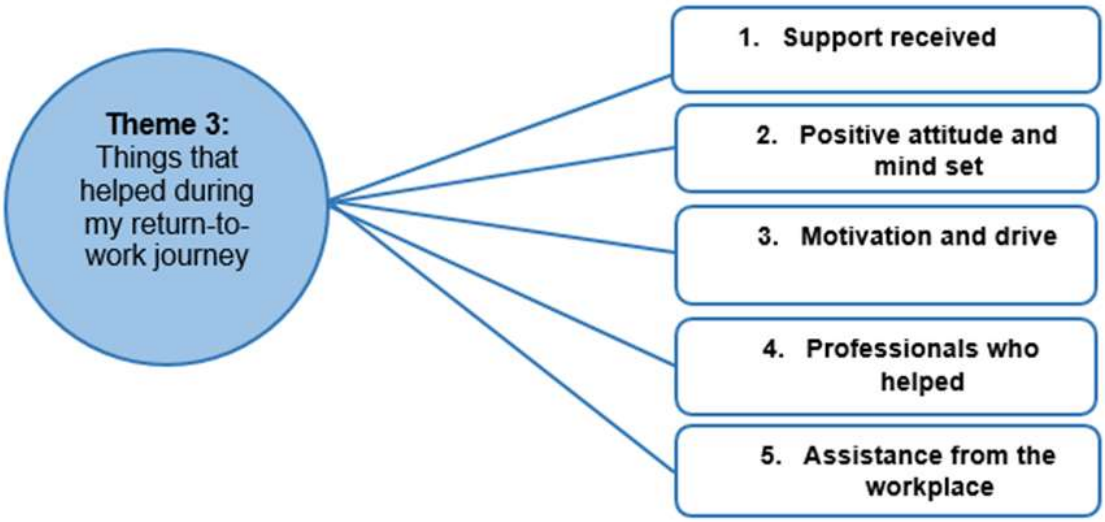


Figure 4.13: Representation of Theme 3 with subsequent subthemes

Participants reported things that they found helpful during their return-to-work journey, this included practical support received from the workplace and professionals as well as emotional and practical support received from colleagues, family, friends and partners. One participant described:

- *"People also like Precious (pseudonym -hand therapist), she walked the journey with me and helped me to be independent again even though I am not 100%."* (Thato).

Participants also described how positive thinking and motivation played a role in assisting with their RTW journey. Five subthemes were identified under this theme, namely: support

received, positive attitude and mind-set, motivation and drive, professionals who helped and assistance from the workplace; a description of these follows with examples from data extracts.

4.3.3.1 Subtheme 3.1: Support received

Table 4.14: Subtheme 3.1 with codes

Support received	
Codes	
1.	Family support
2.	Support from friends
3.	Support from a partner
4.	Support from the workplace
5.	Support from the rehabilitation team

Participants reported obtaining support from friends, family, partners, colleagues, managers as well as from the social worker and occupational therapist during rehabilitation.

- *"I received a lot of support from my wife. She always called me every day to check on me*." (Simphiwe)
- ***"****Yes, they (family) would contact me to check if I was fine."* (Andile)
- *"I think what helped me was seeing the social worker, the support really helped and it helped to talk to someone. I think my situation could have been worse if I didn't have this help."* (Tumelo)
- *"Also where I did the training for the hand, the therapist was very supportive she spoke to me and encouraged me."* (Tumelo)
- *"My colleagues were very helpful and supportive."* (Simphiwe)
- *"I got support from my managers and colleagues, they would call to check in on me, to hear if I was fine and if I need anything..."* (Andile)

For most participants, the support they received provided a sense of dependable and accessible reassurance. Peer and family support or support from a partner appeared to occur spontaneously with most participants.

Only one participant reported abandonment and lack of support from his friends. For this participant, this encounter helped him realise the true nature of his friends.

- *"…and from that day on they stopped checking on me so my eyes were open to see that these people actually don't wish the best for me, they are not my true friends. Even today, they have not contacted me again."* (Tumelo)

4.3.3.2 Subtheme 3.2: Positive attitude and mind-set

Table 4.15: Subtheme 3.2 with codes

Positive attitude and mind set	
Codes	
1.	Applying a positive mind set
2.	Correct mind-set helpful

One participant described the impact of positive thinking, *"I had a positive mind, and I think that helped me to heal faster."* (Andile). This participant shared his perception that having a positive mind set helped him during his RTW journey.

- *"I put on the right mind set and that is what helped me through this process."* (Andile)

Another participant expressed:

- "*I just want to say again that the mind-set is important- you have to tell yourself that you will be able to do something and try do it. There is a way out of everything, no situation is permanent…*" (Thato)

4.3.3.3 Subtheme 3.3: Motivation and drive

Table 4.16: Subtheme 3.3 with codes

Motivation and drive	
Codes	
1.	Motivation from therapist
2.	Participant had the drive to resume breadwinner role
3.	Participant motivated by family to return-to-work

The experience of motivation and drive to RTW was reported by three participants, these individuals all described different facilitating factors: One participant was motivated by his doctor and occupational therapist during acute and vocational rehabilitation; another participant reported that her motivation was driven by her family; the third participant's

motivation and drive to RTW was associated with a personal need by the participant to resume his role as a breadwinner in order for him to continue providing for his family. The following quotes from participants support this:

- "*…I got the motivation from the doctor, from the therapists, they gave me that motivation to keep on going."* (Thato)
- *"Then even the vocational rehab, the therapist motivated me not to give up."* (Thato)
- *"Well, I can say as a family orientated person...I think my family is the one that gave me that strength and motivation to go back to work because I have kids that are still young, I have to work for them…"* (Bandile)

4.3.3.4 Subtheme 3.4: Professionals who helped

Table 4.17: Subtheme 3.4 with codes

Professionals who helped
Codes
1. Hand rehabilitation
2. Vocational rehabilitation
3. Social worker services

All six participants reportedly attended hand rehabilitation and vocational rehabilitation post medical intervention. Participants reported they found the intervention from the rehabilitation team beneficial, as supported by the following statements:

I. Hand rehabilitation helpful:

- *"*..okay, I think therapy (hand rehabilitation), therapy helped me.." (Andile)
- "The training helped me a lot, to be where I am now…the training for the hand (*hand rehabilitation*)." (Simphiwe)
- *"Dr Precious, where I did the training of my hand, she helped me a lot."* (Tshepiso)

II. Vocational rehabilitation helpful:

- *"Yes, it did (vocational rehabilitation), because I could see that my hand became fine…"* (Bandile)

- "*When they made me lift weights, it helped me see what my hand can do, I could practice lifting with this injured hand, it helped me see that my hand can do heavy work."* (Tshepiso)
- "*..I also practised with weights during training so I got used to them (the weights)."* (Simphiwe)

Only one participant saw a social worker due to psychological difficulties following amputation. He described, *"I think what helped me was seeing the social worker, the support really helped and it helped to talk to someone."* (Tumelo)

4.3.3.5 Subtheme 3.5: Assistance from the workplace

Table 4.18: Subtheme 3.5 with codes

Assistance from the workplace
Codes
1. Colleagues helpful

Participants described helpful colleagues who were understanding and willing to assist with heavy manual tasks. Participants regarded support received from colleagues as helpful and supportive. One participant said:

- *"My colleagues were very helpful and supportive..they always checked on me to make sure I was fine and they always asked to help me with the heavy work.."* (Andile)

Participants described colleagues were aware of their injury and open to providing support. Another participant reported:

- *"My colleagues helped me do the heavy work."* (Tshepiso)

