

https://dspace.org/

Factors influencing retention of patients with traumatic brain injury in the South African National Defence Force

Maredi, Thembeka Victoria

2021

https://hdl.handle.net/10539/33533

Downloaded from a DSpace repository. https://dspace.org/



WITS
UNIVERSITY

FACTORS INFLUENCING RETENTION OF PATIENTS WITH TRAUMATIC BRAIN INJURY IN THE SOUTH AFRICAN NATIONAL DEFENCE FORCE

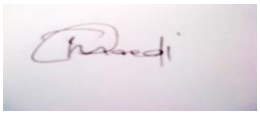
Thembeka Victoria Maredi

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Occupational Therapy. Johannesburg

2021

Declaration

I, Thembeka Victoria Maredi, hereby declare that this research report is my own work. It is being submitted for the degree of Masters of Science in Occupational Therapy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

Signature:  04th Day of November, 2021.

Plagiarism Declaration

Faculty of Health Sciences, Postgraduate Office
Phillip V Tobias Building, 2nd Floor
Cnr York & Princess of Wales Terrace, Parktown 2193
Tel: (011) 717 2745 | Fax: (011) 717 2119
Email: Mathoto.senamela@wits.ac.za

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I, Thembeka Victoria Maredi (Student number: 1754607) am a student registered for the degree of Occupational Therapy in the academic year two.

I hereby declare the following:

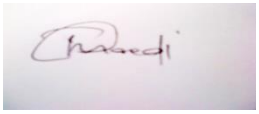
I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.

I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.

I have followed the required conventions in referencing the thoughts and ideas of others.

I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature:  Date: 04th November 2021

Dedication

This research is dedicated to all the participants who took their time to participate in the research and give their valuable inputs. This research would have not been possible if it was not for you, Thank you.

Acknowledgments

First, I would like to thank the Almighty God for showering me with blessings, the opportunity to be able to do this, the wisdom, strength and courage to complete the research.

I would like to thank the University of Witwatersrand for affording me the opportunity to complete my master's study.

I would also like to thank the Department of Defence Force for granting permission and opportunity to conduct the research in the organization.

I would like to express my greatest gratitude to my supervisors Ms Kirsty Van Stormbroek and Dr Denise Franzsen for their support, guidance, patience, motivation, enthusiasm and providing immense knowledge through the research.

A special thank you to Major Schutte for your inputs and guidance as my military supervisor. To the head of Occupational Therapy and all my colleagues - thank you for your support by giving your time when taking up extra work when I had to be away for purpose of the research.

Last but not the least I would like to say thank you to my family: My mom for your prayers and always being there for me, to my dad and sister (continue to rest in peace) your spirit is forever with me and guiding me, my beautiful daughters (Masego & Lekhethelo) for being my greatest inspiration, for your love and understanding. Also express my thanks to my siblings and cousins for always cheering for me. To my friends for their support and words of encouragement thank you.

Abstract

Background:

Service force members in the military are at an additional risk for traumatic brain injury (TBI) due the nature of their duties. Returning to active service after TBI is not an easy process and service force members with TBI struggle with meeting work demands because of residual functional limitations. Service force members require adequate rehabilitation and support in order to return to work (RTW) and to be retained in military service. Although evidence exists to inform rehabilitation for RTW, little is known about the factors that influence retention in the workplace. This study thus sought to investigate factors influencing retention of service force members diagnosed with TBI in active service in the SANDF after RTW on completion of the vocational rehabilitation programme in occupational therapy.

Method: A quantitative descriptive methodology was employed. A questionnaire to determine factors related to retention in the military after return to work of service members with TBI was developed by the researcher based on a review of the literature. Factors covered in the questionnaire included demographics, work and military factors, cognitive factors and rehabilitation and occupational therapy factors. The participants were also evaluated using the Montreal Cognitive Assessment (MoCA) to screen their cognitive function.

Results: A sample size of 86 service members was achieved. The results indicated that age is a significant demographic retention factor (p=0.001). Work and military factor findings, showed the following to influence retention: the time it takes a TBI patient to return to work after injury (p=0.005), success in the workplace (p=0.001), reasonable accommodations (p=0.002), communication with supervisor (p=0.045), taking prescribed medication while on duty (p=0.012) and ability to perform military duties (p=0.001). Cognitive factors that influenced retention were concentration (p=0.000), ability to make decisions (p=0.000), ability to problem solve (p=0.000) and memory (p=0.000). Service force members, both those retained and not

retained in the SANDF after return to work, reported that they were not rehabilitated using tasks that related to their duties or alternative duties to which they returned and that occupational therapists providing vocational rehabilitation rarely did work site visits.

Conclusion: Findings of this study offer evidence that occupational therapists providing vocational rehabilitation should consider the factors demonstrated in this study affecting retention in military service after TBI. Work simulations that are close to the service force members' military duties are recommended. It is recommended that the transformation management policy looks into the ranking system in the SANDF when considering reasonable accommodations for injured/disabled service force members for appropriate redeployment into a rank position.

For future research literature indicated that psychosocial trauma was reported to be negatively influencing recovery and exacerbating symptoms of TBI in the military rather than other resultant outcomes of the TBI Further research on the influence of PTSD and substance abuse on TBI patients is recommended. The research on the influence of chronic pain including headaches is recommended. Further research on factors influencing retention of TBI patients from the supervisor's perspective is recommended.

Table of Contents

Declaration i
Plagiarism Declaration ii
Dedication iii
Acknowledgments iv
Abstract v
Table of Contents vii
List of Tables x
Operational definitions xi
Abbreviations xiii
CHAPTER 1: INTRODUCTION 1
1.1 Background of the study 1
1.2 Statement of the problem 3
1.3 Purpose of the study 3
1.4 The research question 3
1.5 The research aim 4
1.6 Objectives 4
1.7 The significance of the study 4
1.8 Layout of the study 5
CHAPTER 2: LITERATURE REVIEW 6
2.1 Introduction 6
2.2. Traumatic Brain injury in military service 6
2.2.1 Return to service or RTW post traumatic brain injury 8
2.3 Factors influencing RTW post traumatic brain injury 9
2.3.1 Demographic factors. 10
2.3.2. Military and workplace factors 11
2.3.3. The neuropsychological and cognitive factors. 13
2.3.4. Rehabilitation and occupational therapy factors 15
2.4 Summary 21
CHAPTER 3: METHODOLOGY 23
3.1 Study Design 23
3.2 Study Setting 23
3.3 Population of the study 24
3.3.1 Sample of the study 24

3.3.2 Sample size 25
3.4 Research Instrumentation 25
3.4.1 Questionnaire – Perceived barriers and facilitators for return to work in military service 25
3.4.2 Montreal Cognitive Assessment (MoCA) 26
3.5 Research procedure and Data collection 27
3.5.1 Data Management 27
3.6 Data analysis 27
3.7 Ethics 28
CHAPTER 4: RESULTS 30
4.0 Introduction 30
4.1: Retention in the military after traumatic brain injury 30
4.2 Demographics and work categories 31
4.2.1: Demographics 31
4.3. Work Factors 32
4.3.1 Time since injury before return to work 32
4.3.2: Work categories 33
4.3.2: Perceived success of return to work 34
4.3.3: Relationship with supervisor and their involvement in rehabilitation 35
4.3.4: Changes made on return to work, sufficiency of tasks given and contribution made at work 37
4.3.5 Perception of coping and amount of leave taken after return to work 39
4.4. Military Factors related to members with health conditions 40
4.4.1: Taking prescribed treatment while at work 40
4.4.2: Health limitations recorded on the system 41
4.4.3: Ability to carry out work/duties and stigma 42
4.5. Cognitive Factors 43
4.5.1: Cognitive factors at work - concentration, decision making, problem solving and memory 44
4.5.2: Loss of temper/getting angry at work 46
4.5.3. The Montreal Cognitive Assessment (MoCA) 47
4.6. Factors related to Rehabilitation in Occupational Therapy 48
4.6.1 Occupational therapy for return to work 48
4.6.2 Follow up and further occupational therapy after return to work 49
4.7 Summary 50
CHAPTER 5: DISCUSSION 53
5.1. Introduction 53

5.2. Demographics of the sample 53
5.3 Factors influencing retention in the South African national Defence Force after traumatic brain injury 54
5.3.1 Demographic factors 54
5.3.2 Work-related factors 55
5.3.3 Military-related factors 60
5.3.4. Cognitive factors 62
5.3.5 Factors related to rehabilitation in Occupational Therapy 65
5.4. Study strengths and limitations 66
CHAPTER 6: CONCLUSION & RECOMMENDATIONS 68
6.1. Introduction 68
6.2 Conclusion and main findings of the study 68
6.3 Clinical Recommendations 70
6.3 Recommendations for further research 73
References 75
APPENDIX A 84
APPENDIX B 96
APPENDIX C 99
APPENDIX D 102
APPENDIX E 106
APPENDIX F 106
APPENDIX G 109
APPENDIX H 112
APPENDIX I 114

List of Tables

Table 4.1 Retention and months before return to work in the military after traumatic brain injury (n=86). 30
Table 4.2 Personal demographics of participants 31
Table 4.3 Combat related injury....32
Table 4.4 Time since injury before return to work 33
Table 4.5 Work categories of participants....33
Table 4.6 Reported success of return to work....34
Table 4.7. Reported supervisor involvement in rehabilitation. 35
Table 4.8 Reported relationship with supervisor prior TBI....36
Table 4.9 Reported changes made on return to work 37
Table 4.10 Participation in sufficient duties, and contribution made after return to work....38
Table 4.11 Level of coping and amount of leave taken after return to work....39
Table 4.12 Taking prescribed treatment while at work 40
Table 4.13 Health limitations on the system....42
Table 4.14 Ability to carry out physical work/duties and stigma....43
Table 4.15 Cognitive factors - concentration, decision making, problem solving and memory at work....44
Table 4.16 Reported frequency on loss of anger in the workplace....46
Table 4.17 Results of the Montreal Cognitive Assessment. 47
Table 4.18 Occupational therapy for return to work 49
Table 4.19 Follow up and further occupational therapy after return to work 50

Operational definitions

- **The Assessment of Military Multitasking Performance (AMMP)** – is a battery was composed of three dual tasks concurrently tasking finite cognitive processing resources with physical and sensorimotor challenges (Scherer, et al., 2013, p. 1260)
- **Military skills**: “A collection of individual soldering skills deemed critical to soldier survival, including activity-level competencies such as proficiency with weapons handling, communication skills, or negotiating obstacles” and battle drills - “integrated, multi-person, unit level activities which require RTW readiness” (Scherer, et al., 2018, p. 1258).
- **Polytrauma:** a diagnosis that has been used to diagnose patients that have suffered several body system injuries. It has been defined as **“**Two or more injuries to physical regions or organ systems, one of which may be life threatening resulting in physical, cognitive, psychological or psychosocial impairments and functional disability” (Gray, et al., 2017, p. 2).
- **Reasonable accommodations:** Any modification or adjustment to a job or to the working environment that will enable a person with disability to have access to, participate or advance in employment (Department of Public Service and Administration, 2014).
- **Retention: –** For the purpose of this study retention implies an employee being retained in a job after injury and enjoying the benefits of the job same as before the injury. **I**t includes “job enrichment, financial rewards, and employee benefits, training and development opportunities, work environment and work life balance. Retention strategies as career development opportunities, employee engagement and learning attitudes” (Kundu & Lata, 2017), p.2.
- **Return to work:** The process of returning an injured worker to work (Schultz et al., 2007, p.330).

- **Traumatic brain injury (TBI):** “An alteration in brain function, or other evidence of brain pathology, caused by external force” (Memon, et al., 2010, p. 1637)
- **Vocational Rehabilitation:** a process consisting of medical, psychological, social, and occupational activities among sick or injured people with a work history to re-establish work capacity to enable return to the work force (Escorpizo, et al., 2010),p128.
- **Decision Making:** for the purpose of this study decision making has been defined as a process of making basic daily decisions regarding a service force member’s daily routine for own occupation.
- **Problem Solving:** for the purpose of this study problem solving has been defined as a service force member’s own ability to solve even basic problems that arises in their daily routine in their occupation.

Abbreviations

AMMP	Assessment of Military Multitasking Performance
CAF	Canadian Armed Forces (CAF)
DOD	Department of Defence
PEMT	Patrol-Execution Multitask
PTSD	Post-Traumatic Stress Disorder
RWT	Return to work
SANDF	South African National Defence Force
TBI	Traumatic Brain Injury
VR	Vocational Rehabilitation

CHAPTER 1: INTRODUCTION

1.1 Background of the study

Internationally, and in South Africa (SA), traumatic brain injury (TBI) is known to be one of the leading causes of disability and it has been estimated that 89 000 new cases of TBI are reported every year (Pretorius & Broodryk, 2013). Head injuries can have a devastating impact on people's lives, both personally and socially (Webster, et al., 2015). These effects are also true for those in the military, since serving in the military may put service force members at extra risk for TBI due to participation in military training exercises and active combat. Other than weapon and blast injuries, TBIs in the military can also result from motor vehicle accidents, assaults and falls, as well as incidences that occur while service force members are off duty (Reid & Velez, 2015). Although literature on the prevalence of TBI for those in the military in South Africa was not found, research indicates an incidence rate of 1,811.4 per 100,000 service force members in the American armed forces, with a 92% higher incident rate for those in active combat areas (Agimi, et al., 2019).

Traumatic brain injury is defined as "an alteration in brain function, or other evidence of brain pathology, caused by external force" (Memon, et al., 2010, p. 1637). Traumatic brain injuries often cause impairment of cognitive, perceptual, social, behavioural, psychological and physical functioning and therefore returning to active service after such an injury is not an easy process for a soldier. Military service is known to be physically and psychologically demanding (Arrabito & Leung, 2008), and the process of determining a service member's readiness for RTW or combat in the military is complex. Service member competence goes beyond military skills (drills, parade, ability to perform under pressure). Additional skills required to execute duties include resilience, self-efficacy, the capacity for complex thought and various other personal factors (Scherer, et al., 2018). Therefore, in the military work context, service force members with TBI struggle with meeting work demands due to functional limitations caused by residual TBI symptoms (Artman & Mchon, 2013).

Artman and Mchon (2013) cite cognitive and emotional deficits as the most persistent deficits affecting employment and return to active military service. Functional limitations also include a wide array of symptoms that vary in type, duration or intensity and include sensory, gross and fine motor, physiological and communication impairments (Artman & Mchon, 2013; Brainline Military, 2013) This may result in major health and economic issues linked with increased use of medical care, the loss of active time duty and substantial compensation costs (Songer & LaPorte, 2000). Without adequate rehabilitation and support, this may mean the end of a soldier's military career (Bates, et al., 2008).

According to Scollon (2000), return-to-work (RTW) is an important endpoint with regard to measuring the effectiveness of rehabilitation among TBI patients (Scollon, 2000). Factors that influence return to service or work include severity of injury, the demographics of the patient in terms of skill and education, the complexity of their work, as well as the support received once they are back at work (Brainline Military, 2013). Consequently, when a soldier becomes injured, the objective for all concerned is to facilitate, where possible, the soldier's return to health and full productivity in the military or to accommodate them in other duties (Bates, et al., 2008). Thus, based on an assessment of the service member with TBI in the military and the work context, the focus of treatment for an occupational therapist is both return to active service and retention in the military (Brown & Hollis, 2013; Cogan, et al., 2019). Follow up of the service member in their work context is essential, especially as they usually have some residual difficulties even when integrated back into service.

Successful RTW can be influenced by a number of factors including demographic, military service or work, neuropsychological and cognitive factors, as well as rehabilitation services received and from occupational therapy (Cogan, et al., 2019). There is little understanding of the factors influencing retention in military service post TBI after return to work, and this requires research, as well as the role of vocational rehabilitation in facilitating this retention (McCrea, et al., 2008)

1.2 Statement of the problem

The literature reports mostly on factors that influence return to work (RTW) after TBI, with little research on retention after RTW globally. Little research could be sourced on the factors that influence retention of service force members or patients with TBI who RTW or work in a military service with no published literature on this aspect in the South African context. The researcher has worked in the Occupational Therapy Department's neurology section at 1 Military Hospital for 11 years. From her experience, RTW in the military service in the South African National Defence Force (SANDF) for service force members with TBI, is not always successful with some not retaining their positions or jobs. This can occur despite having received multidisciplinary team members rehabilitation (including occupational therapy intervention) in preparation to RTW. Some service force members report difficulties at work after a few weeks or months, while others are successful. The factors, why some service force members with TBI are not retained after return in military service in this context is unknown.

1.3 Purpose of the study

The purpose of the study is to determine which factors (demographics, work, military, occupational therapy and cognitive function) identified in the literature as influencing RTW, to explored as to whether are also influencing retention in military service in the South African context**.** This study will consider factors that influence retention and non-retention of service force members with TBI in active service in the SANDF from patient's perspective. The factors ta into consideration are those that influence retention after their RTW and they have completed the vocational rehabilitation programme in occupational therapy**.**

1.4 The research question

What factors do service force members diagnosed with TBI report influence their retention after RTW in military service in SANDF?

1.5 The research aim

To investigate factors influencing retention of service force members from their perspective, diagnosed with TBI in active service in the SANDF, after RTW.

1.6 Objectives

- To determine the demographic factors (age, race, gender, marital status and educational level) influencing retention or non-retention in the SANDF, reported by service force members diagnosed with TBI, after RTW.
- To determine the workplace and military factors influencing retention or non-retention in the SANDF reported by service force members diagnosed with TBI after RTW.
- To determine the cognitive factors influencing retention or non-retention in the SANDF reported by service force members diagnosed with TBI after RTW and screened by the occupational therapist using the MoCA.
- To determine the rehabilitation and occupational therapy factors influencing retention or non-retention in the SANDF reported by service force members diagnosed with TBI after RTW.

1.7 The significance of the study

Results of this study will promote awareness of the factors that influence retention of service force members with TBI in the military service in order to improve their work transition programme by addressing barriers and facilitating success in their retention after RTW. The outcome of this research would also improve the value of work transition programme with service force members with TBI and as a result, improve the overall inputs of occupational therapy in multidisciplinary intervention in transitioning back to the community and work in patients following a TBI. Lastly, the study will assist in addressing the financial implications associated (This may result in major health and economic issues linked with increased use of medical care, the loss of active time duty and substantial compensation costs Songer & LaPorte, 2000) with temporary

incapacity leave for both the member and military), as improved rehabilitation services for successful work placement will minimise temporary incapacity and increase productivity in the workplace of members who RTW after TBI.

1.8 Layout of the study

This study follows the traditional layout for a research report. The initial introduction chapter presents the background, purpose of the study, research question and aim, objectives and significance of the study. Chapter 2 features a literature review. The methodology is described in the third chapter with results in the fourth chapter. Chapter Five presents the discussion of the results and Chapter Six presents the conclusion by outlining the main findings and the recommendations for clinical practice and further research.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature on patients diagnosed with traumatic brain injury in military service and the factors influencing the retention of service force members with TBI injured in active service and in work. The factors explored have been proved to influence RTW in literature however have not been sufficiently proven that after patients with TBI RTW do those factors play a role in patients with TBI to be retained. The factors are explored also in comparison between the military service and civilian service. Demographic factors, work factors, cognitive factors and the role occupational therapy plays in RTW are also considered. The researcher utilised Google Scholar, Researchgate and PubMed databases to search for relevant literature. Literature was explored from 1993 to 2020 and keywords used for the searching literature included TBI, TBI in military, TBI and RTW, TBI and retention.