4.3.4 Theme 4: Change and return-to-work

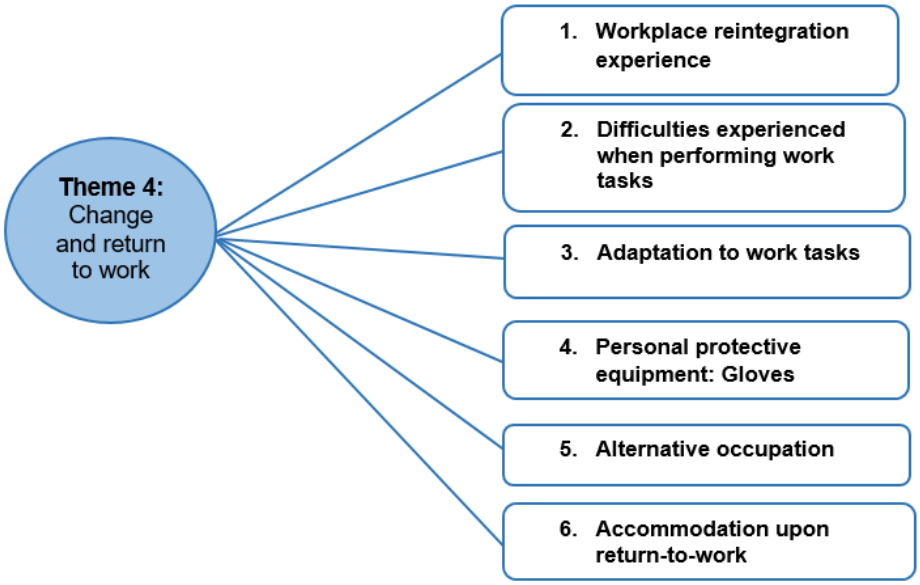


Figure 4.19: Representation of Theme 4 with subsequent subthemes

The fourth emergent theme was change and RTW. Change is perceived as a never ending process of readjustment and re-adaptation.[115] Most participants in this study reported a change in their lives due to the upper limb amputation injury. One participant expressed:

- *"This injury has changed my life..."* (Tumelo)

Another reported:

- *"This (injury) was an adjustment for me, this hand does not work normally anymore like before when I had five fingers, so I had to adjust to the changes..."* (Andile)

Participants encountered subjective experiences during their RTW trajectory. The subthemes under this theme centred on workplace reintegration experience, difficulties experienced when performing work tasks, adaptations to work tasks, personal protective equipment (gloves), alternative occupation and accommodation upon RTW. A description of these subthemes appears below with supporting data extracts.

4.3.4.1 Subtheme 4.1: Workplace reintegration experience

Table 4.20: Subtheme 4.1 with codes

Workplace reintegration experience
Codes
1. Difficulty facing colleagues after injury
2. Difficulty showing colleagues injured finger
3. Difficulty talking about injury to colleagues
4. Talking about injury helpful

Participants' described their experience when reintegrating back into the workplace following upper limb amputation and vocational rehabilitation. Two participants described different experiences when reintegrating back into the workplace. Tumelo expressed:

- "*When I returned to work, it was difficult to face my colleagues again. I was really afraid of what people will say and think about my injury."* (Tumelo)

This participant described how it was "*hard*" showing people his ray amputation and talking about the injury to his colleagues. In contrast to Tumelo's experience, another participant, Andile expressed no difficulty seeing her colleagues again; she expressed that it was actually helpful for her to talk about her injury frequently at work.

4.3.4.2 Subtheme 4.2: Difficulties experienced when performing work tasks

Table 4.21: Subtheme 4.2 with codes

Difficulties experienced when performing work tasks
Codes
1. Discomfort when working with grinder
2. Participant unable to lift more than 15kg
3. Poor physical endurance when lifting
4. Poor physical endurance when welding

Upon RTW, two participants had difficulties with executing work tasks. Experiences of discomfort, pain, weight handling limitations and poor physical endurance were amongst the challenges reported by two participants. These participants gave the following accounts:

- *"I am unable to lift for a long time...because my finger gets tired from lifting."* (Thato)
- *"Sometimes I noticed that I could not lift something for a long time."* (Andile)

- *"And then welding, welding I saw that when I used my right hand...after eight or ten minutes it starts to get tired, so I needed to rest then continue to work once its fine."* (Thato)

4.3.4.3 Subtheme 4.3: Adaptations to work tasks

Table 4.22: Subtheme 4.3 with codes

Adaptations to work tasks
Codes
1. Discovering new ways to grasp 2. Rest breaks implemented when grasping

Despite the challenges upon RTW, one participant said:

- *"The first time when you use the machine, I still remember the first time that I used the grinder with my right hand, my muscles will be pulling I could feel that my hand was complaining that there is something not right but I just told myself that just keep on holding to that grinder until that right hand learns that this is a grinder and it has to learn to tolerate the vibrations." (Thato)*

This participant gave a detailed account of how he taught himself to use a grinder despite the challenges he encountered initially. He also described other adjustments, such as learning to grasp differently, and implementing rest breaks due to decreased physical endurance.

4.3.4.4 Subtheme 4.4: Personal protective equipment: Gloves

Table 4.23: Subtheme 4.4 with codes

Personal protective equipment: Gloves
Codes
1. Problem with work gloves 2. Work gloves not comfortable 3. Work gloves causing pain and sensitivity 4. No difficulty using soft gloves during training (vocational rehabilitation) 5. Using adjusted glove at work

Two participants described the challenges they encountered when using work gloves after their amputation injury:

- Simphiwe said, *"I experienced a lot of pain and sensitivity….I had to use gloves at work and the gloves were hurting me."* This participant explained that the pain and sensitivity experienced was as due to the type of gloves used at work. He expressed, *"…we use the hard plastic ones, and those ones are not comfortable."* According to this participant, he had no difficulties during vocational rehabilitation because he used soft gloves during training.

- Bandile reported, *"I did have a problem, because gloves come with five fingers and I have four fingers on the one hand..."* This participant described how she used adjusted gloves to accommodate the amputated finger. Bandile explained that she adjusted her work gloves independently because she was sure that her employer would not accommodate her.

4.3.4.5 Subtheme 4.5: Alternative occupation

Table 4.24: Subtheme 4.5 with codes

Alternative occupation
Codes
1. Employer allowed change of occupation **2.** Change of occupation after injury

Most participants did not change occupations following RTW, however two did report a change in occupation; one participant, Andile, performed light duty in an alternative occupation and later returned to performing her pre-injury occupation with not difficulty.

Another participant, Tumelo, reported changing occupations from a rock drill operator to a lighter occupation (general worker). The participant requested the change in occupation as he felt he was not ready to return to his previous work. Interestingly, despite claims from Tumelo that he was not ready to RTW to his pre-injury occupation, he assisted by working as a rock drill operator for four days when his colleague was away; during this time the participant managed well. After this, Tumelo returned to working as a general worker as he still did not feel "ready" to return to his pre-injury occupation.

4.3.4.6 Subtheme 4.6: Accommodation upon return-to-work

Table 4.25: Subtheme 4.6 with codes

Accommodation upon return-to-work
Codes
1. Managers unsure with accommodation of injured worker upon return to work
2. Managers were open to accommodating participant

Regarding reasonable accommodation in the workplace, one participant conveyed how his managers were unsure how to accommodate him upon RTW. He described:

- *"They (mangers) didn't know where they could accommodate me. So they just said let us give you a chance and try different things out so that we see where can you fit."* (Thato).

Although the managers lacked insight regarding the participant's work ability following his amputation injury, they were open to accommodate him.

4.4 CONCLUSION

This chapter focused on the findings of the factors influencing RTW for South African mine workers following upper limb amputation and vocational rehabilitation. Firstly, there was a description of the demographic information and characteristics of participants, and secondly, there was the delineation of the themes and subthemes of the study. Four themes, namely *Initial and ongoing difficulties, Colleagues' attitude and workplace responses, Things that helped during my return-to-work journey and Change and return-to-work* were outlined with relevant subthemes and subsequent data abstracts. This was to give participants' direct perception of their RTW experiences following upper limb amputation. Chapter 5 will discuss these study findings in relation to literature.

5 CHAPTER 5: DISCUSSION

5.1 INTRODUCTION

In this chapter, the researcher elaborates on the results of the study as presented in Chapter 4. The discussion of the results is in line with the study objectives. As outlined in Chapter 3, further content analysis was conducted by means of a deductive approach with use of the OCM[116] as a guideline for organising, and synthesising the factors influencing RTW following upper limb amputation and vocational rehabilitation.[25] Use of this approach for further analysis and synthesis was necessary in ensuring further review of the study results to capture participant's responses in line with the purpose of the study. [110]

5.2 APPLICATION OF THE OCCUPATIONAL COMPETENCE MODEL

The complexity of the RTW phenomenon necessitates a framework to aid the organisation of the complex and interactive nature of factors influencing variations in work outcomes.[25] The OCM is a three dimensional model that considers a broader perspective of the person, occupation and environment influences inside and outside the workplace.[25]

The results of this study represent a conceptualisation of the RTW experiences of South African platinum mine workers following upper limb amputation and vocational rehabilitation. Four themes emerged in this study that need to be considered in furthering the understanding of the factors influencing RTW and future research toward the development of work outcome measures.[22] Organised within the context of the OCM, Figure 5.1 represents the four emergent themes, together with subsequent subthemes:

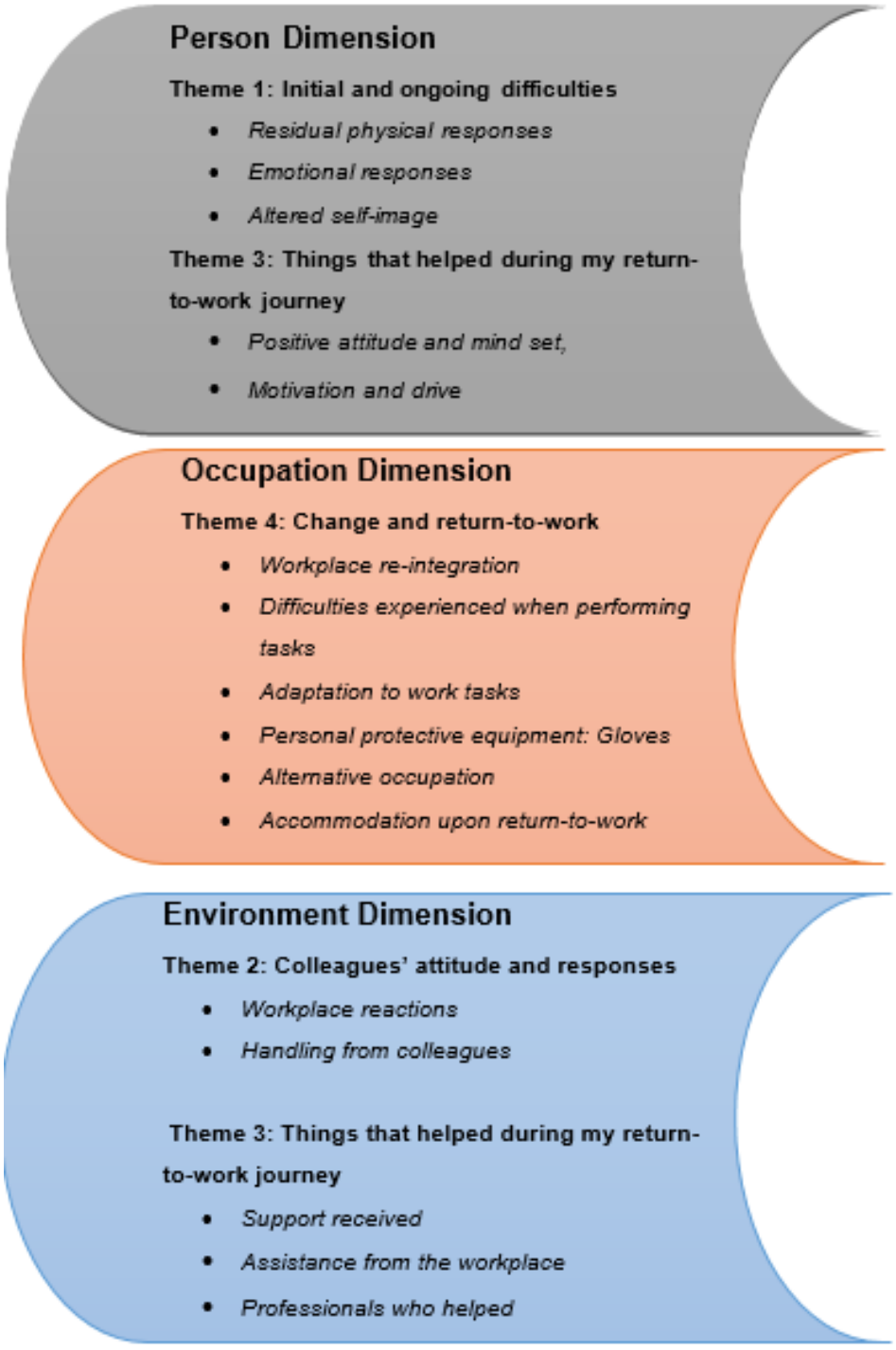


Figure 5.1: Emergent themes and subthemes organised within the OCM dimensions

Themes 1 and 3 of this study, Initial and ongoing difficulties (*residual physical responses, emotional responses and altered self-image*) and Things that helped during my return-to-work journey (*Positive attitude and mind-set, motivation and drive)* reflect the person dimension of the OCM.

Theme 4, Change and return-to-work *(Workplace re-integration, difficulties experienced when performing tasks, adaptations to work tasks, PPE: gloves, alterative occupation and accommodation upon RTW)* reflects the occupation dimension and Themes 2 and 3 of this study, Colleagues' attitude and workplace responses *(workplace reactions and handling from colleagues) and* Things that helped during my return-to-work journey *(Support received, assistance from the workplace and professionals who helped)* reflect the environment dimension of the OCM. In the next section (5.3), the discussion of these themes is in line with the study objectives, and with relevance to existing literature.

5.3 THEME DISCUSSION

The objectives of this study were to explore and describe the personal, occupational and environmental facilitators and barriers influencing RTW following upper limb amputation post vocational rehabilitation. This section will include a discussion of the facilitators and barriers of RTW for the person, occupation and environment dimensions of the OCM in line with emergent themes and subthemes. The discussion will include data extracts to highlight participants' experiences and existing literature to validate the study findings.[35]

5.3.1 The person dimension

Organised within the OCM, the following themes and subthemes were characterised within the person dimension:

Table 5.2: Person dimension themes and subthemes

Themes	Subthemes
Initial and ongoing difficulties	• Residual physical responses • Emotional responses • Altered self-image
Things that helped during my return-to-work journey	• Positive attitude and mind-set • Motivation and drive

The person dimension of the OCM includes cognitive, physical and affective functions.[25] Cognitive functions encompass all intellectual functions, physical functions, including all sensory and motor functions, and affective functions, including an individuals' social and emotional functions.[117] In medical and rehabilitation literature, the person dimension comprises of descriptive variables such as demographics (age, gender), personal resource variables, which include coping skills, self-esteem and self-efficacy, and psychological

factors, such as an individuals' cognitive ability.[50] This study will highlight the aspects of the physical and emotional function.

5.3.1.1 Initial and ongoing difficulties

Despite the fact that a finger makes up only a small percentage of the total body surface area, injury to this small part can be somewhat debilitating with numerous physical and psychological difficulties.[41,64] The emergent theme, *initial and ongoing* difficulties represent factors in the person dimension of the OCM. Participants in this study reported noteworthy changes from the time of injury with challenging paths on the road to physical recovery and RTW. Consistent with previous studies, [1-2,42,64,118] participants reported numerous physical, emotional and psychological challenges following upper limb amputation injury. These encounters were associated with personal RTW barriers.