2.2. Traumatic Brain injury in military service

Recent statistics show that 383 947 American military service force members sustained TBIs between 2000 and 2018 (Brainline Military, 2019). It is possible that non-reporting or under-reporting of TBI in the military makes this a conservative figure (Brainline Military, 2019). In the American military and veteran populations, TBI is a major health problem as it remains a “signature injury” for service force members injured in the line of duty (Beran & Bhaskar, 2018) or civilian life (Gray, et al., 2017). Service force members are at a significantly higher risk for TBI due to the inherent vocational hazards associated with military training, combat and war (Scherer, et al., 2018). Although no statistics on causes of TBI are available for the SANDF. A review of TBI in the military found gender (being male), longer deployment to active service and not having officer rank significantly increased the risk of TBI while in service. There was however no risk associated with race or level of education (Lindquist, et al., 2017).

Improved battlefield medicine and protective equipment have increased the survival rates for military personnel who have sustained complicated injuries from exposure to blasts, including TBIs (Luethcke, et al., 2011). The sequalae of blast injury TBIs do not differ from TBIs from other causes (Luethcke, et al., 2011). Over 80% of TBI diagnosed in American military personnel are reportedly mild (Lindquist, et al., 2017). Traumatic brain injury research on military service force members has indicated that the clinical manifestation of mild TBI may also be complex (Dillahunt-Aspillaga, et al., 2017). Although symptoms usually resolve soon after a single exposure, there are significant residual post-concussive symptoms. Service force members with mild TBI reported more post-concussive symptoms than those with moderate/severe injuries, although emotional stress was the most prominent post-concussive symptom. Soldiers with mild, and moderate to severe TBIs require rehabilitation and need to be assessed in terms of their ability to RTW (Gray, et al., 2017). After rehabilitation, soldiers who are fit for work should be able to RTW.

The careful and considered transition of defence force personnel back into the SANDF workforce is needed (Republic of South Africa, 2002) as the Labour Relations Act (1995) and the Employment Equity Act (1998) do not apply to members of the National Defence Force. To this end a disability committee in the military reviews the disability issues for defence force personnel. There are processes and procedures for transformation management in the Department of Defence (DOD), to eradicate unfair discrimination in the SANDF and to ensure equity for people with disabilities as well as (Parliamentary Monitoring Group, 2015). Thus, the ultimate goal for a person with a TBI in the military is return to active service and retention in the military with the support of amongst other the occupational therapists (Cogan, et al., 2019).

Determining the factors that support the retention of a person with a TBI in their work context in the service of the SANDF which is the intension of this study will contribute to in the implementation of such transformational policy. This understanding will assist with the successful integration and retention of service force members with TBI who

still have some residual difficulties which need some minor accommodation or whose injury resulted in disability who may need some other redeployment

2.2.1 Return to service or RTW post traumatic brain injury

In the military, the success of services and missions is dependent on the service force members' ability to perform coordinated actions under physically, cognitively, and psychologically demanding conditions. Return to work readiness involves the all members being able to fulfil their allocated duties by participation in "complex tasks, including a range of activities from dismounted patrolling to casualty evacuation in order to be ready to react and survive. Therefore, in order for the DOD to be deemed mission ready, a service force member should be able to perform those types of complex military tasks according to the existing military operational competence standards" (Scherer, et al., 2018, p. 1258).

For these reasons there is a need for military-based assessment tools so that when a service force member has sustained a TBI, their readiness and competence for RTW can be effectively and efficiently evaluated. Assessment tools need to evaluate participation in warrior tasks, battle drills and other foundational competencies or standards for a soldier (Scherer, et al., 2018). Warrior tasks are defined as "a collection of individual soldiering skills deemed critical to soldier survival, including activity-level competencies such as proficiency with weapons handling, communication skills, or negotiating obstacles and battle drills are known as "integrated, multi-person, unit level activities which require RTW readiness" (Scherer, et al., 2018, p. 1258). The readiness of service force members with TBIs for RTW in the military should include proficiency in these tasks and drills; this usually requires above average fitness, speed of movement and cooperation. Where service force members are unable to demonstrate this, an alternate placement need to be considered (Scherer, et al., 2018).

Return to work has benefits for both the employer and employee (Arrabito & Leung, 2008) and the US military emphasises the use of resource (personnel, treatment equipment) facilitation for successful RTW after brain injury. The RTW programme for

those with TBI who are considered able to go back to military service, facilitates the restoration of their physical and mental health by assisting them to reintegrate into the workplace as soon as they are medically fit to work (Arrabito & Leung, 2008). This programme bridges the gap by coordinating rehabilitation and vocational goals, providing on-the-job evaluations and supervisor education, as well as follow up in case where the service force members' need change (reasonable accommodations -RA) when they RTW (Brainline Military, 2013). In a study in the USA examined RTW of service force members after moderate to severe TBI. They reported that 70% were retained in the military after cognitive rehabilitation in hospital or at home, having returned to work 5-8 months post injury (Salazar, et al., 2000).

Successful RTW is reported to be influenced by a number of factors including demographic, type of military service or work, neuropsychological and cognitive factors as well as the rehabilitation services from occupational therapy (Cogan, et al., 2019). Factors influencing retention in military service post TBI, as well as the role of occupational therapy rehabilitation in RTW, therefore require further research (McCrea, et al., 2008).

2.3 Factors influencing RTW post traumatic brain injury

Dillahunt-Aspillaga et al. (2017) reported there is insufficient research with regard to patients with TBI in the military. This holds true, especially for factors influencing retention of service force members with TBI in the active force. Factors provided in literature focus more on RTW than on retention. Dillahunt-Aspillaga et al. (2017) argue that civilian-based researchers have failed to identify the context specific factors that influence retention after RTW for military service force members. Consequently, little information is available on the factors that influence retention of military service force members following a TBI. Most of the available research has considered civilians with TBI in retention after RTW. Therefore, factors reported to have an influence on RTW and on retention for civilians with a TBI were sourced and are reported below.

2.3.1 Demographic factors.

The demographic factors found to influence RTW included patient gender, age, marital status, race and level of education. Patients in Canada who were male, younger than 50 years old, single and white, and who had post matric tertiary qualifications were reported to have better prospects for RTW (Scollon, 2000). The pre-work status of patients with a TBI also played a role in the process of RTW, as did the pre-injury educational status, rather than just the age (Scollon, 2000). Scollon (2000) further indicated good family support pre-accident and during rehabilitation contributed to good RTW prospects (Scollon, 2000). However, factors influencing their retention after theyRTW were not identified.

In South Africa, the post-TBI RTW rate has been reported to be less than 32% for civilians (Watt & Penn, 2000). Demographic factors that contribute to detrimental prospects for RTW were reported to be first language and pre-TBI educational levels, as well as communication difficulties (Watt & Penn, 2000). Although Scollon (2000) and Watt and Penn (2000) also found the level of education to be an important predictor of employment retention for persons with TBI in the civilian population, contrary results in the military regarding level of education influencing retention were reported by Dillahun-Aspillaga et al., (2017). They argued that level of education might have an influence on RTW but has nothing to do with retention in the workplace, specifically in the military. They however acknowledge that classification of educational level might have been different to other studies. These authors also disputed age and marital status as being a factor, since they found being older and single had little to do with retention in the military. They argued that being retained in a job might be described differently in other studies. However, this must be viewed in light of their study participants having an average age of 23 years. With regard to retention in the military, DilahuntAspillaga et al. (2017), identified the deployment factors before the TBI and the position in the military as significant in retention in the service.

The severity of a TBI was found to be a predictor of retention in the military. The retention of service force members with mild TBI was less likely when compared to members with moderate and severe TBI. In the military mild TBI is reported to have a significantly negative impact on retention and community integration, particularly when members with mild TBI also have PTSD (DillahuntAspillaga, et al., 2017). This is in contrast to civilian studies that have reported the better retention of patients with mild TBI in work compared to patients with moderate and severe TBI, regardless of their age (Dillahunt-Aspillaga, et al., 2017). Therefore, severity of the TBI and retention in the workplace may not be related when comparing the military and for civilian populations. However, when service force members have a severe TBI, and leave acute inpatient rehabilitation lacking independence in daily activities, this usually precludes RTW (Dillahunt-Aspillaga, et al., 2017).

2.3.2. Military and workplace factors

A South African civilian study found that pre-work history, work performance, work habits, interpersonal relationships with co-workers and supervisors play a substantial role in RTW of patients with TBI (Watt & Penn, 2000). In addition, the vocational skills the TBI patient acquired pre-injury have also been found to influence return and retention in the workplace. Fewer patients with TBI who had previously worked with a job classification of unskilled work RTW as compared to those with a job classification of semi-skilled and skilled work (Watt & Penn, 2000). This supports international literature that reports that Canadian patients with TBI who had jobs with high mental demands pre-injury, such as those in specialised skills training, were more likely to RTW when compared to patients in unskilled manual jobs (Scollon, 2000). Outcomes for RTW were also better if the patient with TBI had been in their job for more than six months and , full time employees achieved better outcomes than those who did piece or temporary jobs pre-TBI (Scollon, 2000).

Research on RTW after TBI in the military, however, suggests that supervisors struggle to decide if the service member is ready to return to their military duties due to limited

medical knowledge of the residual problems and prognosis (Scherer, et al., 2018). The military environment is reported to be unique and requires specific competencies for certain duties. Service force members are required to have physical, cognitive and psychological capacity to execute timely, coordinated actions in pressurised situations that demand special military skills capacities since the safety of others may depend on their performance (Scherer, et al., 2018). Supervisors need to be assured that the service member can perform at the expected level. In addition, the researchers noted that workplace stigma exists towards injured service force members who are unable to perform their military duties. This stigma can interfere with the creation of a supportive work environment, which is critical for unit cohesion, morale and ultimately operational effectiveness (Arrabito & Leung, 2008).

Stigma and discrimination have been attributed to a lack of understanding among supervisors and colleagues about how a service force member's bodily function can affect their ability to carry out their military duties (Scherer, et al., 2018). Authors suggest that this stigma must not be ignored as it has a negative impact on work retention and has been associated with greater occupational stress for injured workers (Aikins, et al., 2020).

Occupational stress has been identified as one of the factors that further affects the recovery, health and wellbeing of service force members with TBI, and hinders their work performance (Aikins, et al., 2020). Service force members may avoid seeking assistance regarding their occupational stressors if they believe this will result in being undermined by supervisors and colleagues (Aikins, et al., 2020). Therefore, even though it may be difficult and time-consuming to address stigma, its reduction is necessary if injured members are to have a better outcome when navigating the successive phases of recovery, rehabilitation and return to and retention in military service (Arrabito & Leung, 2008). Service force members may also avoid seeking assistance as every consultation is added to their profile.

All service force members profile is created when joining the force. When service force members suffers from illness/ disease/injury that result in functional limitations, it is recorded on their profile so that they can be accommodated in the service if necessary. Service force members with TBI that result in functional limitations, are recorded in their profile, which documents the service member's health condition and the impact of the condition on their ability to perform duties and may limit their geographic assignment (Bates, et al., 2008). To accommodate issues with performance following a TBI, usually injured service force members return to support duties and are exempted from warrior tasks and battle drills. If the service member cannot resume employment in their military occupation after injury or illness, they may remain in military service in an alternative position, provided they meet minimum operational standards for that position related to the service (Arrabito & Leung, 2008).

2.3.3. The neuropsychological and cognitive factors.

Amongst civilians with TBI in South Africa, the strongest predictor for failure to RTW is mental skill impairment (Watt & Penn, 2000). An inability to manage behaviour, such as aggression, and other cognitive skills resulted in an inability to maintain employment in pre-injury jobs (Moller, et al., 2017). Such TBI suffers struggle in work environments due to their mood changes, lack of insight and disrupted interpersonal skills related to impaired self-awareness of their abilities and limitations (Scollon, 2000). The other impairments after TBI which impair RTW are reported to include deficits in body image, neuropsychological and executive function (Scollon, 2000). Earlier findings by Brooks et al. (1987) concur with the above, stating that mental abilities, social interaction and personality deviations contribute to RTW incapacities of patients with TBI more than body function deficits (Brooks, et al., 1987).

The ability of a service member to perform duty related activities has also been associated with other factors such as post concussive, neurocognitive, sensorimotor, or somatic sequelae (Scherer, et al., 2018). It has been reported that service force members with TBI who were retained in the military, were those with fewer limitations

in cognitive and motor functioning, and fewer psychiatric symptoms (Dillahunt-Aspillaga, et al., 2017). Those who did not use mental health services for a year were also more likely to remain in the military workplace. This suggests that the absence of psychiatric symptoms may also have an influence in the retention in the workplace (Dillahunt-Aspillaga, et al., 2017). However besides absence of psychiatric symptoms other residual physical, psychosocial or cognitive limitation can affect retention in the workplace.

Service force members with TBI often present with several residual or comorbid difficulties, due to other injuries which accompanied the TBI. This is described as polytrauma, defined as “two or more injuries to physical regions or organ systems, one of which may be life threatening resulting in physical, cognitive, psychological or psychosocial impairments and functional disability” (Gray, et al., 2017, p. 2). Other conditions, such as chronic pain and soft tissue injury, may also affect cognitive symptoms, which may produce new or more severe symptoms affecting retention in the work place at a later stage (Lees-Haley & Brown, 1993).

Concurrent polytrauma and TBI has be associated with psychiatric conditions such as post-traumatic stress disorder, depression, anxiety and substance abuse (Kennedy, et al., 2010). These also include high rates of psychological and neurobehavioral symptoms, such as memory deficits, mood symptoms and a demotivation that may, or may not be, directly related to the TBI (Frénisy, et al., 2006). Service force members with TBI, especially those who suffer more than one mild TBI, may also be at risk of neurodegenerative diseases (DeKosky, et al., 2010).

Research on the cognitive functioning in service force members, even those with mild TBI, revealed difficulties with memory, attention, concentration and irritability, as well as sleep disturbances. Poor tolerance to noise was also reported at 3 months follow up appointments (Luethcke, et al., 2011). Luethcke, et al. (2011) suggests there is clinically significant impairment in cognitive processing seen in patients with TBI in the military, irrespective of the cause of the TBI. Thus, the severity of the head injury alone

may not predict the neuropsychological and cognitive symptoms with which patients present (Luethcke, et al., 2011). In addition to symptoms of physical discomfort, sensory instability or disorientation, acutely concussed service force members with mild TBI, may experience deficits in activity or participation-level performance in previously highly practiced and well-trained military occupational competencies (Scherer, et al., 2013). In these patients “post-concussive activity level deficits in service force members which may include marksmanship (stemming from gaze instability, visual or central cognitive processing capabilities) or difficulty engaging in radio communications due to central auditory or cognitive processing impairments) included with a number of highlighted symptoms and impairments believed to degrade RTW readiness” (Scherer, et al., 2013, p. 1257). Thus, due to the need to execute timely, coordinated actions in pressurised situations, rates of retention of service force members with TBI, especially those with mild TBI, may be low
(Stergiou-Kita, et al., 2011).

2.3.4. Rehabilitation and occupational therapy factors

The ultimate goal of rehabilitation following TBI is to assist force members to RTW or to make an optimal return to civilian life if the extent of their injuries necessitates a medical boarding (Gray, et al., 2017). According to Dilahaunt-Aspillaga et al. (2017), community integration, positive affect, and social support after rehabilitation discharge can significantly influence the quality of life after TBI, whether in a military context or not. Being productive in the workplace has shown to be an important part of people’s daily life with or without TBI (Dilahaunt-Aspillaga et al. 2017). Not returning to work following a TBI can influence quality of life and psychological wellbeing (Pugh, et al., 2017), and is linked to regression of health status. Pugh et al. (2017) stated that work difficulties or unemployment can negatively affect wellbeing. They reported that addressing employment issues can assist in preventing regression of health and functioning. Vocational rehabilitation should therefore be an important focus for individuals who have sustained TBI.

Service force members with TBI require multidisciplinary rehabilitation, which should include vocational rehabilitation and ongoing vocational support for the multiple challenges related to the complex interaction of physical, cognitive, and emotional impairments (Salazar, et al., 2000). Before 1994 force members with a major injury were usually released from the service, today however, where accommodation technology (RA including assistive devices) exists and where opinions and attitudes have changed, these service force members can potentially RTW and continue to serve in the military (Bates, et al., 2008).

Occupational therapists are important team members in providing vocational rehabilitation and are responsible for functional capacity evaluations of TBI service force members (Scherer, et al., 2018) as well in South Africa context. This rehabilitation usually takes place in a military or veterans' hospital followed by a home-based programme, with the occupational therapist usually recommending a suitable work placement (Salazar, et al., 2000).

Ideally, service force members should return to their own occupation without reasonable accommodation within the limits of the residual problems from brain injury (Silverberg, et al., 2017). Some service force members with TBI however dare reported to require reasonable accommodation in the workplace (Pugh, et al., 2017). Reasonable accommodations are any adaptations to duties or work context recommended and put in place whenever a service force member returns RTW following an injury such as a TBI. This may include service force members who return to their own occupation with modified duties or limited hours, those who returned to a different occupation and other modified work stations with less physically and cognitively demanding occupations (Pugh, et al., 2017).

In rehabilitation following a TBI successful RTW an essential goal, but careful monitoring of the patient is essential so they do not attempt to RTW too soon or late. A RTW goal is more likely to be achieved if the patient and therapist are both realistic about the type of work the patient can manage initially and at a later stage, and when

the RTW is managed so that it is within the patient's residual capabilities (Stergiou-Kita, et al., 2011). Generally, for civilians with TBI, Scollon (2000) reports that the duration of rehabilitation is typically an indication for future possible RTW. If the patient with TBI only requires only a few months in rehabilitation they have a good chance of returning to work compared to those who require more than a year of rehabilitation (Scollon, 2000). Significant progress in the first six months of recovery following TBI has also been associated with RTW in 60% to 90% of patients (Silverberg, et al., 2017).

2.3.4.1 Assessment of functional capacity

Accuracy of the vocational assessment completed, as well as the skills and competency of the assessors can influence the outcomes of RTW in adults with TBI (Stergiou-Kita, et al., 2011). However, despite the need for reliable and accurate functional capacity assessment methods, there is a great variability in how vocational evaluations are completed in practice. Evaluators have challenges including describing the specific purpose of an evaluation, selecting proper evaluation tools and issues with interpreting their findings when completing vocational-related evaluations (Stergiou-Kita, et al., 2011).

Due to the nature of military environment and the complexity of military duties, the assessment tools used have to be relevant and realistic to the military in terms of function and performance for RTW and may differ compared to RTW assessments in the civilian environment. Available standardised assessment measuring tools have not all been validated for military service force members.

If work samples used to assess RTW of service force members, these work samples should resemble the real-work duties, including the environment in which the duty takes place. In the military, there is a need for protocols that integrate ecologic (war zone environments/environments were duty takes place) aspects when making recommendations in relation to RTW (Scherer, et al., 2018).

There is reluctance in the military to use self-report tools of cognitive function because service force members may be hesitant to report their symptoms in detail if they feel it will jeopardise their military duties and reliability of people with head injuries is a concern is civil society as well. Any self-reporting assessment tools used need to be supported by other objective assessments if decision makers (multidisciplinary team) are to generate proper recommendations on the service member's readiness to return to RTW (Brainline Military, 2013). Higher order mental skills and good work habits need addressing in rehabilitation, especially for patients working in high-level jobs (Scollon, 2000).