Participants in this study reported physical difficulties, such as the experience of pain, cramps, altered sensation, phantom limb sensation, itchiness, and problems with decreased endurance; commonly reported were pain and hypersensitivity. Participants mostly reported hypersensitivity to touch and water. Hypersensitivity describes a variety of pain sensations resulting from normally non-noxious stimuli, including paraesthesia, sensitivity to touch, and cold intolerance.[41] Consistent with this report, previous studies revealed that pain and hypersensitivity are often a primary complaint following amputation due to the density of sensory endings along the phalanges.[4,40-41,87]

The experience of pain is significant enough to interfere with the ability to perform daily activities in persons with amputation.[2] Furthermore, pain may worsen the functional, vocational and psychological outcomes of amputees.[16] The relationship between RTW and pain is viewed as complex.[2] MacKenzie et al.[2] found that individuals who experienced greater pain early in their recovery were less likely to RTW.[2]

In this study, despite the experience of pain, all participants returned to work. Notwithstanding, the recounting of pain experiences were with consequent functional limitations. One participant recounted how he frequently relied on pain medication to help him cope. This passive form of coping is known as a personal RTW barrier, as previous studies suggest that reliance on pain medication, as opposed to taking a more active approach, is not associated with long-term success thus leading to inferior RTW outcomes.[88]

Only one participant in this study reported the experience of phantom sensation. As revealed in previous studies,[119] phantom limb pain and sensations are common in amputees, however this was not noted in this study. Of note, the development of this phenomena is associated with several factors, such as the type and severity of the amputation, residual limb pain experienced, the duration of pain before amputation, and psychological factors.[16] Phantom limb sensation is defined as any sensation in the absent limb, except pain.[119] Phantom limb pain is described as a form of neuropathic pain, although the pathogenesis is not fully understood, the development of a cortical pain memory seems to be central, with important contributions from the peripheral and autonomic nervous systems.[16]

As with the physical experiences reported, participants also reported emotional difficulties, highlighted as personal barriers of RTW. The experience of deep emotional response is common following traumatic amputation, as it forms part of the psychological adjustment to the injury.[16] Even in the case of lower limb amputation, a previous study by Liu et al.[71] revealed that amputees experience emotional challenges following injury.[71] Experiences of grief, disbelief, numbness and anger are expected, followed by a period of acceptance where sadness and hopelessness are prevalent.[16,71] Consistent with the report from Liu et al.,[71] participants in this study reported emotions of fear and hopelessness. Participant's emotional experiences centred on the uncertainty of whether they would be able to return to work and the ability to perform their pre-injury occupations. One participant viewed his pre-injury occupation as "risky," as he expressed fear of returning to this occupation.

In addition to dealing with heightened emotions after upper limb amputation, other changes may occur, such as re-integrating an altered body image.[120] Upper limb amputation can negatively affect self-image, leaving individuals with a sense of inadequacy and loss of identity.[120] This study also confirmed the impact of upper limb amputation on self-image; two participants having described a change in the way they viewed themselves following injury.

One participant described how he made use of the gloves at work to conceal the injured hand: *"I am using the glove at work just to cover the hand"* (Tumelo). He further said, *"I wish that I also had a glove to use at home or when I am walking around in the streets just so that my hand can be covered."* Individuals who have undergone upper limb amputation need time to grieve and become psychologically and physically accustomed to an altered body image.[71] Amputees need time for adaptation and acceptance following injury.[71]

5.3.1.2 Things that helped during my return-to-work journey

The emergent theme, *things that helped during my return-to-work journey* along with subsequent subthemes: *Positive attitude and mind-set, and motivation and drive* characterise factors in the person dimension of the OCM. Participants in this study reported helpful experiences relating to the individuals coping style. Firstly, two participants described how applying a positive mind-set helped them in their RTW journey; this factor was associated as a personal RTW facilitator. Secondly, three participants expressed how the experience of motivation and drive was helpful in their RTW journey. Despite having gained their motivation from external influences, as in the case with two participants, it is worth mentioning, as these experiences were important RTW facilitators. One participant who obtained motivation from the rehabilitation team described, *"They gave me that motivation to keep going."*

Consistent with the present findings, a previous study identified the following coping styles as RTW facilitators classified under the personal dimension of the International classification of functioning: attitude, faith, hope, knowing limits, asking for help when needed and working accordingly.[30] Findings are consistent with a previous study that revealed that individuals are more likely to RTW if psychologically invested and motived to be involved in the job.[2]

5.3.2 The occupation dimension

Organised within the OCM, the following themes and subthemes were characterised within the occupation dimension:

Table 5.3: Occupation dimension themes and subthemes

Themes	Subthemes
Change and return to work	• Difficulties experienced when performing work tasks • Adaptations to work tasks • Personal protective equipment: Gloves • Alternative occupation • Accommodation upon return-to-work

The domains within the occupation dimension of the OCM represent the affective, cognitive and physical demands required in executing job tasks.[25,116] The cognitive demands may include "attention, judgement and decision making and the physical demands may include

lifting, reaching, and pulling."[25] The affective demands of an occupation may include the interpersonal skills required to perform the job.[25] For the purpose of this study, there will be highlighting of the factors relating to the physical demands.

5.3.2.1 Change and return to work

Most occupations in the South African platinum mining industry are risky and physically demanding.[55] Some mining companies have the advantage of simulated underground environments, where employees can be reintegrated to the mining environment in a safe and controlled manner.[55] Considering the hazardous nature of the mining environment, the process of RTW for an injured worker should be done gradually and not hastily.[55]

The emergent theme, *change and return to work* highlights participants' experiences of the change they encountered following upper limb amputation and their subjective RTW experiences. The following subthemes were characterised as factors relating to the occupation dimension of the OCM: *difficulties experienced when performing work tasks, personal protective equipment (gloves), adaptation to work tasks, accommodation upon RTW and alternative occupation*. This section delineates these subthemes.

Predictably, and consistent with past research, participants in this study reported difficulties with executing work tasks;[88] these difficulties were viewed as occupational RTW barriers. Two participants had difficulties with pain, discomfort, poor physical endurance, weight-handling limitations, and difficulties executing specific job tasks, such as welding and working with a grinder. Despite the experience of these challenges, both participants returned to their pre-injury occupations, and reported to be coping.

Participants re-counted difficulties experienced with using work gloves. Consistent with the present study, previous findings revealed how participants described work gloves as not designed for an individual with a specific limitation.[88]

Participants in this study displayed a good understanding of their performance capacities and limitations. Similarly in a previous study, participants had knowledge of duties that were within their physical capacity.[64] This characteristic is highlighted as a RTW facilitator.

Lynn Shaw et al.[50] outlined that factors relating to the physical characteristics of work are predictive of work outcomes. Generally, the study of workplace factors has primarily focused on the physical nature of the work.[50] Performance measures, such as work speed, number

of repetitions and the rating of physical demands of work, are some of the most frequently studied workplace factors.[50] Heavy physical work is the most common workplace factor predictive of return to work.[50]

In individuals with upper limb amputation, although the rate of RTW is high, over one third of these cases required workplace adaptation.[64] In this present study, one participant described how he adapted to performing work tasks by teaching himself how to tolerate exposure to vibrations from a grinder. This participant also described other adjustments that he applied, such as grasping work equipment in different ways and implementing rest breaks while working. In a previous study, participants reported applying flexibility when performing work tasks; this was a positive or facilitatory RTW influence.[88] The study revealed how participants 'figured out what worked best', 'learnt their limits,' 'broke up the day into manageable tasks,' and 'limiting the number of hours of repetitive movement."[88]

In line with applying workplace adaptations, employers play a vital role in modifying and adjusting working conditions by assigning new working hours, or delegating new tasks to injured employees to enable their quick recovery and return to work.[121] The most common workplace accommodations include modifying the employees duties, switching them to a part-time schedule, modifying their work area, changing their role, or changing their work department.[121]

Reasonable accommodation in the workplace involves the provision of adjustments in the work environment by the employer for a person or group of people with unique requirements following illness or injury.[122] As a result, the worker with an injury or disability stays active, thus enabling the resumption of normal activity at a higher pace and accelerating recovery.[121]

Implementation of supportive workplace accommodations is identified as a RTW facilitator.[123] Reasonable accommodations can address the barriers related to the physical demands of a person's work, which will improve their work-related transition outcome.[124] This is also supported by legislation in South Africa.[81]

One participant in this study described how his mangers were open to accommodating him despite having limited knowledge on how they could facilitate such accommodation. This participant was appreciative of his manager's efforts; he found it helpful that they were willing to assist him.