While there are valid and reliable assessment tools available to assess limitations or other adverse results in terms of neuropsychological and cognitive function following a TBI, or more severe neurologic pathology, these assessments are not suitable for service force members (Sherer et al., 2013). The available assessment tools lack normative values in the typical age and activity range of the service force members. Consequently, the scoring values on many standardised assessments do not match the abilities that require assessment (Scherer, et al., 2013). In the USA, occupational therapists have relied on sports concussion literature when assessing readiness of service force members with mild TBI for RTW. However, Sherer, et al. (2018) have found that the sports concussion literature references are not applicable in the military to determine RTW as sports concussion focuses more on musculoskeletal than the cognitive limitations in TBI.

Scherer et al. (2013) reported on extensive developments in virtual reality applications that are usable in the assessment and recommendations for RTW readiness of service force members post TBI. These applications provide flexibility in carrying out complex, scenarios of duties in the real work world of the service force member. The establishing of these new assessment methods address "immersive virtual reality environments, field-based scenario-driven assessment programs, and militarized dual-task and multitask-based approaches for the evaluation of sensorimotor and cognitive function

following TBI" (Scherer et al., 2013, p: 1264). Military rehabilitation teams are still researching complex, dual and multi task evaluations in order to obtain accurate measures for RTW readiness of service force members. For assessment of successful RTW, the participation in/completion of complex tasks are well suited, since they consider the performance of tasks with real-world demands (Scherer, et al., 2013).

A battery of novel dual tasks and multitasks were created by a multidisciplinary team of military and civilian clinician-scientists, to address competency related to known TBI-related residual problems in combat service force members (Scherer, et al., 2013). The Assessment of Military Multitasking Performance (AMMP) battery was composed of three dual tasks concurrently tasking finite cognitive processing resources with physical and sensorimotor challenges. However, adding endurance to participate in the tasks was a problem. The development of the Patrol-Execution Multitask (PEMT) was to concurrently probe for symptoms of post-concussive exercise intolerance using an exertion task while engaged in a virtual reality patrol to replicate the experiences of a deployed, dismounted war fighter. The PEMT scenario requires engagement of cognitive resources, including situational awareness, memory and decision making under conditions of moderate exertion" (Scherer, et al., 2013, p. 1260). Technically, multitasking is the need to engage in multiple activities at the same time with serial switching of attentional priorities between activities. The PEMT diverges from the traditional clinical definition of multitasking. The assessment is characterised by discrete interleaving tasks typically punctuated by interruptions, and used to identify executive dysfunction.

The PEMT and AMMP battery are not available for the South African context and thus rehabilitation professionals are using assessment batteries available for the civilian population (Erasmus, 2013). Occupational therapists use various assessments same as used by other occupational therapist civilian society, not military specific, to test readiness for work of service force members with TBI. Although many factors influence RTW, the most important is the capacity of the TBI patient to fulfil the requirements of

the job to which they are returning. The higher cognitive skills of an individual are the determinants of whether a person can complete a goal-orientated task. Patients with TBI, specifically those in management positions, struggle in these particular positions due to affected high cognitive skills functioning (Erasmus, 2013).

Trudel et al. (2007) agreed with Sherer et al., (2013) that psychometric and practical issues hamper the available clinical assessment methods used to assess injured service force members. They reported there is an absence of sensitivity to high-level functioning limitations in the assessment methods used by physical and occupational therapists. The assessments fail to detect deficits when used on combat populations. Batteries currently used do not contain validity (not measuring military skills) or measure function related to combat specifically for service force members (Trudel, et al., 2007).

The focus of an assessment of the patient and the work context, for the occupational therapist of a service member with TBI is not just the return to active service, but also most importantly retention in the military. For them to be successfully retained in the workplace, factors that influence their retention need to be known.

2.3.4.2 Retention after return to RTW

An accurate functional capacity evaluation and vocational rehabilitation is important but retention in the workplace may not be assured without further follow up and support of service force member. The rehabilitation team should ensure the patient with TBI has adequate endurance, work habits and does not experience under-productivity or loss of productivity (Silverberg, et al., 2017). Patients with TBI who have returned to work reported various cognitive, physical and emotional symptoms of moderate severity (Dillahunt-Aspillaga, et al., 2017). Additional severe subjective symptoms of depression, anxiety and Post-Traumatic Stress Disorder (PTSD), as well as post-concussive symptoms have been associated with retention in the workplace (Dillahunt-Aspillaga, et al., 2017).

According to Silverberg et al. (2017), RTW does not guarantee productivity when patients with TBI still struggle with residual symptoms. These residual symptoms that affect productivity may result in difficulties in retaining their job. Retention in the workplace could also be affected by absenteeism. The cost of productivity loss may outweigh that of absenteeism and disability leave resulting in the employer not wishing to retain the employee with TBI (Silverberg, et al., 2017).

Dillahunt-Aspillaga et al. (2017) reported other factors that may interfere with retention of service force members with TBI after they RTW include attendance at rehabilitation/follow up appointments, access to transportation for rehabilitation/medical services and family responsibilities. Retention studies have highlighted the importance of an accurate functional capacity evaluation using relevant assessment tools for the military service force context, but most of these studies have been undertaken in the United States. The recommendations from current study would thus address the gap with regard to improving the current rehabilitation procedures and assessment methods in the SANDF. Traumatic brain injury effects are more detrimental in SA as there is loss of skilled employees and sustaining unemployed persons with TBI worsens the load on the economy (Erasmus, 2013).

2.4 Summary

In military and veteran populations, TBI is a major health problem due to the residual symptoms that do not completely resolve. Statistics indicate military service force members may have a higher rate of TBIs than civilian population. In previous years, active service force members with TBI were typically released from service; while more recently, there are attempts to retain them (Gray, et al., 2017).

Traumatic brain injury leads to varying levels of disability resulting in health and economic concerns linked with increased use of medical care, the loss of active time RTW and substantial compensation costs. The short-term and long-term changes in cognitive, behavioural, psychological and physical functioning are consequences of TBI that can impact on a person’s ability to return, maintain employment, or obtain

alternative employment as well as community re-integration. Furthermore, there is often a link between the persistent symptoms and complex co-morbidities, such as chronic pain, irritability, sleep and mental disorders (e.g., depression, anxiety, anger management or PTSD) that can affect work performance and participation in daily activities (Dillahunt-Aspillaga, et al., 2017).

The effects of physical, cognitive and psychological deficits in patients with TBIs, as reported in previous civilian studies, also hold true for those in military service (Songer & LaPorte, 2000). Military service is physically and psychologically demanding (Arrabito & Leung, 2008). For a service member there are foundational competencies or standards required with regard to military tasks and combat drills (Scherer, et al., 2018). Therefore, once a soldier is injured, returning to active service after an injury, such as a TBI, is not an easy process. Without adequate rehabilitation and support, this may mean the end of a soldier's career in the military (Bates, et al., 2008).

The researcher identified observed difficulties in retention of service force members with TBI in the military. Those difficulties have devastating effects on the health and well-being of service members, as well as on the economy. Even after rehabilitation, skilled trained service force members may not be retained in the workplace. There seems to be a gap in the literature in identifying the factors that influence retention of TBI patients, specifically in the military in the South African context.

Therefore, this study's aim was to investigate factors that influence retention and to promote awareness of the factors that influence retention of service force members with TBI in the military service in order to improve their work transition programme by addressing barriers and facilitating success in their retention in the South African SANDF context.

CHAPTER 3: METHODOLOGY

3.1 Study Design

The study employed a quantitative descriptive, cross-sectional design. Quantitative research was chosen because the service force members were describing their perspectives rather than assumptions of the situations by the researcher. The descriptive report included the study of certain variables with no manipulation of the variables (Sukamolson, 2007). The cross-sectional study was selected since data were collected at one point in time (Olsen & St George, 2004). The study was quantitative because data was numerical and analysed with statistical procedures.

3.2 Study Setting

The South African National Defence Force has four arms of service, which included the South African Army, South African Air Force, South African Navy and South African Health Military Services. The South African Health Services offered medical support to all arms of the services, at one of three hospitals, 1, 2 and 3 Military Hospital, based in Pretoria, Cape Town and Bloemfontein respectively. The study was undertaken at 1 Military Hospital, which is the biggest of the three hospitals. Occupational therapy formed part of the medical support provided to the four arms of services in all three hospitals. The Occupational Therapy Department at 1 Military Hospital consisted of 13 occupational therapists, three community service occupational therapists and two occupational therapy technicians, with three sections offering services in child, psychiatry and neurology and orthopaedic rehabilitation. Occupational therapy provided services to injured and sick service force members and their families for a wide variety medical conditions. Although this research was conducted in the neurology section of the occupational therapy department, in all sections the role of occupational therapy with ill and/or injured service force members emphasised the successful integration back in to the workplace.

3.3 Population of the study

Service force members diagnosed with TBIs and treated at 1 Military Hospital in the last five years who have RTW having completed an occupational therapy vocational rehabilitation programme.

3.3.1 Sample of the study

The method of sampling used was convenience purposive sampling. The selection of the participants was due to the suitability of the study Acharya et al., 2013). The researcher went through the occupational therapy records systematically and identified 109 service force members diagnosed with TBI at 1 Military Hospital who have returned to work and had or had not been retained in active service. The service force members that met the inclusion criteria below were contacted and those that were easily available were invited to participate the study. Service force member patients with TBI recommended for RTW in active service, with and without reasonable accommodations, irrespective of the severity of the TBI were included in the study.

Inclusion criteria

- Service force members who had sustained TBI as active members who have received occupational therapy vocational rehabilitation service from 2014 to 2019.
- Service force members with TBI who were able to complete a questionnaire independently, or an interview format
- Service force members with TBIs who were older than 18 and younger than 60

Exclusion criteria

- Service force members with TBIs that presented with pre-existing psychiatric conditions

3.3.2 Sample size

From the reviewed of records at 1 Military Hospital over the last five years, there were 109 service force members with TBIs who returned to work and had or had not been retained in the military from in the five-year period under review . According to Cochrane's formula, a minimum of 85 service force members should have completed the questionnaire to achieve no more than a 5% margin of error if the sample is to be representative of the population (Bartlett, et al., 2001).

3.4 Research Instrumentation

3.4.1 Questionnaire – Perceived barriers and facilitators for return to work in military service

The researcher did not find an existing tool suitable for the study and thus developed her own for the patients with TBIs who had returned to work (Appendix A) Questionnaires on RTW exist but were not suitable to address the objectives of the study, which focused on work retention in the military service. Items included in the questionnaire were based on the reviewed literature (Rationale in Appendix B) and the *Employee return-to-work following long-term sickness absence- BOHRF survey (Hicks, 2017)*. The questionnaire included a number of questions that could be answered using a Likert-scale. The questionnaire had 37 items and was self-administered. The researcher administered the questionnaire in an interview format for participants unable to complete the questionnaire

Survey Validation

A survey validation was conducted to strengthen the content validity and utility of the questionnaire. Five experts with at least five years' experience in the field of Vocational rehabilitation received the questionnaire for validation. The experts were asked to critique the questionnaire and made recommendations to assist to strengthen the validation of the questionnaire. The results of the survey validation were used to refine the questionnaire. Six TBI patients, who were not part of the study, also pre-tested the

questionnaire. The testing of the questionnaire aimed to address ambiguity and ensured ease of completion. Ten questions underwent correction based on the feedback received (see Appendix C). Grammar was also corrected as per recommendations.

3.4.2 Montreal Cognitive Assessment (MoCA)

The Montreal Cognitive Assessment (MoCA) (Appendix D) screened the participants' cognitive function. The design of the MoCA was as a rapid screening instrument for mild cognitive dysfunction that takes approximately 10 minutes to administer. The tool assessed the following cognitive domains: attention and concentration, executive functions, memory, language, visuo-constructional skills, conceptual thinking, calculations and orientation. The MoCA was used in this study prior to training being made mandatory by the developers in 2019 (Nasreddine, 2019). The MoCA screened whether higher cognitive skills needs further assessment depending on severity of the results and assisted in determining if the patients will be able to complete questionnaire.

The highest total score is 30 points, with a score of 26 or above being considered normal (Nasreddine, 2019). The MoCA is a valid assessment tool for assessing gross cognitive ability in patients with TBI (intra-cranial haemorrhage) (Wong et al., 2013). The tool demonstrated high specificity and sensitivity for detecting mild cognitive impairment (Nasreddine, 2019). Nasreddine and colleagues (2005) also determined the internal consistency of the MoCA on standardised items (Cronbach's alpha = 0.83). Their assessment of the test-retest reliability demonstrated the mean change in scores was 0.9. The tool can track cognitive abilities over time in geriatric patients with cognitive impairment, but there was no evidence for the tool's responsiveness in a TBI population (Nasreddine, et al., 2005). The MoCA has been validated on a healthy South African cohort (Beath et. al., 2018) so was considered suitable for use in this study

3.5 Research procedure and Data collection

Approval for the protocol was obtained from Faculty Graduate Studies Committee at the University of the Witwatersrand and School of Therapeutic Sciences Postgraduate Committee.

After permission was granted for the research contacts details of potential participants were taken from 1 Military Hospital's occupational therapy records. The research was explained to the participants. The researcher set up appointments telephonically for visits with the service force members. The visits were either at the workplace or at the nearest military unit for participants not retained, and in the SANDF sites for those retained.

Each participant completed a MoCA, administered by the researcher. After completion of the MoCA, the participants were given the research questionnaire to complete. While the participants were filling in the questionnaires the researcher was available for assistance and clarification. English language was used with participants. It took 20-30 minutes for participants to complete both the MoCA and questionnaire.

3.5.1 Data Management

The capturing of the collected data was via Microsoft *Excel* on the researcher's computer, which was password secured. The data underwent cleaning and coding in Microsoft *Excel* and the accuracy of the data entered checked. Backing up of data occurred regularly on a separate storage device. The data was accessible to the researcher and the supervisor as well as the involved research committees if required. It will be stored for 5 years on the computer which is password secured.

3.6 Data analysis

Demographic data was analysed using descriptive statistics. Analysis sought to describe the profile of TBI patients retained in the workplace and those not retained. Categorical data from the questionnaire was summarised as frequencies and

percentages. Frequency tables were used to present data. The comparison between those retained and not retained were analysed using the Chi Square test. It was used for comparing ordinal variables between the retained and no retained service force members. Data were analysed using Statistica v 13.2

The presentation of the results of the MoCA was as a median and interquartile range using the Mann Whitney U test. The Mann Whitney U Test determined differences between those retained and those not retained. The Mann-Whitney U test is a non-parametric statistical technique used because the data were ordinal data and analysed differences between the medians of two data sets (Milenovic, 2011). The performing of all analyses was at a 95% confidence interval.

3.7 Ethics

Ethical clearance for the study was provided by the Human Research Ethics Committee at the University of the Witwatersrand (M180423) (Appendix E) as well as ethical clearance and permission from 1 Military Hospital Research Ethics Committee (1MH/302/6/03.01.2018) (Appendix F) prior to conducting the research.

The ethical principles adhered to during the study included:

Autonomy

Participants were given the right to exercise their choice in accepting or declining participation within the study respected their autonomy (Panter, 2011). The respondents were informed of the nature of the study to be conducted and that participation in the research was entirely voluntary. Participants were able to refuse, or cease to participate without stating any reasons. Each participant was provided with an information sheet (Appendix G) and asked to sign informed consent (Appendix H).

Confidentiality

Confidentiality and privacy of records of names of patients diagnosed with TBIs in the South African Defence Force was ensured, as participants were not required to put

their names on the questionnaires. Data was kept confidential; it was not made accessible to other people other than the researcher and supervisor and the stated research ethics committees upon request. Respondents' names did not appear on questionnaires (Appendix A) during data collection. Respondents' data is non identifiable and will not be identifiable on published results, as the privacy, dignity and information of the participants remains confidential.

Beneficence

Participants received notification that there were no potential benefits for them in participating in the study.

Non-maleficence

There was no potential or documented harm for respondents in this study.

Justice

All participants received equal treatment, and their contributions were recognised and valued. Information collected was for the purpose of the study, and the researcher honestly presented the research findings. The researcher acknowledged all the assistance, collaboration, sources of information and financial support received.

CHAPTER 4: RESULTS

4.0 Introduction

This chapter includes presentation of the results from 86 participants, more than required, who completed the questionnaire on factors associated with retention and non-retention of service force members with TBIs in the SANDF. The questionnaire included questions on demographic and work factors> This chapter includes a comparison of these factors for participants retained and those not retained after returning to work post TBI in the SANDF. The Montreal Cognitive Assessment (MoCA) was used to evaluate the participants to determine their cognitive function and retention associated with this variable, as well as factors related to their rehabilitation and occupational therapy experiences. The factors related to military procedures for members with health conditions such as TBI are also presented.

4.1: Retention in the military after traumatic brain injury

Table 4.1 shows that 82.5% of participants were still active service force members at the time of the study, indicating the retaining of this proportion of members following a TBI. Of the other participants, 17.4% (n=15) were not retained, of which 5.8% (n=5) were veterans and 11.6% (n=10) left the force following medical boarding. The 86 participants all returned to work after completing a rehabilitation programme; some returned to work after few months and some after a year or more.

Table 4.1 Retention and months before return to work in the military after traumatic brain injury (n=86).

	Category	n	Percentage
Retention	No	15	17.4
	Yes	71	82.5

4.2 Demographics and work categories

4.2.1: Demographics

Table 4.2 indicates that 69 (80.2%) males and 17 (19.7%) females participated in the research. The majority of participants were African (n=70, 81.3%), married (n=33, 38.3%) and had a Grade 12 (n=49, 56.9%) level of education.

Table 4.2 Personal demographics of participants

		Total (n=86)		Retained (n=71)		Not retained (n=15)		
	Category	**n**	**%**	**n**	**%**	**n**	**%**	**p value**
Gender	Male	69	80.2	58	81.6	11	73.3	0.616
	Female	17	19.7	13	18.3	4	26.6	
Age	20-30 years	5	5.8	5	7.0	0	0	0.001**
	30-40 years	27	31.3	24	33.8	3	20	
	40-50 years	35	40.6	30	42.2	5	33.3	
	50-60 years	19	22.0	12	16.9	7	46.6	
Ethic group	African	70	81.3	57	80.3	13	86.66	0.669
	Caucasian	12	13.9	10	14.1	2	13.3	
	Indian	1	1.1	1	1.4	0	0	
	Coloured	3	3.4	3	4.2	0	0	
Marital status	Married	33	38.3	24	33.8	9	60.0	0.098
	Divorced	10	11.6	9	12.6	1	6.6	
	Cohabitation	17	19.7	14	19.7	3	20.0	
	Single	26	30.2	24	33.8	2	13.3	
Highest level of education	Grade 12	49	56.9	39	54.9	10	66.6	0.620
	Post-matric certificate	8	9.3	7	9.8	1	6.6	
	Diploma	23	26.7	21	29.5	2	13.33	
	Degree	6	6.9	4	5.6	2	13.33	

Significance p≤ 0.05* p≤ 0.01**

Results show that the majority (n=35, 40.6%) of the participants were in the age range 40-50 years and with the fewest participants (n=5, 5.8%) in the 20–30-year category. The only demographic factor for which there was a significant difference in the participants that were and were not retained was age (p=0.001).