Most participants in this study returned to their pre-injury occupations upon RTW. Only one participant reported a change in occupation to a lighter job as he felt that he was “not ready” to return to his pre-injury occupation. The view of this participant was self-limiting due to his altered perception of not being able to perform his pre-injury job despite having worked in his pre-injury occupation for a few days when required to stand in for a colleague. Another participant reported that initially upon RTW, she was in a lighter position for one month; this participant later returned to her pre-injury job with not difficulties.

Not consistent with the present study findings, previous research revealed that most individuals who RTW post amputation rarely returned to the same position,[2] most often returning to a less physically demanding occupation.[2] Schoppen et al.[2] reported that among those who were in jobs with a high physical workload, moving to positions with decreased workloads post amputation led to a 100% success rate in maintaining their employment; this was viewed as an occupational RTW facilitator.[2] Despite the positive RTW outcome, this finding led authors to speculate that a change in occupation also results in reductions in pay and social status.[2] According to this past study, those who do successfully return to their previous occupation are more likely to have had vast experience in their pre-injury occupations.[2]

5.3.3 The environment dimension

Organised within the OCM, the following themes and subsequent subthemes were characterised within the environment dimension:

Table 5.4: Environment dimension themes and subthemes

Themes	Subthemes
Change and return to work	• Workplace reintegration experience
Colleagues attitude and workplace responses	• Workplace reactions • Handling from colleagues
Things that helped during my return-to-work journey	• Support received • Assistance from the workplace • Professionals who helped

The environment dimension comprises of three domains namely, the physical, social and cultural aspects of work.[117] According to Shaw and Polatajko,[25] the environmental dimension classifies factors outside the workplace as the “macro-environment” and those inside the workplace as the “micro-environment”.[25] The micro-environment includes physical workplace factors and the macro-environment includes life events, day-to-day

activities and family accountabilities.[25] For the purpose of this study, factors related to the social aspects of the microenvironment will be highlighted.

5.3.3.1 Change and return-to-work

Earlier in this paper, the discussion of the emergent theme *change and return* to work was under the occupation dimension with the following subthemes: *Difficulties experienced when performing work tasks, personal protective equipment (gloves), adaptation to work tasks, accommodation upon return-to-work, and alternative occupation*. In this section, the discussion of this theme will be in relation to the subtheme, *workplace reintegration experience*. This subtheme represents factors associated with the environment dimension of the OCM.

Two participants revealed their practical experience of workplace reintegration following amputation. Interestingly, these individuals reported contrasting accounts of their encounters regarding workplace re-integration. The first participant detailed how he found it difficult to face his colleagues again; he described how talking about his amputation and showing his colleague the injured hand was hard for him. This participant further recounted the fear he experienced of how people would react to his amputation. Similarly, a previous study revealed how participants isolated themselves following injury to avoid rejection by society.[27]These participants revealed how they avoided going outside and meeting any visitors, because they were afraid of the potential reactions of others.[27]

On the other hand, the second participant recounted how she experienced no difficulty reintegrating back into the workplace following recovery after her amputation injury, this participant described how she found it helpful to talk about her injury.

5.3.3.2 Colleagues' attitude and workplace responses

The theme, *Colleagues, attitude and workplace responses* highlight factors associated with the environment dimension of the OCM. Participants in this study described their encounter of changes in attitude from colleagues, workplace reactions and handling from co-workers upon RTW. One participant described how he noticed a change in attitude from his colleagues, according to this participant, he experienced name calling which was difficult for him.

Participants experienced various workplace reactions upon RTW, one participant described how his managers were shocked to see him for the first time after his injury, another participant articulated how colleagues were empathetic towards her upon RTW, colleagues frequently offered assistance with performing work tasks, according to the participant, her co-workers spontaneously assumed that she could no longer work normally.

Stigmatisation of employees on the basis of their illness or injury is a common problem faced by people with physical health problems, this is highlighted as an environmental RTW barrier.[121] Injured individuals may be afraid of returning to the workplace because it can change colleagues' attitudes towards them and lead to discrimination and prejudgment.[121] Consistent with present findings, previous studies reveal that individuals may face verbal harassment, name calling, social isolation and even physical abuse.[121]

Green et al.[121] found that stigmatised individuals experienced a negative impact on their identity and confidence, as they are made to believe that they are somewhat deficient.[121] This, in turn, reduces their sense of worth and their willingness to interact with other people.[121] Notably, and similarly from this present study, stigmatised people often get used to their colleagues' attitudes and successfully overcome the negative beliefs.[121]

5.3.3.3 Things that helped during my return-to-work journey

Earlier in this chapter the emergent theme, *things that helped during my return-to-work journey* was discussed under the person dimension of the OCM with the following subthemes: *Positive attitude and mind-set, and motivation and drive*. In this section, this theme will be discussed in relation to the following subthemes: *Support received, professionals who helped and assistance from the workplace*. These subthemes highlight RTW facilitators in the environment domain of the OCM.

All participants in the present study stated that they received support from different people at various stages following upper limb amputation. Social support after injury has been revealed as an important factor in RTW.[25] It is often associated with adjustment to amputation, although the effect may be moderated by personality factors such as optimism.[71] Social support is recognised as a complex construct, which is more than the basic presence of a supportive network influencing work outcome.[71]

Consistent with previous research, [88] participants in this present study reported support from family, friends, partners and healthcare providers.[88] Support from immediate family

members and partners was significant for most participants, one participant expressed: "*It's really good to have a support from somebody that you love, somebody that you care about."*- (Thato). Support received for most participants ranged from physical to emotional support. Participants received help with daily tasks and tasks at work and most participants reported that they were often "checked on" by others through phone calls or special visits. For most participants, having someone to talk to was needed and very helpful. Contrastingly, one participant in this study reported lack of support as he experienced abandonment from his friends following his amputation injury.

Participants in this study reported how healthcare professionals were supportive and helpful, allowing them to talk about their injury. Another participant reported to have received support from his hand therapist, he conveyed that the therapist walked his recovery journey with him and helped him become independent. There was also support received from the occupational therapist during vocational rehabilitation. A previous study suggests that to better facilitate RTW following amputation, vocational supports may be necessary, including a biopsychosocial holistic appraisal of an individual's circumstances.[2]

When it comes to post-injured workers and their potential return to work, employers and supervisors are liable for creating a supportive atmosphere to enable their successful reintegration in the organization.[88,121] Workplace relationships appear to be an important feature of the environmental landscape and one that could benefit from input regarding how to best demonstrate and provide co-worker support.[88] In this case, ongoing support and understanding on the part of the employer appears key to the maintenance of RTW gains and avoidance of long-term employment withdrawal.[88] Workers who are supported by their employers tend to RTW promptly and report increased job satisfaction.[124]

Participants in this study reported support from their colleagues and managers. In this study, there was constant identification of support from the workplace, more than any other group. The assistance provided was both practical and psychosocial in nature, suggesting that workplace relationships and practical support contributed to helping in ensuring a smoother RTW transition for participants. Participants described helpful colleagues who were thoughtful and considerate, offering assistance with performing heavy manual tasks. The assistance received from colleagues was as an environmental RTW facilitator and highlighted as such.

This study also reveals participants' experiences of rehabilitation services, which they found helpful. Participants described finding hand rehabilitation and vocational rehabilitation

services beneficial. In particular, one participant indicated how weight-handling activities during vocational rehabilitation helped him see what “his hand could do,” this helped him see that he would also manage at work with lifting tasks. Another participant, seen by a social worker, indicated how he found the psychological services helpful; he described how having someone to talk to was of assistance to him.

5.4 CONCLUSION

Chapter 5 presented a general discussion of participants’ RTW experience following upper limb amputation and vocational rehabilitation. There were four themes together with relevant subthemes highlighted; these were organised and discussed with guideline from the OCM. Discussions were reinforced with data extracts and past research to highlight some personal, occupational and environmental facilitators and barriers of RTW following amputation. The next chapter will conclude the study, as well as make relevant recommendations.