4.2.2 Traumatic brain injury

Only 13.9% (n=12) of participants reported that their injuries were combat related and none of the non-retained participants had combat related injuries (Table 4.3). However, the difference between the participants who were and were not retained was not significant for whether the injury was combat related or not.

Table 4.3 Combat related injury

Variable	Was your injury combat related						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p value
0 = No	74	86.0	59	83.0	15	100.0	0.089
1 = Yes	12	13.9	12	16.9	0	0	

Significance p≤ 0.05* p≤ 0.01**

4.3. Work Factors

4.3.1 Time since injury before return to work

Table 4.4 reflects the months before participants returned to RTW/work. There was a significant difference in the time taken to RTW for participants with TBI who were and were not retained in the military (p=0.005). Of the participants who were retained in service, 80.2% (n=57) returned to work within one year compared to 46.6% (n=7) of those who were not retained. A higher percentage of participants (n=2: 13.3%) who were not retained only returned to work 25-36 months after injury compared to those who were retained (n=2: 2.8%).

Table 4.4 Time since injury before return to work

	Total ($n_{=86}$)		Retained (n=71)		Not retained (n=15)		
Months before return to RTW	**n**	**%**	**n**	**%**	**N**	**%**	**p value**
2-6 months	30	36.6	29	40.8	1	6.6	0.005**
7-12months	34	42.2	28	39.4	6	40.00	
13-18 months	10	8.4	8	11.3	2	13.3	
19-24 months	5	7.0	2	2.8	3	20.0	
25-36 months	4	5.6	2	2.8	2	13.3	
Don't remember	3	3.5	2	2.8	1	6.6	

Significance p≤ 0.05* p≤ 0.01**

4.3.2: Work categories

Of the participants, 37.0% (n=33) were in occupations that had medium physical demands followed by those in sedentary occupations (n=19: 22.0%). (Table 4.5).

Table 4.5 Work categories of participants

Variable	Work categories of participants						
	Total (n=86)		Retained (n=71)		Not retained (n=15)		
	n	**%**	**n**	**%**	**N**	**%**	**p value**
Light to sedentary	9	10.4	7	9.8	2	13.3	0.470
Sedentary	19	22.0	17	23.9	2	13.3	
Medium	33	37.0	29	40.8	4	26.6	
Light	9	10.4	7	9.8	2	13.3	
Light to medium	6	6.9	4	5.6	2	13.3	
Medium to heavy	8	9.3	5	7.0	3	20.0	

Significance p≤ 0.05* p≤ 0.01**

The lowest percentage of participants (n=6: 6.9%) were those who performed light to medium occupations since they do sedentary work with some components of light occupation. There was no significant difference in the categories of work for those retained and not retained in the military after TBI.

4.3.2: Perceived success of return to work

Table 4.6 shows how the participants felt about the success of their RTW after TBI. Return to work was very or mostly successful for 35.1% (n=25) of the participants who had been retained. A further 46.6% (n=33) indicting fairly successful RTW and 18.2% (n=13) reporting fairly/mostly unsuccessful.

Of the 15 participants not retained, 26.6 % (n=4) reported they had returned to work and this was fairly successful/unsuccessful, but they had since been boarded or retired, while the other 73.3% (n=11) indicated their RTW was unsuccessful. There was a significant difference for reported successful RTW for those retained and not retained in the military after TBI (p=0.001).

Table 4.6 Reported success of return to work

Variable	How successful has RTW been:						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p value
1 = Very successful	6	6.9	6	8.4	0	0	0.000**
2 = Mostly successful	19	22.0	19	26.7	0	0	
3 = Fairly successful	34	39.5	33	46.4	1	6.0	
4 = Fairly unsuccessful	12	13.9	9	12.6	3	20.0	
5 = Mostly unsuccessful	8	9.3	4	5.6	3	20.0	
6= Very unsuccessful	7	8.1	0	0	8	53.3	

Significance p≤ 0.05* p≤ 0.01**

4.3.3: Relationship with supervisor and their involvement in rehabilitation

In Table 4.7 t slightly more than one third of participants (n=32: 37.2%) reported that they received some support from their supervisor during their rehabilitation.

Table 4.7. Reported supervisor involvement in rehabilitation.

Variable	Was supervisor involved in rehabilitation						
	Total n=86		Retained n=71`		Not retained n=15		p-value
	n	%	n	%	n	%	0.534
1 = Not at all	30	34.8	26	36.6	4	26.6	
2 = To some extent	32	37.2	26	36.6	6	40.0	
3 = To a moderate extent	11	12.7	8	11.2	3	20.0	
4 = To a large extent	13	15.1	11	15.4	2	13.3	
	How frequently did supervisor communicate with you/family during rehabilitation						
1 = Never	38	44.1	35	49.2	3	20.0	0.045**
2 = Occasionally	33	38.3	25	35.2	8	53.3	
3 = Frequently	8	9.3	6	8.4	2	13.3	
4 = Very frequently	7	8.1	5	7.0	2	13.3	

Significance p≤ 0.05* p≤ 0.01**

A slightly lower percentage of participants (n=30, 34.8%) reported they had no support at all from their supervisor during their rehabilitation. A higher percentage of participants (n=11, 73.3%) not retained received support from their supervisors during their rehabilitation compared to 63.3% (n=45) of retained participants. The difference in support for those retained and not retained was not significant. However, there was a significant difference for reported communication with their supervisors between themselves and/or family for those retained and not retained in the military after TBI (p=0.045). The participants not retained (n=12: 80%) had occasional, frequent or very frequent communication with their supervisor compared to 50.6% (n=36) of those participants who were retained

Table 4.8 shows that none of non-retained participants had an excellent relationship with their supervisors prior to their TBI.

Table 4.8 Reported relationship with supervisor prior TBI

Variable	Relationship with supervisor prior your injury						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p value
1 = Excellent	6	6.9	6	8.4	0	0	0.850
2 = Good	26	30.2	19	26.7	7	46.6	
3 = Fair	39	45.3	34	47.8	5	33.3	
4 = Poor	12	13.9	10	14.0	14	13.3	
5 = Very poor	3	3.4	2	2.8	1	6.6	
	Relationship with supervisor after your injury						
1 = Excellent	6	6.9	6	8.4	0	0	0.522
2 = Good	28	32.5	20	28.1	8	53.3	
3 = Fair	34	39.5	30	42.2	4	26.6	
4 = Poor	6	6.9	5	7.0	1	6.6	
5 = Very poor	12	13.9	10	14.0	2	13.3	

Significance p≤ 0.05* p≤ 0.01**

Of those who were retained, only six (8.4%) had an excellent relationship with their supervisor. It is interesting to see only a small percentage (n=2; 2.8% and n=1; 6.6% respectively) between the retained and the not retained participants had a very poor relationship with their supervisor prior the injury, while n=10; 14.0% and 13.3% respectively had a very poor relationship with their supervisor after the injury; therefore a higher percentage of participants reported having a very poor relationship with their supervisors after the injury. There was not a significant difference in relationships with the supervisors between those who were retained and not retained prior to and after the TBI.

4.3.4: Changes made on return to work, sufficiency of tasks given and contribution made at work

Table 4.9 shows reasonable accommodations implemented for service force members with TBIs on their RTW. There was a significant difference for reported changes on RTW for those retained and not retained in the military after TBI (p=0.002).

Table 4.9 Reported changes made on return to work

Variable	In which ways did the workplace make changes to support you when you returned to work?						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p-value
Reduced working hours	6	6.9	3	4.2	3	20.0	0.002**
Reduced working hours, reduced working tasks, different work	3	3.4	0	0	3	20.0	
Different work	18	20.9	16	22.5	2	13.3	
Reduced working hours, reduced work tasks	8	9.3	6	8.4	2	13.3	
Reduced work tasks	31	35.9	28	39.4	6	40.0	
Reduced working hours, different work	1	1.1		0	0	6.6	
No changes were made	18	20.9	17	23.9	1	6.6	
Reduced work tasks, different work	1	1.1	1	1.4	1	6.6	

Table Significance p≤ 0.05* p≤ 0.01**

A higher percentage of those retained were accommodated with different work (n= 16, 22.5%), reduced work tasks (n=28, 39.4%) or no change (n=17, 23.9%). Of the 15 participants who were not retained, 40.0 % (n=6) reported reduced working hours with a combination of accommodations, such as reduced working hours, working tasks and different work. Only 6.6% (n=1) of these participants reported no changes were made. There was a significant difference on the finding related to changes that were made on RTW for both groups.

Table 4.10 Participation in sufficient duties, and contribution made after return to work

Variable	Were you given tasks to do at work						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	P-value
1 = Not at all	16	18.6	9	12.6	7	46.6	0.000**
2 = To some extent	28	32.5	22	30.9	6	40.0	
3 = To moderate extent	16	18.6	14	19.7	2	13.3	
4 = to large extent	26	30.2	26	36.6	0	0	
Variable	**Do you feel that you're able to make meaningful contribution to tasks in current work place**						
	n	%	n	%	n	%	P-value
1 = Unable to contribute	20	23.2	8	11.2	12	80.0	0.000**
2 = Able to contribute minimally	19	22.0	17	23.9	2	13.3	
3 = Able to contribute adequately	27	31.3	26	38.0	1	6.6	
4 = Able to contribute substantially	19	22.0	19	29.4	0	0	
5 = Able to concentrate adequately	1	1.1		0	0	0	

Significance p≤ 0.05* p≤ 0.01**

Reintegration into work was dependent on the participants' ability to cope at work and complete the tasks they were given. Table 4.10 indicates the participants not retained reported they did not get enough tasks to do at their workplaces. The results indicate 46.6% (n=7) of these participants felt that they did not have sufficient duties to do at their respective workplaces compared to 12.6% (n=9) of those who were retained. There was a significant difference for reported sufficiency of work tasks or participation in duties at work for those retained and not retained in the military after TBI (p=0.000). The lack of contribution at work was reported by 80% (n=12) of participants who were not retained. Feelings of not being productive at the workplace and making a meaningful contribution were reported in relation to this. About 38% (n=26) of the participants with TBI who were retained felt they were making satisfactory contributions

to the organisation. There was a significant difference for reported meaningful contribution for the organisation for those retained and not retained in the military after TBI (p=0.000).

4.3.5 Perception of coping and amount of leave taken after return to work

Participants not retained perceived they were not coping with all the tasks given to them. Table 4.11 indicates none of them reported coping with some, most or all their tasks.

Table 4.11 Level of coping and amount of leave taken after return to work

Variable	**Perception of coping with demands of your work/RTW**						
	Total n=86		**Retained n=71**		**Not retained n=15**		
	n	**%**	**n**	**%**	**n**	**%**	**P-value**
1 = Not coping at all	20	23.2	7	9.8	13	86.6	0.000**
2 = Coping with some of the tasks	20	23.2	18	25.3	2	13.3	
3 = Coping with all of the tasks	18	20.9	18	39.4	0	0	
4 = Coping with most of the tasks	28	32.5	28	25.3	0	0	
Variable	**How frequently did you take leave after returned to work**						
	n	**%**	**n**	**%**	**n**	**%**	**P-value**
1 = Never	4	5.6	4	5.6	0	0	0.000**
2 = Seldom	20	23.2	20	28.1	0	0	
3 = Occasionally	24	27.9	24	33.8	0	0	
4 =Frequently	16	18.6	14	19.7	2	13.3	
5 = Very frequently	22	25.5	9	12.6	13	86.6	

Significance p≤ 0.05* p≤ 0.01**

While most participants who were retained stated they could cope with at least some of the tasks, 9.8% (n=7) perceived they were not coping at all. This contrasts with most of the participants who were not retained perceiving that they were not coping n=13;

86.6%.There was a significant difference reported for coping with duties at work for those retained and not retained in the military after TBI (p=0.000).

These results might be linked to the frequent amount of leave participants (n=13: 86.6%) who were not retained took after their RTW due to issues related to their TBI. Only 12.6% (n=9) of participants who were retained reported a frequent amount of leave from their work. There was a significant difference for reported for leave taking by those retained and not retained in the military after TBI (p=0.000).

4.4. Military Factors related to members with health conditions

Military factors include procedures in the military for a reported health condition, such as TBI, in relation to the possibility of taking medication while on RTW, the recording of limitations due to health on the profile system, ability to complete specific military duties as a service force member and possible stigma.

4.4.1: Taking prescribed treatment while at work

Table 4.12 indicates 8.1% (n=7) of the participants reported it was impossible to take medication at the work place or while on RTW.

Table 4.12 Taking prescribed treatment while at work

Variable	How possible to take your prescribed treatment while at work?						
	n	%	n	%	n	%	p-value
1 = Very possible	17	19.7	15	21.1	2	13.3	0.012**
2 = Possible	49	56.9	45	63.3	4	26.6	
3 = Slightly possible	13	15.1	7	9.8	6	40.0	
4 = Impossible	7	8.1	4	5.6	3	20.0	

Significance p≤ 0.05* p≤ 0.01**

This was indicated by 20% (n=3) of participants not retained, while 40% (n=6) indicated it was only slightly possible to take medication while in the workplace A significant

difference was found between the participants who were and were not retained in terms of the possibility of taking prescribed medication at work (p=0.012).

4.4.2: Health limitations recorded on the system

When a military service force member is injured or diagnosed with a medical condition, a record of their health status is placed on their service profile, and they receive a medical classification to indicate the location and RTW restrictions due to their condition. There were no significant differences between the participants who were retained and those who were not in relation to their medical classification being recorded on their profile in the system. Most of the participants from both groups (n=40: 56.3% and n=9: 60.0 % respectively) believed it to be necessary for their health status limitations to be recorded on the system (Table 4.13).

About a third of the participants reported they do not know if their health status limitations, recorded on their profile on the system, affect their career progression. However, more participants who were not retained (n=4: 26.6%) strongly agreed that they felt it did affect their career progression compared to 16.9% (n=12) who were retained.

A higher percentage of participants who were not retained (n=8: 53.3%) strongly agreed or agreed they felt discouraged that their health status was recorded on their profile on the system compared to the 39.3% (n=6) who disagreed or strongly disagreed. The finding was similar for participants who were retained who also strongly agreed or agreed (n=35: 49.2%) that they felt discouraged by the record on the system compared to those who disagreed or strongly disagreed (n=23 32.3%). No signi8ficance was found between these two groups for this variable.

Table 4.13 Health limitations on the system

Variable	Do you think it is appropriate that your health limitations are put on your profile?						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p value
0 = No	37	43.0	31	43.6	6	40.0	0.252
1 = Yes	49	56.9	40	56.3	9	60.0	
Variable	**Do health limitations recorded on your system affect your career progression**						
	n	%	n	%	n	%	p value
1 = Disagree	13	15.1	11	15.4	2	13.3	0.657
2 = Strongly disagree	12	13.9	10	14.0	2	13.3	
3 = I don't know	26	30.2	22	30.9	4	26.0	
4 = Agree	18	20.9	15	21.1	3	20.0	
5 = Strongly agree	16	18.6	12	16.9	4	26.6	
Variable	**Feel discouraged about your health limitations being put on your profile**						
	n	%	n	%	n	%	p value
1 = Disagree	20	23.2	15	21.1	5	33.3	0.099
2 = Strongly disagree	9	10.4	8	11.2	1	6.6	
3 = I don't know	14	16.2	13	18.3	1	6.6	
4 = Agree	23	26.7	20	28.1	3	20.0	
5 = Strongly agree	20	23.2	15	21.1	5	33.3	

Significance p≤ 0.05* p≤ 0.01**

4.4.3: Ability to carry out work/duties and stigma

A higher percentage of participants who were not retained reported not being able to perform all of, or a moderate number of their physical military duties (0%). There was

a significant difference for reported ability to perform physical military duties for those retained and not retained in the military after TBI (p=0.000) (Table 4.14).

Table 4.14 Ability to carry out physical work/duties and stigma

Category	Are you able to perform your physical military duties						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p-value
1 = Not at all (the worst)	24	27.9	11	15.4	13	86.6	0.000**
2 = Some of the task	27	31.3	25	35.2	2	13.3	
3 = Moderate number tasks	19	22.0	19	26.7	0	0	
4 = All tasks	16	18.6	16	22.5	0	0	
Variable	**Stigma attached to not being able to do military duties**						
	n	%	n	%	n	%	p value
0= No	42	48.8	34	47.8	8	53.3	0.707
1 = Yes	44	51.1	37	52.1	7	46.6	

There was no significant difference in reported stigma due to not being able to carry out duties reported by participants who were retained and not retained in the military although a higher percentage of those retained (n=37: 52.1%) felt there was stigma compared to those not retained (n7=46.6%).

4.5. Cognitive Factors

These results consider the service force members with TBI self-reporting the effects of their cognitive limitations on being retained and not retained in the workplace. The 86 participants were also screened for cognitive function with the use of the MoCA and the results for those retained and not retained were compared.

4.5.1: Cognitive factors at work - concentration, decision making, problem solving and memory

Table 4.15 presents the participants' perceived cognitive ability in four categories. The concentration levels in terms of their ability to concentrate on the tasks given at work without having to be re-directed to the task at the hand. Decision making has been defined as a process of making basic daily decisions regarding a service force member's daily routine for own occupation. Problem solving has been defined as a service force member's own ability to solve even basic problems that arises in their daily routine in their occupation.

Table 4.15 Cognitive factors - concentration, decision making, problem solving and memory at work

Variable	How well are you able to concentrate on tasks you supposed to do						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p-value
1 = Unable to concentrate	13	15.1	3	4.2	10	66.6	0.000**
2 = Poor concentration	19	22.0	16	22.5	3	20.0	
3 = Adequate concentration	36	41.8	34	47.8	2	13.3	
4 = Good concentration	18	20.9	18	25.3	0	0	
Variable	**How capable are you of making decisions**						
	n	%	N	%	n	%	p-value
1= Unable to make decisions (worst)	17	19.7	6	8.4	11	73.3	0.000**
2 = Has occasional difficulty making decisions	22	25.5	21	29.5	1	6.6	
3 = Has frequent difficulty in making decisions	11	12.7	9	12.6	2	13.3	
4 = Is able to make decisions	36	41.8	35	49.2	1	6.6	

Variable	How capable are you of problem solving						
	n	**%**	**n**	**%**	**n**	**%**	**p-value**
1 = Unable to problem solve (worst)	16	18.6	5	7.0	11	73.3	0.000**
2 =Have occasional difficulty problem solving	20	23.2	18	25.3	2	13.3	
3 =Have frequent difficulty problem solving	15	17.4	14	19.7	1	6.6	
4 = Able to problem solve (Able to solve routine problems)	35	40.6	34	47.8	1	6.6	
Variable	**Do you have difficulty of remembering at work**						
	n	**%**	**n**	**%**	**n**	**%**	**p-value**
1 = Not at all	12	13.6	12	16.9	0	0	0.000**
2 =To some extent	37	43.0	36	50.7	1	6.6	
3 = To moderate extent	11	12.7	10	14.0	2	13.3	
4 = To large extent	25	29.0	13	18.3	12	80.0	

Significance p≤ 0.05* p≤ 0.01**

Of the participants not retained, none reported having good concentration and a high percentage (n=10: 66%) reported not being able to concentrate at work. The participants who were retained reported they had adequate concentration ability (n=34: 47.8%) to complete task given in the workplace. There was a significant difference for reported concentration levels for those retained and not retained in the military after TBI (p=0.000).