6 CHAPTER 6: CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

6.1 INTRODUCTION

Chapter 6 presents the conclusion to the study, in which the study findings in relation to the research aim and objectives, and a synopsis of the findings with the implications for occupational therapy practice are included. Further recommendations are provided together with suggestions on future research. An evaluation of the study is also included, detailing the limitations and strengths of the study. Lastly, the researcher reflects on her experiences during the research and presents the conclusion.

6.2 RESEARCH AIM AND OBJECTIVES

The aim of the study was to explore and describe the factors influencing RTW for South African platinum mine workers following upper limb amputation post vocational rehabilitation. In Chapter 3, the researcher explained the methodology to achieve the research aim and the objectives of this study, which were:

- To explore and describe personal barriers and facilitators influencing RTW following upper limb amputation post vocational rehabilitation.
- To explore and describe environmental barriers and facilitators influencing RTW following upper limb amputation post vocational rehabilitation.
- To explore and describe occupational barriers and facilitators influencing RTW following upper limb amputation post vocational rehabilitation.

To gain a better understanding of participants' real-life experiences of the factors influencing RTW, a qualitative approach was employed to describe participants' encounters of their RTW journey following upper limb amputation post vocational rehabilitation. Telephonic semi-structured interviews were conducted and the researcher transcribed participants' responses verbatim, and analysed them inductively using Braun and Clarke's[125] six phases of thematic analysis; further content analysis was conducted by means of a deductive approach to organise and synthesise participant's experiences into the personal, occupational and environmental factors influencing return-to-work following upper limb amputation injury. Section 6.3 presents a summary of the outcome of the study.

6.3 SUMMARY OF RESULTS

The findings of this study provided insight into the factors influencing RTW for upper limb amputees in the South African platinum mining industry. Four themes emerged, which all served to describe participants' subjective RTW experience, thus accomplishing the aim of the study.

Each theme yielded subsequent subthemes, organised with guidance from the Occupational Competence Model (OCM)[25] into RTW factors in the person, occupation and environment dimensions, thus consolidating information received on participants' RTW encounters, and taking into consideration the broader perspective of the personal, occupational and environmental influences, both inside and outside the workplace following upper limb amputation.

The OCM served as a guide in identifying barriers and success factors, thus illuminating participants' experiences of helpful and challenging encounters during their RTW trajectory. This model provided a suitable template for organising and integrating RTW factors.[25] The findings of this study complement the body of knowledge indicating the multifaceted nature of the factors influencing RTW.[2,16,25,84]

Figure 6.1 graphically presents a summary of the study findings. Sub-themes representing the factors influencing RTW appear in white rectangular blocks. The rectangular blocks are in three large blue circles, displaying the multidimensional representation of factors as personal, occupational, and environmental factors influencing RTW for South African platinum mine workers following upper limb amputation post vocational rehabilitation.

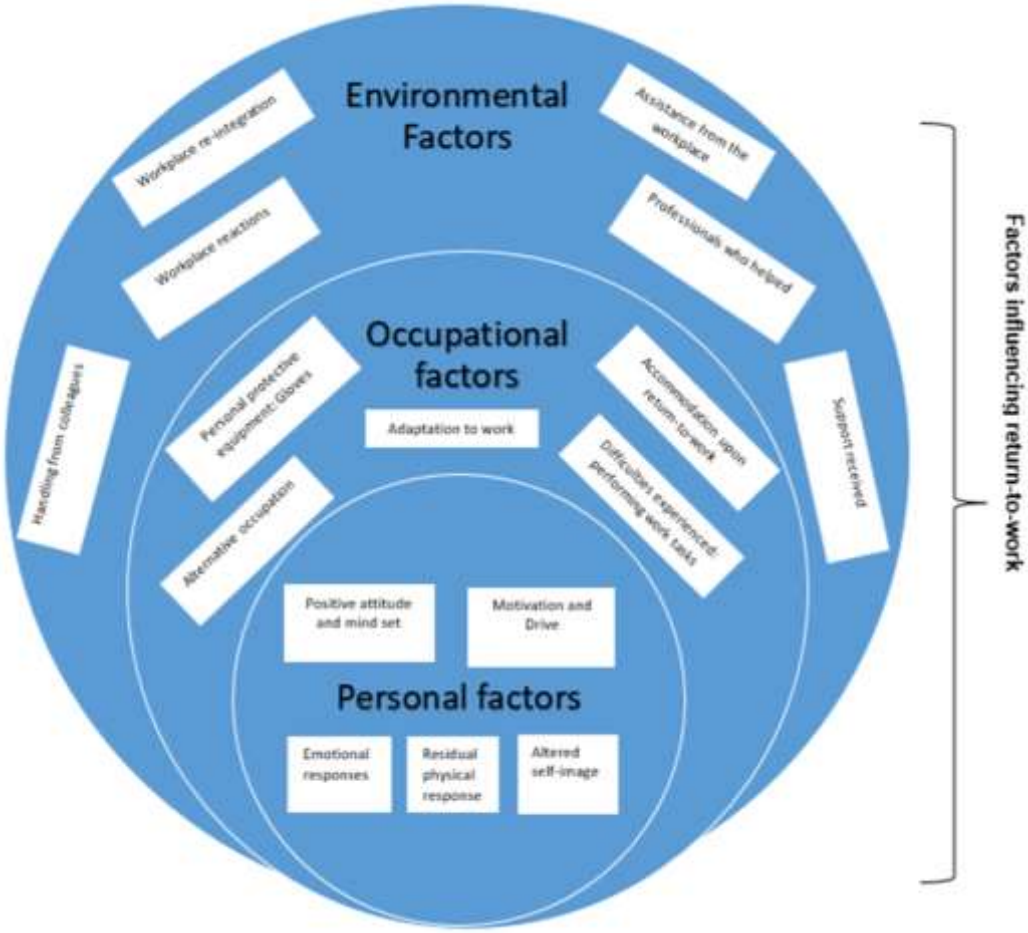


Figure 6.1: Summary of the factors influencing return-to-work following upper limb amputation

The subsections below provide a summary of the study themes, highlighting the factors influencing RTW following upper limb amputation. Contingent on the findings of this study and with support from literature, a delineation of the implications in occupational therapy practice for upper limb amputee rehabilitation is also presented.

6.3.1 Initial and ongoing difficulties

Participants described initial and ongoing difficulties due to upper limb amputation. Participants highlighted personal RTW barriers with regard to physical, psychological, and emotional responses, as well as altered self-image. Physical responses included pain, cramps, stump itchiness, decreased physical endurance and altered sensation. Emotional responses involved the experience of fear and hopeless.

6.3.1.1 Implications for practice

The following implications apply to occupational therapy practice:

- To ensure a successful work-related transition, treatment during rehabilitation should primarily focus on components of function.[124] This enhances engagement in both physical and emotional recovery.[41,120] Functional components include physical aspects such as functional range of motion and grip strength.[120]
- In addition to employing a functional approach during rehabilitation, occupational therapists should discuss future rehabilitative progressions, pain management, and symptoms with clients who undergo upper limb amputation.[65] This should be initiated during hospitalisation.
- Clients should be encouraged to take ownership of treatment aspects such as wound care, scar management, as well as passive and active range of motion exercises.[64] Ownership of the hand therapy exercise programme improves adherence and ensures active participation in the treatment programme.[64]
- Active participation in functional activities provides valuable feedback to the client regarding sensations that are helpful, such as a stretches during passive or active range of motion exercises; this is to prevent complications such as stiffness in the affected hand.[65] The best outcomes rely on regular home programme exercises outside of the hospital and clinic situation, therefore, a clear understanding of the components and functions of hand therapy treatment is imperative for the client.[120]
- Clients and their family members need educating about expected physical challenges, such as hypersensitivity, surgical site infection, stump pain and phantom limb pain.[64-65]
- Client and family education should be provided at different phases of the treatment process, during hospitalisation, during outpatient rehabilitation and at the time of discharge.[64] Use of educational materials such as brochures, videos and face-to-face education needs consideration.[64]
- Clients need reassurance, through patient education, that stress and emotional responses are normal reactions to trauma, but that prolonged symptoms can impede progress and adjustment, hence the necessity for other treatment resources, such as counselling.[120]
- When appropriate, occupational therapists should facilitate referrals (through networking) to a social worker, psychologist, or psychiatrist.[120] When discussing

referral to other healthcare professionals, it is important to convey that this is part of the overall treatment programme because clients may express concern about the potential stigma of counselling.[120]

- Occupational therapists should be sensitive to clients' potential loss of a sense of physical wholeness.[71]
- Careful observation of how a client reacts to the sight of the amputation over time can help identify those in need of psychological support.[120] Ensuring participation of the client during rehabilitation increases the individual's feelings of control and self-efficacy, which may have been altered by the amputation itself.[120] Focus on function and the resumption of valued roles (e.g., spouse, caregiver, friend, and worker) is critical to identity, self-worth, and recovery.[120]

6.3.2 Colleagues' attitude and workplace responses

This theme reflects participants' encounters of colleague's attitude and workplace responses. There were varied RTW encounters experienced, and highlighted as environmental factors influencing RTW. Participants described the experience of empathy and ridiculing. One participant described a shocked response from managers upon his RTW, as they were unsure on how to accommodate him post amputation. Workplace factors, including negative influences from colleagues, often are the cause of poor work outcomes; this it noted as a barrier of RTW.[126]

6.3.2.1 Implications for practice

The following implications apply to occupational therapy practice:

- Occupational therapists assist in preparing and empowering the client for RTW; this involves educating the client with regard to potential reactions from colleagues about the upper limb amputation. Group education programmes can be implemented for clients to help them with desensitisation of potential negative reactions from colleagues.
- Occupational therapists can educate supervisors or line managers and workplace colleagues through disability awareness workshops, to improve their knowledge and awareness of upper limb amputation and the possible functional implications. This will promote positive reactions and ongoing support in the work environment.

Participants in this study found it helpful to receive support from colleagues in the workplace.

6.3.3 Things that helped during my return-to-work journey

Participants reported an array of helpful encounters during their RTW journey. In conformance with personal RTW facilitators, applying a positive mind-set, and motivation and drive was beneficial. In conformance with environmental RTW facilitators, most participants received emotional and practical support from colleagues, family, friends, and partners, and others received practical support from the workplace and healthcare professionals.

Further environmental RTW facilitators include participants' experience of rehabilitation and psychological services. Participants found the intervention during hand rehabilitation and vocational rehabilitation beneficial. One participant who received psychological services reported it to be helpful. Also regarded as an environmental RTW facilitator, participants received help from colleagues in the workplace with heavy manual tasks.

6.3.3.1 Implications for practice

The following implications apply to occupational therapy practice:

- Occupational therapists need to support and guide individuals to cope better with ongoing physical difficulties.[1,71] Occupational therapists can assist clients in recognising the impact of negative coping strategies and maladaptive behaviours on recovery and adjustment.[120] Ongoing evaluation of coping strategies can help identify these maladaptive coping behaviours and assist clients in developing more effective coping strategies.[120]
- Coping skills, such as applying positive thinking and enhancing the client's motivation, can be facilitated in the early stage of rehabilitation intervention. [124]
- Occupational therapists should actively listen to a client's needs or concerns and ensure emotional support and encouragement during rehabilitation. There should also be support extended during the clients' transition back into the work environment.

6.3.4 Change and return-to-work

This theme captures the changes participants' encountered during their RTW transition after upper limb amputation. Relating to an environmental RTW factor, two participants detailed the experience of workplace reintegration. Noted as an environmental RTW barrier, one participant expressed difficulty reintegrating into the workplace, as it was "hard" talking about his injury and showing colleagues his single ray amputation. In contrast, another participant expressed no difficulty reintegrating into the workplace; it was helpful for her to talk to colleagues about her injury. This openness and smooth RTW transition was a facilitatory environmental RTW factor.

Identified as occupational barriers of RTW, two participants' experienced difficulties with executing work tasks upon RTW. There was difficulty experienced due to discomfort, pain, poor physical endurance, and weight handling limitations. In addition, in conformance with an occupational RTW barrier, two participants reported difficulty using work gloves due to pain and hypersensitivity, and poor fit of the work glove over the affected hand. This negatively affected participants' performance in work tasks.

One participant indicated learning adaptive ways of performing work tasks, this was noted as an occupational RTW facilitator, as was participants' experience of alternative occupation and accommodation upon RTW.

6.3.4.1 Implications for practice

The following implications apply to occupational therapy practice:

- With a good understanding of workplace demands and residual functioning associated with a return to the pre-injury occupation, occupational therapists are well suited to assist with job matching as well as advising on adaptations to work tasks.[127] Occupational therapist should incorporate job specific training during vocational rehabilitation, by taking into consideration the functional demands of the client's occupation. Shaw and Polatakjo[29] proposed a similar idea that therapists working with amputees need to consider the nature of the client's work together with their ability to cope within their work environment.[29]
- In addition, work capacity testing can be conducted prior to RTW to determine the client's physical and functional fitness to RTW following upper limb amputation, this

can be conducted at a Rehabilitation and Functional Assessment Centre at the mine's Occupational Health Centre.

- Simulating work tasks with the required protective equipment allows the therapist to problem solve with the client in order to adapt the work task or provide protection to the stump until tolerance or sensitivity improves.[120]
- For occupational therapists in practice, incorporating accommodations into a RTW plan is vital for creating opportunities for healthy change in the workplace.[29]
- Modifications to accommodate the limitations of an injured worker do not need to be extensive or expensive.[88] Supervisor training, for actively determining roles where accommodations can be made, is recommended in the workplace to assist with placement of workers.[121] Supervisors are often a key factor in a successful RTW.[29]
- Consideration should be taken regarding the availability of suitable alterative occupations at the client's workplace. Taking into consideration South Africa's high rate of unemployment, the job market is competitive, and this can be challenging for injured individuals who can no longer continue with their pre-injury occupations.

6.4 RECOMMENDATIONS

In the previous section, the researcher presented implications for occupational therapy practice for upper limb amputation rehabilitation. In this section, recommendations are presented to advance vocational rehabilitation services and upper limb amputation rehabilitation practice by the multidisciplinary team in South Africa. The researcher hopes that this study will serve as a platform for further research in other rehabilitation settings. Recommendations are also made to empower further research.

6.4.1 Recommendations for multidisciplinary team practice

Health professionals have a key role to play in facilitating a safe, effective and timely RTW.[82] With RTW goals identified during rehabilitation, healthcare professionals are more likely to understand how their expertise can facilitate work resumption and continued work participation for the individual experiencing upper limb amputation.[120] Healthcare professionals involved include the orthopaedic surgeon, occupational therapist, social worker and psychologist.

Each team member plays a vital role when treating upper limb amputation, the surgeon will be best positioned to facilitate a pain and surgical consultation, the occupational therapist

will have a more comprehensive understanding of possible barriers to rehabilitation and recovery whereby referral to a social worker or psychologist may be beneficial.[23,120]

The presentation of the following recommendations is for practice:

- Clients need to be treated using a multidisciplinary approach, with timely intervention from all healthcare professionals. Participants in the present study found intervention from various team members helpful, including the occupational therapist and social worker.
- Effective interdisciplinary planning should be conducted to gather information related to personal, social, occupational and environmental factors to structure treatment goals, and reduce barriers in order to promote collaborative and consistent goal setting for rehabilitation.[120 22]
- Sharing of profession-specific perspectives is advisable to foster holistic intervention for the client. Healthcare professional can give input on identified barriers and share profession specific perspectives contributing to planning of intervention for the upper limb amputee by each team member.