When considering decision-making, a high percentage of the participants (n=11, 73.3%) who were not retained reported they were not able to make decisions independently within their day-to-day work duties**.** Some participants with TBI might have been accommodated in alternative occupations where decision-making is limited and most daily routine decisions are made by a higher authority. Despite this, nearly half (n=35: 49.2%) of the participants retained perceived that they were able to make decisions related to their duties at work. There was a significant difference for reported

ability to make decisions for those retained and not retained in the military after TBI (p=0.000).

Problem solving limitations, as self-reported by participants, indicated that 73.3% (n=11) of the participants who were not retained had no ability to problem solve in the workplace. There was a significant difference for reported ability to problem solve for those retained and not retained in the military after TBI (p=0.000). Again, it is acknowledged that the military has a ranking system and that higher ranks are responsible for most of problem solving within their workplaces.

Both participants who were retained and not retained reported memory difficulties. The majority (n=12: 80%) of those who struggled with memory were those not retained, while 50% (n=36) of those who were retained reported memory problems to some extent. There was a significant difference for reported memory difficulties for those retained and not retained in the military after TBI (p=0.000).

4.5.2: Loss of temper/getting angry at work

Table 4.16 indicates 73.0% (n=63) of the total group of participants reported that they perceived that they occasionally, rarely or never loose their temper in the workplace, and the results were similar for participants who were retained and not retained with no significant difference between the two groups.

Table 4.16 Reported frequency on loss of anger in the workplace

Variable	How frequently do you lose temper						
	Total N=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p value
1 = Never	25	29.0	22	30.9	3	20.0	0.582
2 = Rarely	19	22.0	15	21.1	4	26.6	
3 = Occasionally	19	22.0	15	21.1	4	26.6	
4 =Often	14	16.2	12	16.9	2	13.3	
5 = Very often	9	10.4	7	9.8	2	13.3	

4.5.3. The Montreal Cognitive Assessment (MoCA)

The results for cognition self-reported by the participants were supported for memory (Delayed recall) problems on the scores for the MoCA (Nasreddine, 2019), which are presented for the different subtests in Table 4.17. It indicates that on visuo-spatial/executive, naming, list of digits, list of letters, serial 7 subtraction starting at 100, repeat and orientation, there was no significant difference between the retained and not retained participants.

Table 4.17 Results of the Montreal Cognitive Assessment.

Variable		Subtests scores and total score			
	Score	**Total n=86**	**Retained n=71**	**Not retained n=15**	
		Median (Interquartile range)			**P-value**
Visuospatial/Executive	5	4.00 (4.00-5.00)	4.00 (4.00-5.00)	4.00 (3.00-5.00)	0.459
Naming	3	3.00 (3.00-3.00)	3.00 (3.00-3.00)	3.00 (2.00-3.00)	0.600
Attention List of digits	2	2.00 (2.00-2.00)	2.00 (2.00-2.00)	2.00 (2.00-2.00)	0.108
List of letters	1	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)	0.606
Serial 7 subtraction starting at 100	3	2.00 (2.00-3.00)	2.00 (2.00-3.00)	2.00 (2.00-3.00)	0.281
Language Repeat	2	2.00 (2.00-2.00)	2.00 (2.00-2.00)	2.00 (2.00-2.00)	0.995
Fluency	1	0.00 (0.00-1.00)	1.00 (0.00-1.00)	0.00 (0.00-0.00)	**0.014***
Abstraction	2	2.00 (1.00-2.00)	2.00 (1.00-2.00)	1.00 (1.00-2.00)	**0.044***
Delayed recall	5	3.00 (2.00-4.00)	3.00 (2.00-4.00)	2.00 (2.00-3.00)	**0.032***
Orientation	6	6.00 (6.00-600)	6.00 (6.00-600)	6.00 (6.00-600)	0.667
Total	30	25.00 (23.00-27.00)	26.00 (23.00-27.00)	24.00 (21.00-26.00)	0.048*

Significance p≤ 0.05* p≤ 0.01**

Overall, the retained participants in the current study had a score of 26 on the MoCA, which indicates normal cognitive function and differed significantly from those not retained, since their median score of 24 indicated cognitive impairment (Nasreddine, 2019). This confirmed the effect of cognitive function on retention after TBI in military service. Both groups scored well, with nearly a full median score for most of these subtests. The participants in both groups performed poorly on fluency and delayed recall, with the participants who were not retained scoring lower for abstraction. There was a significant difference reported on fluency, abstraction and delayed recall, as well as total score for participants retained and not retained in the military after TBI.

4.6. Factors related to Rehabilitation in Occupational Therapy

All 86 participants attended occupational therapy before they RTW and reported various reasons why they had done so. Participants reported that attendance was for occupational therapy rehabilitation, improvement of mental and physical functioning and to teach them to do their specific daily activities for themselves.

4.6.1 Occupational therapy for return to work

With regard to occupational therapy, **T**able 4.18 illustrates that of participants who were retained and not retained, 25.3% (n=18) and 40.0% (n=6) respectively perceived that they were not rehabilitated using tasks related to their work/duties or alternative work/duties to which they were returning. Higher number of participants in both groups indicated that the occupational therapists used some tasks that were linked to their work. Only 14% (n=10) of participants who were retained indicated the occupational therapist used all tasks they were required to do at the work place in their rehabilitation.

Table 4.18 Occupational therapy for return to work

Variable	Did occupational therapist use work activities you are currently required to do with you in rehabilitation						
	Total n=86		Retained n=71		Not retained n=15		
	n	%	n	%	n	%	p value
1 = Not at all	24	27.9	18	25.3	6	40.0	0.075
2 = Some of the tasks	33	38.3	26	36.6	7	46.6	
3 = Moderate tasks	19	22.0	17	23.9	2	13.3	
4 = All tasks	10	11.6	10	14.0	0	0	
Variable	**Did occupational therapist do a work visit before you returned to work**						
	N	%	N	%	N	%	p value
0 = No	68	79.0	57	80.2	11	73.3	0.677
1 = Yes	18	20.9	14	19.7	4	26.6	

Significance p≤ 0.05* p≤ 0.01**

The occupational therapists did not do work visits for 79% (n=68) of the participants, although they did work visits for a slightly lower percentage of participants not retained. There was no significant difference in the use of work activities in occupational therapy or work visits for the two groups.

4.6.2 Follow up and further occupational therapy after return to work

Table 4.19 indicates there was occupational therapy follow up with the highest percentage of participants with TBI who were retained and not retained (n=18: 25.3% and n=6: 40.0% respectively) on a monthly basis after they returned to work. However, 36.6% (n=26) of participants retained and 20.0% (n=3) not retained were never followed up by occupational therapists after their RTW. There was no significant difference between the two groups for occupational therapy follow-up after RTW. This was also the case for attendance at follow up occupational therapy sessions after RTW, more retained participants found it very possible and possible to attend. Of the

participants who were not retained, 33.3% (n=5) reported it was impossible to attend follow up sessions for further rehabilitation after RTW.

Table 4.19 Follow up and further occupational therapy after return to work

Variable	How regularly did occupational therapist check when you returned to work						
	Total n=86		Retained n=71		Not retained n=15		p value
	n	%	n	%	n	%	
1 = Never	29	33.7	26	36.6	3	20.0	
2 = Weekly	1	1.1	1	1.4	0	0	
4 = Monthly	24	27.9	18	25.3	6	40.0	0.377
5 = Every 2 months	5	5.8	5	7.0	0	0	
6 = Every 3 months or less	20	23.2	15	21.1	5	33.3	
7 = Every 6 months or less	7	8.1	6	8.4	1	6.6	
Variable	**How possible was it for you to attend follow up sessions for rehabilitation after return to work**						
	n	%	n	%	n	%	p value
1= Very possible	22	25.5	18	26.7	4	26.6	
2 = Possible	35	47	32	45.0	3	20.0	
3 = Slightly possible	12	13.9	9	12.6	3	20.0	0.236
4 = Impossible	16	18.6	11	15.4	5	33.3	

Significance p≤ 0.05* p≤ 0.01**

4.7 Summary

This chapter presents the results from 86 participants who completed the questionnaire on factors associated with retention and non-retention of service force members following TBIs in the SANDF. The factors investigated included demographic factors, work factors, cognitive factors and military factors. The participants were also evaluated using the Montreal Cognitive Assessment (MoCA) to determine their cognitive function.

From the records of service force members with TBIs treated in occupational therapy who had returned to work over a 5 years period, a sample of 69 males and 17 females was recruited for the research.

Demographic data indicated that the highest percentage of participants were Africans, married and had a grade 12 level of education. The difference in age and months before RTW was significant factors for those retained and those not retained in the service of the SADF. Most participants indicated their TBI did not occur while on RTW.

The work factors show significant difference in variables for those retained and those not retained, including how successful RTW had been, and which ways the workplace made changes to support service force members with TBIs when they RTW. There were significant differences found between the two groups for the frequency of communication between the supervisor, the service force members and their families during rehabilitation, as well as the tasks given at work, and the way in which participants were coping with demands of work. Most participants reported it was possible for them to take prescribed medication while at work, but the ability to do so indicated a significant difference between participants who were and were not retained.

When reporting on cognitive factors, the participants not retained indicated memory difficulties and an inability to concentrate, make decisions and problem solve. There was a significant difference found for these variables between the participants not retained and those reported by the retained participants. The scores on the MoCA for cognition supported those self-reported by the participants for memory problems. No significant difference was found between the participants who were and were not retained on the MoCA subtests for visuospatial/executive, naming, list of digits, list of letters, serial 7 subtraction starting at 100, repeat and orientation. The participants in both groups performed poorly and there was a significant difference reported for fluency, abstraction and delayed recall, as well as the total score for retained participants and those not retained in the military after TBI.

Considering military factors, the participants reported not being able to perform physical military duties, with a significant difference for those retained and not retained. Just over half the service force members with TBIs not retained disagreed that there is stigma attached to not being able to perform military duties, while a similar percentage of the retained service force members with TBI agreed there is stigma.

All 86 participants had attended occupational therapy and assessed as ready for RTW before they did so. The majority of service force members with TBI retained and not retained reported that the occupational therapist did some of the tasks related to their occupation or alternative occupations that they were returning to during their vocational rehabilitation. Participants retained and not retained respectively indicated the occupational therapist did not do work visits. There was no significant difference between the two groups for follow-up after RTW by the occupational therapists or the participants' ability to attend follow-up appointments.

CHAPTER 5: DISCUSSION

5.1. Introduction

This chapter presents the discussion of the findings of the research. The discussion will centre on the participants' responses to actors that influenced retention and non-retention of service force members with TBIs in the SANDF, including explored in the questionnaire (demographic factors (age, race, gender, marital status and educational level), workplace and military factors, cognitive factors, as well as rehabilitation and occupational therapy factors) as well as that of MOCA..

5.2. Demographics of the sample

The target number of the sample for the study was reached and it was significant in drawing conclusions on the findings. More participants in the study were males (80.2%: n=69). The higher percentage of males confirms findings that the prevalence of TBI in the military is higher amongst males (Gray, et al., 2017; Jerome, et al., 2017; Lindquist, et al., 2017). The ages of participants in the current study with the highest percentage at 40-50 years, recorded for the participants at the time of completion of the questionnaire, were higher than those reported in other studies on military service force members with TBI internationally. These studies however did include armies involved in active service in war zones with more combat related TBIs (Lange, et al., 2012; Lindquist, et al., 2017). Since most injuries in the current study were not combat related,this adds an unexpected burden in costs of medical care, compensation costs, time off duty costs for the SANDF. This could account for the older demographic (Beran & Bhaskar, 2018).

The results including older participants in the current study also differed from previous studies in South Africa on TBIs (Jerome, et al., 2017), where the mean age was 27 years and for TBIs from other causes while in the military, such as from motor vehicle accident and falls (Stevens, et al., 2017). Luethcke et al. (2011), reported an age range of 28-30 years for the TBIs accounted for by assaults and injuries on duty in the military

(Lindquist, et al., 2017; Regasa, et al., 2019). The reason for the older demographic of 30- 40 years for members with TBI found in the current study is unknown and requires further investigation.

The majority of participants in the current study were African (81.3%, n=70), married (38.3%, n=33) and had a grade 12 (56.9%, n=49) as their highest level of education. These findings reflect the ethnic distribution in South Africa (Statistics South Africa, 2012). The marital status of those in the military from another study was similar (Stevens, et al., 2017) and the level of education of the sample in the current study equated to that reported in other studies on TBIs in the military. In other studies, the majority of participants had completed 12 years of formal education and approximately 40% had post-secondary and tertiary education (Cohen, et al., 2013; Halvorson, 2010).

5.3 Factors influencing retention in the South African national Defence Force after traumatic brain injury

5.3.1 Demographic factors

The first objective of the study was to determine which demographic factors (age, race, gender, marital status and educational level) influenced retention or non-retention in the SANDF, reported by service force members diagnosed with TBIs, after RTW.

Results indicated that age was the only factor that significantly influenced retention in the military. This is consistent with that reported by s Cohen et al. (2013) who indicated a high employment rate for those with TBIs in the military even above the age of 40 years, as seen with 63% of participants in this study (Cohen, et al., 2013). Older service force members have more family obligations than do their younger counterparts (Aikins, et al., 2020), which may be considered a motivation for them to continue with work to provide for their family.

The lowest retention rate was found for participants 50 years and older, while the highest (40%) in the current study was for participants younger than 40 years. This result was similar to that reported by Scollon (2000), who found that patients with TBIs

younger than 50 years have better prospects on RTW (Scollon, 2000). This finding was different from that reported by Dillahunt-Aspillaga et al. (2017) who indicated that retention in the military was not according to age , but to severity of the motor deficits from TBI when compared to civilian studies (Dillahunt-Aspillaga, et al., 2017). Other studies also indicate that younger service force members with TBIs are more likely not to be retained in the military, but the current study cannot be directly compared to these studies where most participants were younger than 30 years of age (Agimi, et al., 2019; Gray, et al., 2017).

In the current study the older service force members may have felt felt they were unproductive at work and did not see the need to progress in the workplace since they were nearer to retirement age. These results may reflect the findings of other research that older patients (> 50 years) with TBIs show greater regression over the first years after injury compared to younger patients, who demonstrate better outcomes and improvement after TBI (de la Plata, et al., 2008). The burden of responsibilities for the older patients might be too much for them to cope with their limitations as a result of TBI and it is also more difficult to accommodate those who hold higher rank and who have more responsibilities. Their higher-level work skills may be more disrupted and due to their age, they may need to seek medical assistance and intervention more frequently further affecting work compliance (Aikins, et al., 2020).

Other demographic factors reported to influence RTW (Dillahunt-Aspillaga, et al., 2017), such as marital status, level of education and ethnic group, had no significant influence on retention in this study. This is in line with other studies that indicated that deployment factors before the TBI rather than the level of education and marital status factor had little to do with retention in work (Dillahunt-Aspillaga, et al., 2017).

5.3.2 Work-related factors

The second objective of the study was to determine which workplace and military factors influenced the retention or non-retention in the SANDF reported by service force members diagnosed with TBIs after RTW.

Findings in this study indicated that time since injury before RTW, frequency of the supervisor communication during rehabilitation, reported success of RTW, changes made to work, as well as being given sufficient work, feeling that they were making a contribution, being able to cope with the work and not needing to take leave all contributed significantly to retention or non-retention of the participants.

According to the findings, the time it took the service force member with TBI to RTW after the injury was perceived as a significant factor for retention. Most service force members (80.2%: n=57) who were retained RTW within a year after their TBI. Whilst Scollon (2000) reported in a civilian setting that the time taken to RTW after TBI and severity of the TBI had no influence on whether the TBI patient would RTW or not, he did not comment on retention after RTW. The findings in the current study indicate that 53.2% (n=8) of participants who RTW after 13 months or more were not retained. This supports other studies, which show that patients with TBIs who do not RTW within a year after their injury, are unlikely to retain their job (Silverberg, et al., 2017; Artman & Mchon, 2013). For the participants retained in the workplace, 80.2% RTW within a month to a year. Silverberg, Panenka and Iverson (2017) also found it to be true that in patients with TBI that make remarkable progress in the first six months of recovery, with an estimated 60% to 90% RTW successfully. Late RTW has been associated with detrimental economic loss for the TBI patient and the employing organisation, but care must be taken not to allow RTW too soon without adequate accommodations and assessment of the work place (Fadyl & McPherson, 2009).

The other factor that participants reported assisted with their retention, and which they deemed necessary, was communication from supervisors during rehabilitation. The role of the supervisor in the military differs from that in civilian life since the supervisor is usually a higher-ranking officer who trains, motivates and maintains the skills of the service force members (Halvorson, 2010). Communication among the service force member, supervisor and the multidisciplinary team promotes better prospects for RTW (Soeker, et al., 2012). Close work in teams that depend on each other means the

service force member may need to respond to orders without question. Therefore, it may be important for the immediate supervisor of service force members with TBIs to be aware of their capabilities. Of note, there was no significant difference in the relationships with supervisors between those who were and were not retained, and results showed that a high percentage of service force members that participated in the study reported fair to good relationships with their supervisors before and after the injury. None of the non-retained participants reported an excellent relationship with their supervisors, but it would appear that behaviour changes after a TBI that interfere with relationships in the workplace, as reported by Scollon (2000), may be an influencing factor on RTW by participants in the current study.

Results indicate that while the supervisor's involvement in rehabilitation of the participants was similar for those retained and not retained, supervisor communication with the participants and their families differed. Communication from the supervisor during rehabilitation may play an important role in allowing the supervisor to develop an understanding of what the service force member with the TBI is going through, and present an opportunity to provide support. The current research indicated that communication from stakeholders (service force member with TBI, multidisciplinary team members and supervisors) during rehabilitation did play a role in retention after RTW.

The ability to carry out work expected of them appears to have been successful for those participants who were retained, since 81.5% (n=58) reported their RTW being mostly or fairly successful. The participants had to classify their work based on the physical demands of the job that the participants occupied in the SANDF before the TBI. Sedentary work included sitting with minimal standing and walking, as well occasional lifting of 4kg. Light work included frequent lifting 4kg to occasional lifting of 9kg and an amount of standing or walking, and sitting included leg operations, or pulling or pushing. Medium work included frequent lifting of 9kg and occasionally lifting 22.68 kg maximum. Heavy work included frequent lifting of 22kg and occasionally lifting 45.36

kg maximum (National US Dept. of Labor, 2017). As indicated by 23.9% (n=17) of participants who were retained, they were able to continue with the occupations they had pre-TBI. The group of participants between 30 and 50 years, who made up the higher percentage of those retained in the current study, may also have held senior positions or have developed skills in the technical professions that allowed for accommodations that did not require combat service and medical fitness (McLeod, et al., 2004). The use of technology within the military also allowed for more accommodation of occupations, allowing 22.5% of retained participants to be provided with different work (Bates, et al., 2008), and McLeod et al. (2004) reported a higher percentage of soldiers with TBIs are retained in the military than their healthy peers due to accommodation and the availability of ongoing support within a very structured organisation that can offer a variety of tasks, changes to tasks and positions (McLeod, et al., 2004). The possibility of providing alternate jobs and changes in opinions and attitudes of colleagues and supervisors has resulted in more service force members with disabilities RTW in this study. This supports the findings by Bates et al. (2008) that injured force members with a major injury, previously usually released from the service, are now continuing to serve in the military.