6.4.2 Recommendations for vocational rehabilitation

Gaining insight into the factors influencing RTW is a positive step towards the achievement of a safe and sustainable work outcome.[127] The following recommendations apply to implementing the vocational rehabilitation process: *Prevention, Screening, Assessment and evaluation, Intervention, Placement, Follow-up;*[81] this is to facilitate RTW and maintenance of an existing worker role following upper limb amputation.

- ***Prevention:*** Occupational therapists should conduct education workshops to improve insight and awareness on ergonomics and safe work practice in the mining industry. The importance of using personal protective equipment and adherence to safety regulations needs highlighting. Education should also be done in the workplace for colleagues and managers to improve awareness on the functional limitations that occur as a result of upper limb amputation, this will help mitigate the experience of stigma, which was highlighted by participants in this study.
- ***Screening:*** Screening should be conducted of a client's work-related skills, with consideration of the extent of the amputation injury, to establish referrals to more experienced therapists, and specialised services.

- ***Assessment and evaluation:*** To better facilitate RTW following upper limb amputation, vocational rehabilitation services are necessary with inclusion of a bio-psychosocial and holistic evaluation of an individual's circumstances.[2] A comprehensive assessment should be conducted, taking into consideration personal, occupational and environmental factors that influence RTW. Assessment and evaluation services would include workplace assessment, functional capacity evaluations, and industry specific pre-placement screening tools.[81]
- ***Intervention:*** Intervention programmes, including services aimed at improving work performance, can be implemented. This involves an active process that depends on the participation, motivation and effort of the individual, and supported by the workplace and occupational therapist.[17] Intervention services include advising on job modification or work adaptations, case management, pain management, conducting work trials, work hardening, work conditioning programmes, work preparation or readiness screening, work visits, work guidance, and advising on workplace accommodation.[81-82] Consideration should also be made on other workplace factors such as the availability of an alternative occupation and willingness for the employer to accommodate the upper limb amputee.
- ***Placement:*** This involves facilitation by the occupational therapist for returning of individuals with upper limb amputation to their own, alternative or new occupation.[81] When the upper limb amputees residual functioning is determined, a work site visit can be conducted by the occupational therapist for job analysis, ergonomic audits and advice to managers and employers .[81] Referral for placement services can be done, this includes vocational guidance and counselling by an occupational therapist or occupational medical practitioner at a mine hospital[81]
- ***Follow-up:*** Follow-up should occur for all occupational therapy clients who used vocational rehabilitation services.[81] Follow-up could be with employers, referral sources, family members and the clients themselves, either telephonically, electronically or during physical work visits.[81] Participants in this study did not report any follow-up intervention post RTW, a need for this is highlighted by the researcher to ensure that participants cope even after returning into the work environment.

6.4.3 Recommendations for future research

Future research topics emerging from this research study are:

- Considering the dangerous nature of the mining environment, occupational therapists can explore ways to enhance safety and support for upper limb amputees with high-risk occupations in the South African mining sector. This would contribute further to ensuring safety in the mining environment. The frequency of occupational accidents in South Africa indicates there is still work to be done regarding safety in the mining environment.[42,55]
- Future research by occupational therapists should include workplace interventions that would help upper limb amputees, who sustained injury on duty, to remain in the work force. Factors that facilitate sustained employment can be explored.

6.5 EVALUATION OF THE STUDY

6.5.1 Limitations to the study

The following is a limitation of this study: Of note is that, RTW experiences conveyed by participants in this study may not apply to other individuals and contexts outside of the platinum mining industry; research in other mining sectors would be necessary to obtain this information.

6.3.2 Strengths of the study

The following are strengths of this study:

- The researcher succeeded in achieving the aim and objectives of the study. Valuable context-specific insight was gained on the factors influencing RTW following upper limb amputation for clients with partial finger and hand amputations. With insight gained into the barriers and facilitating factors of RTW, occupational therapists in South Africa can provide more efficient and effective rehabilitation services for upper limb amputees, in order to promote participation and enhance work performance. These findings inform future occupational therapy practice and research in the field of vocational rehabilitation for upper limb amputees who have returned to work in the platinum mining sector post vocational rehabilitation.

- The researcher managed to involve experienced occupational therapists in the field of vocational rehabilitation during piloting of the interview schedule form. Expert opinion was gained on adaptations to the content and structure of the interview schedule. Feedback was received as constructive and it enabled refining of the interview schedule to ensure that the aim and objectives of the study were adequately answered.

6.6 RESEARCHER'S PERSONAL REFLECTION

As an occupational therapist working in the field of vocational rehabilitation, I have always been passionate about facilitating RTW for the injured or ill worker. The driving force of this passion is the understanding that work is a defining feature in role fulfilment and a meaningful occupation to many, including myself.

This study highlighted the significance of considering the multidimensional factors influencing RTW, thus, fostering a holistic evaluation of an individual's circumstances by considering personal, occupational, and environmental contexts. As shown by the findings of this study, and consistent with past research, the researcher learned that numerous factors play a role in facilitating or inhibiting RTW.

It has been an empowering process to learn from the upper limb amputees themselves about what was helpful and challenging for them during their RTW journey. The following statements conveyed by participants highlight the subjective experiences:

- "*…I experienced a lot of pain and sensitivity (over the stumps).*" (Simphiwe)
- *"I was really afraid of how I will go back to work…"* (Tumelo)
- *"…people felt sorry for me at work."* (Andile)
- *"People also like Precious (hand therapist), she walked the journey with me and helped me to be independent again even though I am not 100%."* (Thato).

For the researcher, it was motivating to see that participants were appreciative of the rehabilitation services received. Most participants found hand and vocational rehabilitation helpful, including supportive services. This revealed the positive influence of rehabilitation services in the South African platinum mining context.

The researcher learnt that RTW continues beyond the worker being back at work, it considers sustained employment and the factors that support advancement in the workplace. Of note is that, even in practice, focus is placed on getting the injured worker back to work, with vague consideration of whether or not the injured individual remains in the workplace. It is noteworthy to consider future research on efforts to ensure maintenance of employment, which could be useful in determining and ensuring longer-term RTW success.

All the information I gathered and learned during this study was of immense value. I believe initiatives aimed at improving RTW outcomes can go beyond the removal of RTW barriers, and reach interventions within our contextual environments to reduce unemployment rates and poverty in the South African context.

6.7 CONCLUSION

This chapter concluded the research study, by supplying a summary of the findings and the implications in practice and recommendations. It presented and described an evaluation of the study and a personal reflection from the researcher. The findings of this study should benefit upper limb amputees receiving rehabilitation services, rehabilitation practice by occupational therapists and other healthcare professionals and future vocational rehabilitation practice in South Africa.

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8 ANNEXURES

8.1 ANNEXURE A – ICD 5 PARTICIPANT'S INFORMATION AND INFORMED CONSENT DOCUMENT FOR A QUALITATIVE STUDY

8.2 ANNEXURE B – QUALITATIVE INTERVIEW SCHEDULE

8.3 ANNEXURE C – QUALITATIVE INTERVIEW SCHEDULE (TSWANA)

8.4 ANNEXURE D – QUALITATIVE INTERVIEW SCHEDULE (ZULU)

8.5 ANNEXURE E – PARTICIPATION INFORMED CONSENT FOR PILOT STUDY

8.6 ANNEXURE F – COMPLETED EVALUATION FORMS FOR INTERVIEW SCHEDULE

8.7 ANNEXURE G – PARTICIPANT INFORMATION (DEMOGRAPHIC CHARACTERISTIC)

8.8 ANNEXURE H – QUALITATIVE INTERVIEW SCHEDULE (REVISED)

8.9 ANNEXURE I – PARTICIPANT INFORMATION (DEMOGRAPHIC CHARACTERISTIC) IN TSWANA

8.10 ANNEXURE J – PARTICIPANT INFORMATION (DEMOGRAPHIC CHARACTERISTIC) IN ZULU

8.11 ANNEXURE K – ETHICS APPROVAL CERTIFICATE

8.12 ANNEXURE L – PERMISSION LETTER

8.13 ANNEXURE M – TURNITIN REPORT