As suggested by literature, reasonable accommodation after TBI consisted of reduced duties or reduced hours, with a small number of participants placed in different jobs (Gourdeau, et al., 2020) provided in the SANDF. For the participants not retained, there seemed to be the need for more reasonable accommodations, since only 6.6% (n=1) initially returned to the pre-TBI job. The occupational therapist usually makes recommendations for reasonable accommodations for the service force member with TBI after they have established their functional capacity. The occupational therapist in collaboration with the supervisor and the military disability committee look into whether the reasonable accommodations recommended are feasible without compromising the service or other service force members. For successful reasonable accommodation after TBI, literature indicates the patients themselves should have input into the provision of self-directed accommodations (Gourdeau, et al., 2020). Thus, in the

military, the service force member, if possible, should also play a role in the selection of the reasonable accommodations suitable for them by giving a background into their educational, prevocational skills, other vocational interests and work history. However, the self-awareness or insight of service force members with TBIs into their own abilities may affect their perception of what duties they should do. Assessment on denial and self-awareness of ability to engage in activities for individuals with TBI post rehabilitation correlated with their report on problems with motor functions, as well as their problems with behaviour and cognition (Fedio, et al., 2014).

Since duties in the military may be potentially dangerous, guidance is needed in terms of what duties will ensure safety for the service force member with a TBI and other members. This should be considered when suggesting reasonable accommodations. It appears there was a lack of suitable reasonable accommodations suggested for the participants not retained in the SANDF. This was indicated by 46.6% (n=7) of participants reporting that they were not given tasks to do at work. They felt they were unproductive and 80% (n=12) felt they did not make any meaningful contribution in the workplace. The lack of tasks provided and feeling of non-contribution appears to be related to the perceptions reported by 86.6% (n=14) of participants not retained. The non-retained participants also reported they were not coping with all the tasks given to them with the same percentage taking frequent leave from work. The lack of perceived ability to cope at work may have been due to a lack of self-awareness initially of what tasks participants reported they were capable of doing. However, not being able to cope at work results in occupational stress, which has been identified as one of the factors that further affects the recovery, health and well-being, and hinders work performance for service force members with TBIs (Aikins, et al., 2020). The need for frequent leave supposes the effect occupational stress may have had on the participants not retained, and the importance of frequent occupational therapy follow-up on recommended reasonable accommodations once the participant has returned to work.

5.3.3 Military-related factors

The military factors considered in this study affecting retention were being able to take prescribed treatment while at work, and ability to carry out military duties, which made a significant contribution to being retained, or not retained. A significant difference was found between the participants who were and were not retained in terms of the possibility of taking prescribed medication at work. On taking prescribed medication, 8.1% (n=7) of the participants reported it was impossible to take medication at the work place due to the type of duties they were assigned, such as weapons and machinery training and maintenance, physical training (PT), guard duty, operating military vehicles, airplanes, and marine and parade duty (Dowd, 2018).

Some participants' times for taking their prescribed medication were after their working hours while some participants no longer took medication. This was indicated by 60% (n=9) of participants not retained, while only 15.4% (11) of those retained indicated it was not possible to take medication while in the workplace. It is important to take prescribed medication as this may be necessary to prevent or manage further complications or residual problems such as seizures, anxiety, depression or PTSD.

The other military factor found to influence retention in this study was the ability of the service force members to perform military duties. Although there were alternate jobs suggested for service force members with TBIs, some involvement in military duties is still expected. These duties focus on skills, behaviour and discipline required in the military and field operations. Such duties may involve weapons training, guard duty, physical fitness training, drills and parade duty, survival skill training, mine sweeping, and driving tanks and armoured vehicles. In some situations, participation in peace-keeping missions or law enforcement is required (Dowd, 2018). Since these duties require some physical and mental fitness, the service force members with TBIs who were unable to perform any of these (86.6%, n=13) were not retained. Only 22.5% (n=16) of participants who were retained reported they could complete all military duties, while 61.9% (n=44) could perform some or a moderate number of military duties

based on implemented accommodations. These findings are similar to those reported for Canada and the USA, where a service member should only continue with RTW when they meet minimum operational standards required in service (Arrabito & Leung, 2008).

Stigma in this study did not have a significant impact on work retention even though it has been associated with greater occupational stress (Aikins, et al., 2020). There was no significant difference in reported stigma experienced from supervisors and colleagues between participants retained and those not retained, and a similar percentage of those retained (52.1%, n=37) and not retained (46.6%, n=7) felt they were stigmatised for being unable to carry out military duties. Thus stigma has detrimental negative effects on the service force member with a TBI who is trying to integrate back into the workplace, emphasising the need to include all stakeholders, including the patient, in the reintegration. Participants felt that stigma resulted from poor understanding of the effects of TBI from both supervisors and colleagues. Participants reported a lack of support, even though nearly 60% of supervisors had been involved in the participants' rehabilitation. This also indicates the need to follow up and support the service member and their supervisor and colleagues once they have returned to work (Gourdeau, et al., 2020).

Stigma could also relate to all medical limitations in the military being recorded on the service member's profile in the system. In the military, when a service force member is injured or has illness/disease that restricts them from fulfilling their RTW, a medical board is requested to reclassify them on the system according to their physical fitness for RTW. These RTW restrictions can be, for example, limited physical demands and limited geographical deployment, deployable in SA only or globally, or release from the defence force. The profiling of disabilities at times results in service force members avoiding seeking medical assistance regarding their occupational stressors if they believe this will result in supervisors and colleagues undermining them further (Aikins, et al., 2020). For this reason, participants were asked to indicate if they felt this affected

their retention in the military after TBI. There was no significant difference between those retained and those not retained with regard to the recording of their health limitations on the system. Approximately half the participants reported they did not think it appropriate for their health limitations to go on their profiles although it is important for superiors to understand the limitations that apply to the service member with a TBI for operational effectiveness (Arrabito & Leung, 2008).

5.3.4. Cognitive factors

The third objective of the study was to determine cognitive factors influencing retention or non-retention in the SANDF reported by service force members diagnosed with TBIs after RTW.

In the current study, participants in both groups reported cognitive dysfunction in terms of problems with concentration, decision-making, problem solving and memory. The results differ slightly to the findings of French et al. (2014) who found 55% of service force members with TBIs did not report concentration/attention problems and had scores on a standardised test that fell within normal limits. A higher percentage (62.7%: n=54) of all the participants in the current study reported no problems or enough concentration to complete tasks given in the workplace. Similar results were found for memory, as overall, the percentage of participants in the current study who reported good or adequate memory in relation to work tasks was 56.6% (n=49). This was higher than the 45% of service force members with TBIs indicated by French et al. (2014) who did not report memory problems and who had memory scores that fell within normal limits. Fewer participants in the current study may have reported dysfunction since their injury occurred more than three years ago compared to a period of six months post injury reflected in the study by French et al. (2014). Over the longer period, there could have been further recovery or the ability to compensate consolidated (French, et al., 2014).

The results of the current study confirm that for 40 to 50% of participants cognition remained a problem in the workplace. This is congruent with a study by Cook et al.

(2018) who found cognition to be significantly associated with retention outcomes in the military (Cook, et al., 2018). However, a significantly higher percentage of those not retained reported cognitive problems, which affected their ability to complete their duties. Of the participants who were not retained, none reported having good concentration, while 66% (n=10) reported not being able to concentrate at work. The participants who were retained reported they had enough concentration (47.8%: n=34) to complete tasks given in the workplace. Attention, as measured on the MoCA, in the current study did not indicate differences between those retained and those not retained or marked deficits, but this assessment only considers simple tasks with no long-term sustained concentration required for work tasks being evaluated. However, a significant difference was reported for attention on the Repeatable Battery for Neuropsychological Status, between service force members who RTW and those had given medical retirement after the TBI (Cook, et al., 2018).

When considering decision-making, a high percentage of the participants (73.3%: n=11) who were not retained reported they were unable to make decisions independently within their day-to-day work duties**.** However, the ability to think abstractly, which is associated with decision-making and problem solving, are required to some extent in all occupations and was significantly lower when assessed on the MoCA for those not retained. Problem solving limitations, as self-reported by participants, were indicated by 73.3% (n=11) who were not retained compared to 7.0% (n=5) who were retained. In the military, some of the occupations do not require higher order decision-making and problem solving, as many lower ranking personnel are required to follow orders without question. The participants in the current study were older and probably required these cognitive abilities to guide others. Therefore, it was not always possible to accommodate participants with TBIs in alternative occupations where decision-making is limited, as higher authorities make most or important decisions.

The findings confirmed that for those retained and not retained memory difficulties were apparent, with 80% (n=12) of participants not retained reporting they could not remember what they had to do at work and made mistakes. The findings for memory for participants retained and those not retained were confirmed by the scores for delayed recall on the MoCA administered in the study. This confirms the need to accommodate memory problems in nearly a third of those retained since only 67.4% (n=48) of participants on this group indicated no memory problems, or memory problems to a small extend. Cook et al. (2018) also reported significant differences for service force members in delayed and immediate memory on the Repeatable Battery for Neuropsychological Status, between those who RTW compared to those given medical retirement after TBI (Cook, et al., 2018).

Significant differences were also found for fluency on the MoCA for participants retained and those not retained. Fluency may be associated with processing speed and research indicates those with better verbal communication skills, and that employed individuals with TBIs who have better fluency, comprehension, verbal reasoning and speed of processing are more likely to be employable, or retained in employment (Turkstra, 2000). There was a similar finding suggested for those who had better control of their temper and aggressive behaviour (Wehman, et al., 1993), although there was no difference reported by participants in the current study for losing their temper. Approximately 70% (n=44) of participants in both groups indicated this was rarely or never a problem.

The other results on the MoCA, showed no significant difference for those retained and not retained in the current study for language (repeat) and visuospatial cognitive factors. The findings on the Repeatable Battery for Neuropsychological Status, between those who RTW compared to those given medical retirement after TBI, concurred with this (Cook, et al., 2018). Overall, the retained participants in the current study had a score of 26 on the MoCA, which indicates normal cognitive function and differed significantly from the participants not retained, since their median score of 24

indicated cognitive impairment (Nasreddine, 2019). This confirmed the effect of cognitive function on retention after TBIs in military service even though the margin of scores between the groups was very small in the well-researched MoCA screening test used. .

5.3.5 Factors related to rehabilitation in Occupational Therapy

The final objective of the study was to determine rehabilitation and occupational therapy factors influencing retention or non-retention in the SANDF, as reported by service force members diagnosed with TBIs after RTW.

Findings in this study supported this with no significant difference in the use of work activities in occupational therapy, work visits or the number of work site evaluations completed by occupational therapists between the two groups. Retention may dependent more on initial intervention with appropriate accommodations and the evaluation of the member with a TBI to cope with the work tasks given before they RTW. Therapeutic relationships between occupational therapists and clients with TBIs are important. The relationship outcome making outcomes context-dependent, as in this case where skills specific to military duty need to be included in vocational rehabilitation (Fadyl & McPherson, 2009). In the current study however, from the retained service force members' perspective, 39.1% (n=27) were rehabilitated with a moderate or continuous use of work tasks, while for those not retained this only occurred with 13.3% (n=2). It appears the use of tasks related to their duties or alternative duties to which they return is important in their retention otherwise service force members struggle to transfer skills developed in rehabilitation to their work in the military environment.

Nearly 80% (n-68) of participants retained and those not retained also reported that occupational therapists did not conduct work visits to analyse the work duties and determine the suitability of the accommodations recommended. The occupational therapists are available only in the military hospitals and the distance to reach some workplaces proved difficult due to resources. More occupational therapist are needed

in different province to extend community work since three military hospitals are in 3 cities and provide an OT service for all nine provinces in South Africa.

For the same reason, participants reported they were unable to attend follow-up rehabilitation sessions, particularly 53.3% (n-8) of those not retained compared to 18% (n=20) of those who were retained. The lack of follow up rehabilitation appears to have affected retention, as there was no addressing of the many of the cognitive issues reported by those not retained, even though they affected job performance and reintegration into the work situation. Approximately three quarters of the participants were contacted by their occupational therapists after RTW, mostly on a monthly basis, with a higher percentage of those not retained (80%, n=12) being contacted compared to 63.3% (n=44) of those who were retained. While this suggests that occupational therapists were aware of the need for more support for those not retained, there still appears to be a lack of coordinated case management and prolonged intervention to ensure job stability and retention (Machamer, et al., 2005). The argument is that vocational rehabilitation and RTW is only the first step, and retention challenges after TBI must address the experience in the work environment and that case coordination including all stakeholders, which can be led by the occupational therapists, results in higher retention rates. (Malec, et al., 2000)

5.4. Study strengths and limitations

The strength of the study is that it is the first study in the SANDF to look at retention of service members following TBI. The adequate sample size was achieved. The study is based on 1 Military Hospital's patient load and excluded 2 and 3 Military Hospitals' patients, which implies the numbers might have not have covered all other arms of service, for example the South African Military Navy are mainly seen in 2 Military Hospital.

Limitations of the study include no assessment tools specifically standardised on the military service force members are available for occupational therapists to use for

assessing RTW and cognition. It is possible service force members with TBIs may not have had full awareness and insight into the issues related to their performance at work or issues related to this. The researcher was not given permission to interview supervisors about the performance of participants about their work performance for ethical and confidentiality reasons. The indication was that interviewing the supervisors and TBI participants might result in conflicts and unnecessary tensions.

The challenges that the supervisors have with handling or managing service force members in the military is still unknown. Consequently, there was no establishment of the relationship and involvements of supervisors, from their perspective, in the rehabilitation of service force members with TBIs. In retrospect, from ongoing engagement with the literature, the questionnaire should have included additional items such as headaches, chronic pain, substance use, PTSD and any seizures (Brickell, et al., 2020) (Dillahunt-Aspillaga, et al., 2017).

CHAPTER 6: CONCLUSION & RECOMMENDATIONS

6.1. Introduction

This chapter aims to present the conclusion, clinical recommendations based on the findings of the study on factors that influence retention of service force members with TBI in the SANDF, and to make recommendations for further research.

6.2 Conclusion and main findings of the study

Literature describes many factors impacting on RTW following TBI, minimal evidence on factors affecting retention in the military. However, for retention after having returned to work, service force members are supposed to be productive, contributing actively to the service and not experience deteriorating health. Retention in work for service force members with TBIs has a positive impact on their health, wellbeing and the economy. The findings support the retention of service force members with TBIs when all the stakeholders (service force members, supervisors and multidisciplinary team) involved in their management know factors that can influence their retention. The influence of factors after TBIs on service force members with PTSD symptoms and their other psychiatric symptoms still needs further investigation.

This study includes presentation of results from 86 participants who completed the questionnaire on factors associated with retention and non-retention of service force members with TBIs in the SANDF. The factors in the questionnaire include demographic factors, work factors, cognitive factors and military factors. The Montreal Cognitive Assessment (MoCA) also evaluated the participants to determine their cognitive function. There is a comparison, according to these factors, presented for participants retained and those not retained after returning to work post TBI in the SANDF.

Findings demonstrated that 82.5% of participants were still active service force members, so were thus retained. Of the other participants, 17.4% were not retained, of which 5.8% (n=5) were veterans and 11.6% (n=10) left the force as they were medically boarded. The 86 participants all returned to work after completing a rehabilitation programme. Some returned to work after few months and some after a year or more. The participants were 80.2% male and 19.7% female. The highest percentages of participants were African (81.3%), married (38.3%) and those with grade 12 (56.9%) level of education.

Demographic findings indicated that age is a significant retention factor (p=0.001). The work and military factors that indicated significant different between the two groups, includes the time it takes a TBI patient to RTW after the injury, which plays an important factor on retention (p=0.005). Also including success (p=0.000) and changes made on RTW (p=0.002). The other retention factor the service force members deemed necessary was communication from supervisors during rehabilitation, which was significant between the two groups (p=0.045). Participation in sufficient duties (p=0.000) and contribution made after RTW (p=0.000) also contributed to retention as well as level of coping (0.000) and amount of leave taken after RTW (p=0.000).

The service force members with TBIs not retained indicated it was not possible for them to take prescribed medication while on duty compared to those who were retained (p=0.012). The other military factor confirmed to influence retention in the findings was ability of the service force members to perform military duties (p=0.000). Cognitive factors perceived by participants to influence retention were concentration (p=0.000), decision-making (p=0.000), problem solving (p=0.000) and memory (p=0.000), which were significant between participants who were retained and not retained. On the MoCA, the participants retained scored in the normal range with nearly a full median score for most of these subtests, while those not retained had an overall score that indicated cognitive deficits. There was a significant difference reported on fluency,

abstraction and delayed recall, as well as total score for participants retained and not retained in the military after TBI.

The findings confirmed that memory difficulties were apparent in both those retained and those not retained. From the service force members' perspective, both retained and not retained in the SANDF reported they were not rehabilitated using tasks relating to their duties or alternative duties to which they returned. The occupational therapists conducted work visits for 79% of the participants, but with a slightly lower percentage of participants not retained. Occupational therapists did follow up with the highest percentage (65.3%) of retained and not retained participants with TBIs (25.3% and 40.0% respectively) on a monthly basis after they returned to work. However, more than half of participants (56.6%) 36.6% of participants retained and
20.0% of participants not retained were never followed up.

Recommendations based on the presented findings are outlined below.

6.3 Clinical Recommendations

Findings of this study are to promote awareness of the factors that influence retention of service force members with TBIs in the military service in order to improve their work transition programme by addressing barriers and facilitating success in retention. For excellent and highest number of retentions of TBIs in the military, the following are recommendations:

- While it is important the vocational assessment completed are valid for RTW outcomes for adults with TBIs, Scherer et al. (2018) suggested in military even service force members without TBIs are vulnerable to body and cognitive exhaustion, increased stress, sleep disturbances and several physiological disturbances when compared to civilians' workforce. In the South African context, there has been no validation of the available standardised assessment measuring tools for military service force members, and South African military occupational therapists are utilising standardised assessment measuring tools

utilised for the civilian populations. The basis for the activity standards and measures is on scoring values for civilian populations and may not match that of the service force members (Scherer, et al., 2018). This

presents challenges, including selecting proper evaluation tools and issues with interpreting their findings when completing vocational-related evaluation (Stergiou-Kita, et al., 2011), making it difficult for even experienced vocational rehabilitation occupational therapists to provide appropriate work hardening, and placement of service force members ready to return to RTW. The recommendation is for South African military occupational therapists to shadow global military occupational therapists to familiarise themselves with available standardised assessment measuring tools and assess their suitability for the South African military populations. Clinical partnerships can be set up to serve as links between various military occupational therapists to share latest innovations of treatment programmes for service force members. Work simulations that are close to the service force members' military duties are recommended.

- Rehabilitation healthcare workers to perform accurate assessments and ensure that service force member are fit to RTW.
- Creation of further occupational therapy posts for provinces in which military hospitals are not situated. This would assist in carry-over of occupational therapy services for service force members with TBIs discharged from hospital, especially for provinces not close to a military hospital for work visits, to ensure the implementation of reasonable accommodations
- The multidisciplinary team managing the service force members with TBIs should include the immediate supervisor of the service force member from the initial admission stage.
- On the interview form with the TBI patients, there should be contact details of his immediate supervisor and written consent from the service force members with TBIs obtained for the supervisor to be contacted by either one of the

multidisciplinary team members. This would ensure communication lines are open between all service force members with TBIs, supervisors and the multidisciplinary team. The communication would clarify how each person would contribute to the RTW of the TBI patient and ensure accountability.

Communication from all supervisors during rehabilitation may thus play an important role in allowing the supervisor to develop an understanding of what the TBI patient is going through, and an opportunity to provide support. This would also assist when the service force member with a TBI returns to work.

- The supervisor should provide proper feedback monthly for about 3 months, on the functioning of service force members with TBIs, to the multidisciplinary team after their RTW to ensure retention. Additional work visits conducted by occupational therapists to ensure the implementation of reasonable accommodations.
- The supervisor to receive a written report on the recommendations with regard to placement of the service force member with the TBI in work, and reasonable accommodations recommended based on the level of functioning of the service force member. This would assist the supervisor to be aware of the member's capabilities and even if the supervisor is changed/moved, the next one can carry over to facilitate the recommendations for the members' successful retention.
- Continued monthly telephone support for at least three months to the service force members by the multidisciplinary team, even if there is management of symptoms, to ensure the implementation of the recommended and approved reasonable accommodations.
- Education programmes on disability and health awareness (presentations, awareness campaigns, lectures, workshops) by healthcare workers to provide education to the supervisors and other service force members regarding TBI and its effects. Programmes should also provide education on medical boarding and its classifications.

- Resources such as equipment and personnel are recommended in order to have effective rehabilitation services to reduce the negative impact on the economy with prolonged sick leave and not retaining service force members with skills as well as prevention programmes for TBIs off duty.
- The service force members to receive assurance that taking part in mental health educational programmes, or seeking medical assistance improves their abilities as military members (Aikins, et al., 2020) rather than appearing as a weakness by given a chance to participate in health promotion programs.

6.3 Recommendations for further research

For future research, literature indicated that psychosocial trauma negatively influences recovery and exacerbates symptoms of TBIs in the military rather than other resultant outcomes of the TBI (Brickell, et al., 2020). There has been a report of a link between substance abuse and TBI symptoms that are not improving among service force members. Service force members also reported headaches and chronic pain as persistent symptoms that influence work performance (Brickell, et al., 2014). Future research on the influence of substance abuse and chronic pain on TBI patients in the workplace retention is recommended.

Post-traumatic stress disorder has been known to be linked with TBI. Post-Traumatic Stress Disorder symptoms are a big stressor in dealing with symptoms of TBI, as they both have similar symptoms (Beran & Bhaskar, 2018). Further research should include a PTSD screening tool to determine if service force members are also experiencing PTSD symptoms from the TBI incident.

The recommendation is for further research on factors influencing retention of TBI patients considering the perceptions/experiences of the supervisors in the SANDF.

Due to the military working on a ranking system, the recommendation is that the policy on transformation management should take into consideration the ranks of service

members with TBI when recommending reasonable accommodations. Returning an injured service force member with residual limitations (either physical or cognitive) into their original rank that is highly physically or cognitively demanding at times may contribute to loss of self-esteem, self-worth, self-identity, frustrations, feelings of shame, or loss of control.

Medical board procedures need to indicate clearly that before an injured service member returns to work, a full functional capacity evaluation needs to be undertaken.

References

Agimi, Y., Regasa, L. & Stout, K., 2019. Incidence of traumatic brain injury in the US military, 2010–2014. *Military medicine,* 184(5-6), pp. e233-e241.

Aikins, D. et al., 2020. Beyond stigma: Understanding the “inclined abstainers” in military behavioral health-care utilization. *Military Psychology,* 32(5), pp. 419-427..

Arrabito, R. G. & Leung, A. S., 2008. Combating the impact of Stigma on Physically Injured and Mentall Ill Canadian Armed Forces (CAF) Members. *Canadian Military Journal,* p. 25.

Artman, L. K. & Mchon, B. T., 2013. Functional limitations in TBI and their relai tionship to job maintenance following work re-entry. *Journal of Vocational rehabilitation,* 39(1), pp. 13-21.

Ashendorf, L., 2015. *Traumatic brain injury in the military.* [Online] Available at: blog.oup.com

Bartlett, J. E., Higgins, C. & Kotrlik, J. W., 2001. Organizational research: Determining appropriate sample size for survey research. *Information Technology, Learning, and Performance Journal,* 19(1), pp. 43-50.

Bates, M. J., Bowles, S. V., Kilgore, J. A. & Solursh, 2008. Fitness for duty, Recovery and Return for service. In: *Returning wars's wounded, injured and ill.* British: Praeger, pp. 67-91.

Beath, N., Asmal, L., Van den Heuvel, L. and Seedat, S., 2018. Validation of the Montreal cognitive assessment against the RBANS in a healthy South African cohort. *South African Journal of Psychiatry*, *24*(1), pp.1-1.

Beran, R. & Bhaskar, S., 2018. Concussion within the Military. *Journal of Military & Veterans' Health,,* 26(3), pp. 20-27.

Brainline Military, 2013. *Vocational Issues Following Traumatic Brain Injury, Part II.* [Online]

Available at: http://scholar.goohttp://www.brainlinemilitary.org/content/2013/03/vocational-issuesfollowing-traumatic-brain-injury-partii.htmlgle.co.za/scholar?q=return+to+work+in+the+military+TBI&btnG=&hl=en&as_sd t=0%2C5

[Accessed 27 May 2017].

Brainline Military, 2019. *How Many Service Members Have Sustained a TBI?.* [Online]
Available at: https://www.brainline.org/article/how-many-service-members-havesustained-tbi#army [Accessed 4 March 2020].

Brickell, T. et al., 2020. Severity of military traumatic brain injury influences caregiver health-related quality of life. *Rehabilitation Psychology,* 65(4), pp. 377-389.

Brickell, T., Lange, R. & French, L., 2014. Health-related quality of life within the first 5 years following military-related concurrent mild traumatic brain injury and polytrauma. *Military Medicine,* 179(8), pp. 827-838.

Brooks, N., McKinlay, W., Beattie, A. & Campsie, L., 1987. RTW within the first seven years of severe brain injury. *Brain Injury,* 1 July-September, 1(1), pp. 5-19.

Brown, H. & Hollis, V., 2013. The meaning of occupation, occupational need, and occupational therapy in a military context. *Physical therapy,* 93(9), pp. 1244-1253.

Cogan, A. et al., 2019. Occupational challenges in military service members with chronic mild traumatic brain injury. *American Journal of Occupational Therapy,,* 73(3), pp. 7303205040p1-7303205040p9..

Cohen, S., Suri, P., Amick, M. & Yan, K., 2013. Clinical and demographic factors associated with employment status in US military veterans returning from Iraq and Afghanistan. *Work,* 44(2), pp. 213-219.

Cook, P. et al., 2018. A retrospective study of predictors of return to duty versus medical retirement in an active duty military population with blast-related mild traumatic brain injury. *Journal of Neurotrauma,* 35(8), pp. 991-1002.

de la Plata, C. et al., 2008. Impact of age on long-term recovery from traumatic brain injury. *Archives of Physical Medicine and Rehabilitation,* 89(5), pp. 896-903.

DeKosky, S., Ikonomovic, M. & Sam Gandy, M. .., 2010. Traumatic brain injury-football, warfare, and long-term effects. *The New England Journal of Medicine,* 363(4), pp. 1293-1300.

Department of Public Service and Administration, 2014. *Policy on reasonable accommodation and assistive devices for employees with disabilities in the public service.* [Online] Available at: http://www.dpsa.gov.za/dpsa2g/documents/ee/2015/289_1_2_3_20_08_2015_Policy.pdf
[Accessed 12 June 2020].

Dillahunt-Aspillaga, C. et al., 2017. Employment Stability In Veterans and service members with Traumatic Brain Injury. *Archives of Physical Medicine and Rehabilitation,* 19 May, 99(2), pp. S23-S32.

Dowd, M., 2018. *The Responsibilities of Soldiers.* [Online]
Available at: https://work.chron.com/responsibilities-soldiers-18395.html [Accessed 6 March 2021].

Erasmus, C., 2013. *Re-employability assessment of persons with traumatic brain injury,* Johannesburg: Doctoral dissertation, University of Johannesburg.

Escorpizo, R. et al., 2010. Developing a core set to describe functioning in vocational rehabilitation using the International Classification of Functioning, Disability and Health (ICF). *Journal of Occupational Rehabilitation,,* 20(4), pp. 502 - 511.

Fadyl, J. & McPherson, K., 2009. Approaches to vocational rehabilitation after traumatic brain injury: a review of the evidence. *The Journal of Head Trauma Rehabilitation,* 24(3), pp. 195-212.

Fedio, A. et al., 2014. Self-Awareness of Changes during Recovery from Traumatic Brain Injury: Acknowledging One's Functional Weaknesses. *Archives of Clinical Neuropsychology,* 29(6), p. 590.

French, L., Lange, R. & Brickell, T., 2014. Subjective cognitive complaints and neuropsychological test performance following military-related traumatic brain injury. *Journal of Rehabilitation Research & Development,* 51(6), p. 933–950.

Frénisy, M. et al., 2006. Brain injured patients versus multiple trauma patients: some neurobehavioral and psychopathological aspects. *Journal of Trauma and Acute Care Surgery,* 60(5), pp. 1018-1026..

Gourdeau, J. et al., 2020. Workplace accommodations following work-related mild traumatic brain injury: what works?. *Disability and Rehabilitation,* 42(4), pp. 552-561.

Gray, M. et al., 2017. Long-Term Functional Outcomes in Military Service Members and Veterans After Traumatic Brain/Polytrauma Inpatient Rehabilitation. *Archives of Physical Medicine and Rehabilitation,* 27 99(2), pp.S33-S39, 99(2), pp. S33-S39.

Halvorson, A., 2010. *Understanding the military: The institution, the culture, and the people,* s.l.: Substance Abuse and Mental Health Services Administration Center for Substance Abuse Treatment Partners for Recovery Initiative.

Hicks, B., 2017. *Employee return-to-work following long-term sickness absence - BOHRF.* [Online]
Available at: www.surveymonkey.com/r/RYWVGMS
[Accessed 14 May 2017].

Jerome, E. et al., 2017. An audit of traumatic brain injury (TBI) in a busy developing world trauma service exposes a significant deficit in resources available to manage severe TBI. *South African Medical Journal,* 107(7), pp. 621-625.

Kennedy, J., Cullen, M. A. R., Huey, J. & Leal, F., 2010. Symptoms in military service members after blast mTBI with and without associated injuries. *NeuroRehabilitation,* 26(3), pp. 191-197..

Kundu, S. & Lata, K., 2017. Effects of supportive work environment on employee retention. *International Journal of Organizational Analysis.,* 25(4), pp. 703-722.

Lange, R. et al., 2012. Neuropsychological outcome from blast versus non-blast: mild traumatic brain injury in US military service members. *Journal of the International Neuropsychological Society: JINS,* 18(3), p. 595.

Lees-Haley, P. & Brown, P., 1993. Neuropsychological complaint base rates of 170 personal injury claimants.. *Archives of Clinical Neuropsychology,* 8(3), p. 203–209.

Lindquist, L., Love, H. & Elbogen, E., 2017. Traumatic brain injury in Iraq and Afghanistan veterans: new results from a national random sample study. *The Journal of Neuropsychiatry and Clinical Neurosciences,* 29(3), pp. 254-259.

Luethcke, C., Bryan, C., Morrow, C. & Isler, W., 2011. Comparison of concussive symptoms, cognitive performance, and psychological symptoms between acute blastversus nonblast-induced mild traumatic brain injury. *Journal of the International Neuropsychological Society, 17(1), pp..,* 17(1), pp. 36-45.

Machamer, J. et al., 2005. Stability of employment after traumatic brain injury. *Journal of the International Neuropsychological Society: JINS,* 11(7), p. 807.

Malec, J., Buffington, A., Moessner, A. & Degiorgio, L., 2000. A medical/vocational case coordination system for persons with brain injury: An evaluation of employment outcomes. *Archives of Physical Medicine and Rehabilitation,* 81(8), pp. 1007-1015.

McCrea, M. et al., 2008. Official position of the military TBI task force on the role of neuropsychology and rehabilitation psychology in the evaluation, management, and research of military veterans with traumatic brain injury. *The Clinical Neuropsychologist,,* 22(1), pp. 10-26.

McLeod, A., Wills, A. & Etherington, J., 2004. Employment retention after moderatesevere traumatic brain injury (TBI) in the british army 1989–98. *Occupational and Environmental Medicine,* 61(5), pp. 414-418.

Memon, D. K., Schwab, K., Wright, D. W. & Maas, A. I., 2010. Position Statement: Definition of Traumatic Brain Injury. *Archives of Physical Medicine and Rehabilitaion Journal,* 91(11), pp. 1637-1640.

Milenovic, Z., 2011. Application of Mann-Whitney U test in research of professional training of primary school teachers. *Metodicki Obzori,* 6(1), pp. 73-79.

Moller, C., Lingah, T. & Phehlukwayo, S., 2017. We all need employment"-An exploration of the factors which influence the return-to-work after a severe traumatic brain injury. *South African Journal of Occupational Therapy,* 47(3), pp. 17-24.

Nasreddine, Z., 2019. *Montreal cognitive assessment.* [Online] Available at: https://www.mocatest.org/splash/ [Accessed 9 April 2019].

Nasreddine, Z. S. et al., 2005. The Montreal Cognitive Assessment, MoCA: A brief screening tool for mild cognitive impairment. *Journal of the American Geriatrics Society,* 53(4), pp. 695-699.

National US Dept. of Labor, 2017. *Dictionary Of Occupational Titles.* [Online] Available at: https://occupationalinfo.org/ [Accessed 30 May 2018].

Olsen, C. & St George, D., 2004. Cross-sectional study design and data analysis. *College entrance examination board,* 26(03), p. 2006.

Panter, A. a. Sterba, S.K.,. 2011. *Ethics in quantitative methodology: An introduction.* New York: Routledge. p.-1.,

Parliamentary Monitorong Group, 2015. *SA National Defence Force on transformation progress, challenges, plans.* [Online]

Available at: https://pmg.org.za/committee-meeting/20980/
[Accessed 7 July 2019].

Pretorius, C. & Broodryk, M., 2013. Misconceptions about traumatic brain injuries among South African university students. *South African Journal of Psychiatry,* 19(3), pp. 75-80..

Pugh, M. J. et al., 2017. Traumatic Brain Injury Severity, Comorbidity, Social Support, Family Functioning and Community Reintegration Among veterans of the Afghanistan and Iraq Wars. *Archives of Physical Medicine and Rehabilitation,* , 99(2), pp.S40-S49, 99(2), pp. S40-S49.

Regasa, L., Agimi, Y. & Stout, K., 2019. Traumatic brain injury following military deployment: evaluation of diagnosis and cause of injury. *The Journal of Head Trauma Rehabilitation,* 34(1), pp. 21-29.

Reid, M. & Velez, C., 2015. Discriminating military and civilian traumatic brain injuries. *Molecular and Cellular Neuroscience,* 66(May 1), pp. 123-128.

Republic of South Africa, 2002. *Defence Act 42 of 2002.* [Online]
Available at: https://www.gov.za/documents/defence-act?gclid=Cj0KCQiAvbiBBhDARIsAGM48bz9CoHf7JiVI45VU0BIsbR0nkUbYUcDvs1p915iSN0RgpsQtw75ZsaAmieEALw_wcB#
[Accessed 14 July 2019].

Salazar, A. et al., 2000. Cognitive Rehabilitation for Traumatic Brain Injury: A Randomized Trial. *JAMA: The Journal of the American Medical Association,* 283(23), pp. 3075-3081.

Scherer, M. et al., 2013. Returning service members to duty following mild traumatic brain injury: exploring the use of dual-task and multitask assessment methods. *Physical Therapy,* 93(9), pp. 1254-1267.

Scherer, M. et al., 2018. Measuring soldier performance during the patrol-exertion multitask: preliminary validation of a postconcussive functional return-to-duty metric. *Archives of Physical Medicine and Rehabilitation,* 27 October, 99(2), pp. S79-S85.

Schultz, I.Z., Stowell, A.W., Feuerstein, M. and Gatchel, R.J., 2007. Models of return to work for musculoskeletal disorders*. Journal of Occupational Rehabilitation*, 17(2), pp.327-352.

Scollon, J., 2000. *Traumatic Brain Injury and RTW: Review of factors that have a negative, positive and no relationship to vocational outcome in brain injured individuals,* Burnaby, British Columbia: Workers' Compensation Board of British Columbia.

Silverberg, N. D., Panenka, W. J. & Iversion, G. L., 2017. Work Productivity Loss After Mild Traumatic Brain Injury. *Archives Of Physical Medicine and Rehabilitation*, 27 October.

Soeker, M., Van Rensburg, V. & Travill, A., 2012. Are rehabilitation programmes enabling clients to RTW? RTW perspectives of individuals with mild to moderate brain injury in South Africa. *Work,* 43(2), pp. 171-182.

Songer, T. J. & LaPorte, R. E., 2000. Disabilities due to injury in the military. *American Journal of Preventive Medicine,* 18(3), pp. 33-40.

Statistics South Africa, 2012. *Census 2011 Census in brief.* [Online] Available at: http://www.statssa.gov.za/census/census_2011/census_products/Census_2011_Census_in_brief.pdf
[Accessed 23rd January 2019].

Stergiou-Kita, M., Dawson, D. R. & Rappolt, S. G., 2011. An integrated Review Of the Processes and Factors Relevant to Vocational Evaluation Following Traumatic Brain Injury. *Journal of Occupational Rehabilitation,* 21(3), pp. 374-394..

Stevens, L. et al., 2017. Relationship stability after traumatic brain injury among veterans and service members: a VA TBI Model Systems study.. *The Journal of Head Trauma Rehabilitation,* 32(4), p. 234.

Sukamolson, S., 2007. *Fundamentals of quantitative research,* Bangkok: Language Institute, Chulalongkorn University.

Trudel, T., Nidiffer, F. & Barth, J., 2007. Community-integrated brain injury rehabilitation: Treatment models and challenges for civilian, military, and veteran populations. *Journal of Rehabilitation Research & Development,* 44(7), p. 1007– 1016.

Turkstra, E., 2000. Communication abilities and work re-entry following traumatic brain injury. *Brain injury,* 14(5), pp. 441-453.

Watt, N. & Penn, C., 2000. Predictors and indicators of RTW following traumatic brain in South Africa: findings from a preliminary experimental database. *South African Journal of Psychologist,* pp. 27-27.

Webster, J., Taylor, A. & Balchin, R., 2015. Traumatic brain injury, the hidden pandemic: A focused response to family and patient experiences and needs. *SAMJ: South African Medical Journal,* 105(3), pp. 195-198.

Wehman, P. et al., 1993. Critical factors associated with the successful supported employment placement of patients with severe traumatic brain injury. *Brain Injury,* 7(1), pp. 31-44.

APPENDIX A

MEMBER QUESTIONNAIRE

1. Gender:

Male		**Female**	

2. What is your age

3. What is your race/ethnicity

African		**Caucasian**		**Indian**		**Coloured**		**Other**	

4. Marital status

Single		**Married**		**Divorced**		**Cohabitation (Living with a partner)**	

5. Educational level

Grade 12		**Postmatric Certificate**		**Diploma**		**Degree**		**Postgrad Degree**	

6. Job title

	Classification of work by therapist:

7. Date of injury

8. After how many months did you RTW after your injury

9. Are still an active member in the SANDF

Yes		**No**	

If No please indicate are you

Medically boarded		**Reserve Member**		**Veteran**	

If no please Indicate date of service termination: _____

10. How successful has your RTW been

	Very successful
	Mostly successful
	Fairly successful

	Fairly unsuccessful
	Mostly unsuccessful
	Very unsuccessful

Please elaborate:

11. In which ways did the workplace make changes to support you when you returned to work **(You can select more than one option):**

	Reduced working hours

	Reduced work tasks
	Different work
	No changes were made
Other **(please specify)**	

12. Was your supervisor involved in your rehabilitation

	Not at all
	To some extent
	To a moderate extent
	To a large extent

13. What was your relationship with supervisor like **prior** your injury

	Excellent
	Good
	Fair
	Poor
	Very poor

14. What was your relationship with your supervisor **after you returned back to duty**

	Excellent
	Good
	Fair
	Poor
	Very poor

15. How frequently did your supervisor communicate with you/family during your rehabilitation

	Never
	Occasionally
	Frequently
	Very frequently

16. Is your supervisor approachable with all concerns

	Not at all
	To some extent
	To a moderate extent
	To a large extent

17. Are you given tasks/duties to do at work

	Not at all
	To some extent
	To moderate extent
	To large extent

18. Do you feel you are coping with the demands of your duty

	Not coping at all
	Coping with some of the tasks
	Coping with most of the tasks
	Coping with all of the tasks

19. In which ways did your occupational therapist assist you in your rehabilitation

20. Did the occupational therapist do work activities with you in your rehabilitation that you are currently required to do in your job

	Not at all
	Some of the task
	Moderate tasks
	All tasks

21. Did the occupational therapist do a work visit before your RTW

Yes		**No**	

22. How regularly did occupational therapist check on you when you returned to work

	Never
	Weekly
	Every 2 weeks
	Monthly
	Every 2 months
	Every 3 months or less
	Every 6 months or less

23. How possible is it for you to attend follow up sessions with the rehabilitation team

	Very possible
	Possible
	Slightly possible
	Impossible

24. How possible is it to take your prescribed treatment while at work

- [ ] **Very possible**
- [ ] **Possible**
- [ ] **Slightly possible**
- [ ] **Impossible**

25. How frequently did you take sick leave from work after you returned to work

- [ ] **Never**
- [ ] **Seldom**
- [ ] **Occasionally**
- [ ] **Frequently**
- [ ] **Very frequently**

26. How well are you able to concentrate on tasks that you are supposed to do at work

- [ ] **Unable to concentrate**
- [ ] **Poor Concentration**
- [ ] **Adequate Concentration**
- [ ] **Good concentration**

27. Do you feel that you are able to make meaningful contribution to work tasks in your current work placement

	Unable to contribute
	Able to contribute minimally
	Able to contribute adequately
	Able to concentrate substantially

28. How capable are you of making decisions

	Unable to make decisions
	Has occasional difficulty making decisions
	Has frequent difficulty in making decisions
	Is able to make decisions

29. How capable are you of problem solving at work

	Unable to problem solve
	Have occasional difficulty problem solving
	Have frequent difficulty problem solving
	Able to problem solve

30. Do you have difficulty remembering at work (i.e. remembering what tasks you have to do and how to do them

	Not at all
	To some extent
	To moderate extent
	To large extent

31. How frequently do you loose temper/get very angry at work

	Never
	Rarely
	Occasionally
Often	
Very	**often**

32. Do you think it is appropriate that your health limitations are put on the profile system

Yes		**No**	

33. Do the health limitations recorded on your system affect your career progression:

	Strongly agree
	Agree
	I don't know
	Strongly disagree
	Disagree

34. Do you feel discouraged about your health limitations being put on your profile on the system:

	Strongly agree
	Agree
	I don't know
	Strongly disagree
	Disagree

35. Are you able to perform your physical military duties (parade, drills, paying compliments, deployments)

	Not at all
	Some of the task
	Moderate tasks
	All tasks

36. Do you think there is stigma attached to not being able to do military duties

Yes		**No**	

37. Was your injury combat related

Yes		**No**	

APPENDIX B

Rationale for inclusion of question items on both questionnaires

Classifications of item	**Question item**	**Justification for inclusion**
Demographics	Gender, age, race, marital status, educational level and job title	Factors that influenced vocational outcome were reviewed as follows: "Age, marital status, race/ethnicity, pre-educational status, preoccupational status & sex .

Work factors	Reasonable accommodations, work relationships, leave,	Other factors that were also investigated to influence vocational outcome included pre-injury personality factors, social/family factors, compensation status, employer/position characteristics, activity setting and RTW time lapse (Scollon 200)
Rehabilitation factors	Role of the occupational therapist	Evaluators have challenges including describing the specific purpose of an evaluation, selecting proper evaluation tools and issues with interpreting their findings when completing vocational-related evaluations (Stergiou-Kita et al., 2011)

Military factors	Inclusion of limitations (stigma system, inability to p military duties and attac it.	Traumatic brain injury has often been called the "signature wound" from combat (Ashendorf, 2015). After an illness or injury that results in limitation in functioning, as service member is put on a profile. The profile is a system for documenting that a person has condition that impacts his or her ability to perform duties or requires a geographic assignment limitation (Bates, et al., 2008). Lastly there is also stigma towards injured force members (Arrabito & Leung, 2008).
Health condition factors	Cognitive impairments	Artman and Mchon (2003) cite cognitive and emotional deficits as the most persistent deficits affecting employment and return to active military service (Artman & Mchon, 2003; Brainline Military, 2013).

APPENDIX C

Critique from therapist	Comments from therapist	Change made (in consultation with supervisor)
Therapist 1 – Expert in occupational therapy treatment neurological disorders and upper limbs splinting in SANDF.	• Q10 Does it mean with regard to job or settling in • Q19 Comment: What did the OT assist you in your rehabilitation • Q20 Comment: Did the OT do tasks that are related to your work • Q22 Comment: Check on you when you returned to work • Q23 Comment: with rehabilitation team? • Q26 Comment On the task you have to do • Q27 Comment: simplify question • Q29 Comment: How capable are of problem solving at work • Q30 Comment : Grammar and do you have difficulties remembering what tasks to do at work • On race instead of white for race rather Caucasian	• Explanation in brackets • Explanation in brackets ✓

Therapist 2 – previous section head of neurology and psychiatry occupational therapy in 1Military hospital, currently doing PHD in paediatrics	On the rehab • Did they OT communicate with your work regarding RTW • Did they OT conduct work visit before RTW • Were you exposed to simulated work activities of work you are doing currently • After placement • Was the OT involved in your rehab • If need an opinion of someone working the block	The research is looking at factors from those that returned to work even if they were not retained. The overall period they took after injury before they returned to work. 97
	for medical boarded isn't relevant □ What do you want to find out about rehab period or home period	
Therapist 3 – Expert in the field of disability claim assessments at Alexander Forbes	□ Q13 and 14 How about if ask the relationship with supervisor after checking if there was any support	
Therapist 4 – Expert in disability assessments and medico-legal consultancy work	□ Grammar for Q 29 and 30 fixed	

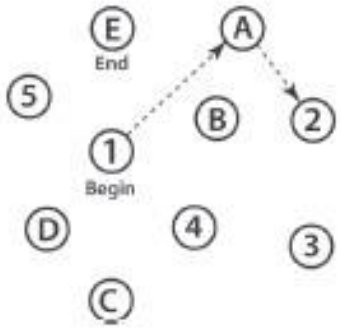
Therapist 5 - Expert in vocational rehabilitation	 U make use of terms such as reasonable accommodation and work hardening , are easier to analyze but questionnaire is selfadministered participants might be confused to participants who are not familiar with those terms It also does not indicate what happens to the participant who chose they did not RTW or medically boarded or veterans. Does questionnaire stop? Maybe there should be a statement that they should continue Instructions on how to answer questionnaire by a tick or a cross?	The research is looking at factors from those that returned to work even if they were not retained. Under each question write mark correct answer with X.

APPENDIX D

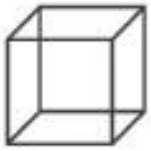
MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

Name:
Education: Date of birth:
Sex: DATE:

VISUOSPATIAL / EXECUTIVE



☐



Copy Cube

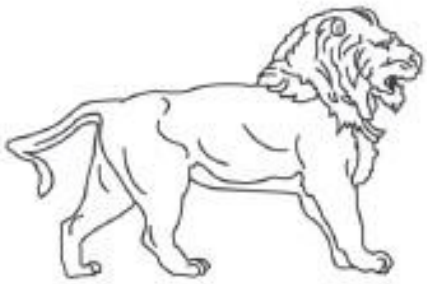
☐

Draw CLOCK (ten past eleven)
(3 points)

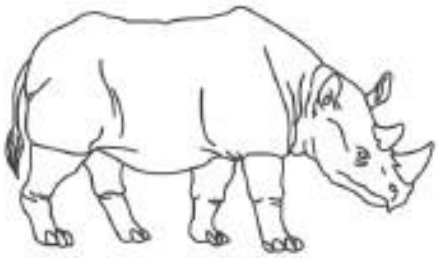
☐ Contour ☐ Numbers ☐ Hands

POINTS ___/5

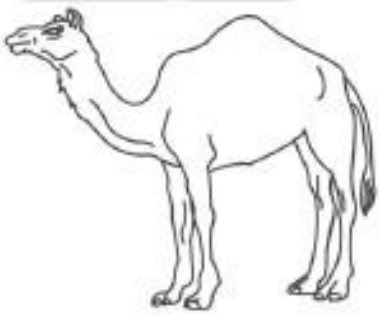
NAMING



☐



☐



☐

___/3

MEMORY

Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.

	FACE	VELVET	CHURCH	DAISY	RED	POINTS
1st trial						
2nd trial						No points

ATTENTION

Read list of digits (1 digit/sec)

Subject has to repeat them in the forward order ☐ 2 1 8 5 4

Subject has to repeat them in the backward order ☐ 7 4 2

__/2

Read list of letters. The subject must tap with their hand at each letter A. No points if ≥ 2 errors

☐ FBACMNAAJKLBAFAKDEAAAJAMOFAAB

__/1

Serial 7 subtraction starting at 100 ☐ 93 ☐ 86 ☐ 79 ☐ 72 ☐ 65

4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt** 0 correct: **0 pt**

__/3

LANGUAGE

Repeat: I only know that John is the one to help today. ☐

The cat always hid under the couch when dogs were in the room. ☐

__/2

Fluency / Name maximum number of words in one minute that begin with the letter F

☐ _____ (N ≥ 11 words)

__/1

ABSTRACTION

Similarity between e.g. banana – orange = fruit ☐ train – bicycle ☐ watch – ruler

__/2

DELAYED RECALL

	Has to recall words WITH NO CLUE	FACE ☐	VELVET ☐	CHURCH ☐	DAISY ☐	RED ☐	Points for UNCUED recall only
Optional	Category cue						
	Multiple choice cue						

__/5

ORIENTATION

☐ Date ☐ Month ☐ Year ☐ Day ☐ Place ☐ City

__/6

© Z.Nasreddine MD

www.mocatet.org

Normal ≥ 26 / 30

TOTAL __/30

Add 1 point if ≤ 12 yr edu

Administered by: _____

Montreal Cognitive Assessment
(MoCA)

Administration and Scoring Instructions

The Montreal Cognitive Assessment (MoCA) was designed as a rapid screening instrument for mild cognitive dysfunction. It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation. Time to administer the MoCA is approximately 10 minutes. The total possible score is 30 points; a score of 26 or above is considered normal.

1. **Alternating Trail Making:**

Administration: The examiner instructs the subject: *"Please draw a line, going from a number to a letter in ascending order. Begin here* [point to (1)] *and draw a line from 1 then to A then to 2 and so on. End here* [point to (E)]."

Scoring: Allocate one point if the subject successfully draws the following pattern: 1 –A- 2- B- 3- C- 4- D- 5- E, without drawing any lines that cross. Any error that is not immediately self-corrected earns a score of 0.

2. **Visuoconstructional Skills (Cube):**

Administration: The examiner gives the following instructions, pointing to the **cube**: *"Copy this drawing as accurately as you can, in the space below".*

Scoring: One point is allocated for a correctly executed drawing.

- Drawing must be three-dimensional
- All lines are drawn
- No line is added
- Lines are relatively parallel and their length is similar (rectangular prisms are accepted)

A point is not assigned if any of the above-criteria are not met.

3. **Visuoconstructional Skills (Clock):**

Administration: Indicate the right third of the space and give the following instructions: *"Draw a clock. Put in all the numbers and set the time to 10 after 11".*

Scoring: One point is allocated for each of the following three criteria:

- Contour (1 pt.): the clock face must be a circle with only minor distortion acceptable (e.g., slight imperfection on closing the circle);
- Numbers (1 pt.): all clock numbers must be present with no additional numbers; numbers must be in the correct order and placed in the approximate quadrants on the clock face; Roman numerals are acceptable; numbers can be placed outside the circle contour;
- Hands (1 pt.): there must be two hands jointly indicating the correct time; the hour hand must be clearly shorter than the minute hand; hands must be centred within the clock face with their junction close to the clock centre.

A point is not assigned for a given element if any of the above-criteria are not met.

MoCA Version November 12, 2004
© Z. Nasreddine MD

www.mocatest.org

4. **Naming:**

Administration: Beginning on the left, point to each figure and say: *"Tell me the name of this animal".*

Scoring: One point each is given for the following responses: (1) camel or dromedary, (2) lion, (3) rhinoceros or rhino.

5. **Memory:**

Administration: The examiner reads a list of 5 words at a rate of one per second, giving the following instructions: *"This is a memory test. I am going to read a list of words that you will have to remember now and later on. Listen carefully. When I am through, tell me as many words as you can remember. It doesn't matter in what order you say them".* Mark a check in the allocated space for each word the subject produces on this first trial. When the subject indicates that (s)he has finished (has recalled all words), or can recall no more words, read the list a second time with the following instructions: *"I am going to read the same list for a second time. Try to remember and tell me as many words as you can, including words you said the first time."* Put a check in the allocated space for each word the subject recalls after the second trial.

At the end of the second trial, inform the subject that (s)he will be asked to recall these words again by saying, *"I will ask you to recall those words again at the end of the test."*

Scoring: No points are given for Trials One and Two.

6. **Attention:**

Forward Digit Span: Administration: Give the following instruction: *"I am going to say some numbers and when I am through, repeat them to me exactly as I said them".* Read the five number sequence at a rate of one digit per second.

Backward Digit Span: Administration: Give the following instruction: *"Now I am going to say some more numbers, but when I am through you must repeat them to me in the backwards order."* Read the three number sequence at a rate of one digit per second.

Scoring: Allocate one point for each sequence correctly repeated, (*N.B.*: the correct response for the backwards trial is 2-4-7).

Vigilance: Administration: The examiner reads the list of letters at a rate of one per second, after giving the following instruction: *"I am going to read a sequence of letters. Every time I say the letter A, tap your hand once. If I say a different letter, do not tap your hand".*

Scoring: Give one point if there is zero to one errors (an error is a tap on a wrong letter or a failure to tap on letter A).

© Z. Nasreddine MD

APPENDIX E

Ethical Clearance – HREC University of Witwatersrand

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Miss Thembeka Victoria Maredi

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M180423

NAME: (Principal Investigator)	Miss Thembeka Victoria Maredi
DEPARTMENT:	Occupational Therapy 1 Military Hospital
PROJECT TITLE:	Factors influencing retention of patients with Traumatic Injury in the South Africa African National Defence Force
DATE CONSIDERED:	04/05/2018
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Kirsty van Stormbroek
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	18/09/2018

APPENDIX F

Ethical Clearance 1 Military Hospital

RESTRICTED

1MH/302/6/03.01.2018

sa military health service
Department:
Defence
REPUBLIC OF SOUTH AFRICA

Telephone: 012 314 0013
Facsimile: 012 314 0013
Enquiries: Prof / Lt Col M.K. Baker

1 Military Hospital
Private Bag x 1023
Thaba Tshwane
0143
10 August 2018

CLINICAL TRIAL APPROVAL: 03.01.2018: "FACTORS THAT INFLUENCE RETENTION OF TRAUMATIC BRAIN INJURY PATIENTS IN SANDF"

1. The 1 Military Hospital Research Ethics Committee (1MHREC) registered in South Africa with the National Health Research Ethics Council (NHREC) (REC-111208-019-RA) adhering to GCP/ICH and SA Clinical Trial guidelines, evaluated the above-mentioned protocol and additional documents.

2. The following documents were evaluated:

   a. Personalised covering letter from investigator
   b. Research proposal
   c. Patient Information and Informed Consent Document
   d. Member Questionnaire
   e. Montreal Cognitive Assessment Document
   f. Rationale for Inclusion of Question Items on both Questionnaires

Permission to conduct research

Permission Letter

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Department of Occupational Therapy
Wits Education Campus

School of Therapeutic Sciences, Faculty of Health Sciences, 7 York Road, Parktown, 2193, South Africa
Tel: +27 11 717 3701 | Fax: +27 717 3709 | Email: leilane.bogoshi@wits.ac.za | **www.wits.ac.za**

To: CEO 1 Military hospital

Dear Sir,

Request for permission to conduct research I Thembeka Maredi, am a registered Masters student in the Department of Occupational Therapy at the University of Witwatersrand. My supervisor is Kirsty van Strombroek.

The proposed topic of research is: Factors that influence retention of Traumatic Brain Injury patients in SANDF.

Although patients with traumatic brain injuries do *return* to active service and other work roles in the SANDF, not all patients are *retained* in these positions. It is not known what factors affect the retention of persons with traumatic brain injuries in work roles in the SANDF and this project aims to find out what those factors are. This may assist occupational therapists treating patients with traumatic brain injuries in the *RTW* intervention in future.

The objectives of the research are:

a. To determine demographic factors (age, race, gender, marital status and educational level) associated with patients diagnosed with TBI in active service the SANDF, after RTW.
b. To determine barriers and facilitators influencing retention or non-retention in the SANDF as a perceived by patients diagnosed with TBI after RTW.
c. To determine the cognitive function of TBI patients who were retained or not retained in active service in the SANDF after RTW.
d. To determine the association between demographic factors, perceived barriers and facilitators, and cognitive function of TBI patients who were retained or not retained in active service in the SANDF after RTW.

I am hereby seeking your permission to conduct the research. To assist you in reaching a decision, I have attached to this letter.

a. A copy of ethical clearance certificate issued by the university.
b. A copy of research questionnaires which I intend using in my research.

Should you require any information, please do not hesitate to contact me or my

supervisor. Upon completion of the study, I undertake to provide you with a bound copy of the research report.

For any ethical concerns please contact the chairperson of the Human Research Ethics Committee at the University of Witwatersrand,
Prof C Penny at clement.penny@wits.ac.za Contact details for the administrative offices: Ms. Z Ndlovu/ Mr Rhulani Mkansi/ Tel: 011 717 2700/2656/1234/1252, or email: Zanele.ndlovu@wits.ac.za; Rhulani.mkansi@wits.ac.za;

Your permission to conduct this study will be greatly appreciated.

Yours sincerely

Thembeka Maredi

Msc student

APPENDIX G

sa military health service
Department:
Defence
REPUBLIC OF SOUTH AFRICA

INFORMATION SHEET FOR PARTICIPANTS

Dear Service Force Member

I, Thembeka Maredi, am a registered Masters student in the Department of Occupational Therapy at the University of Witwatersrand. My supervisor is Kirsty van Stormbroek. I am doing research to understand the factors that help, or make it difficult for service force members to remain in active service after they have had a traumatic brain injury (head injury).

Although many service force members with traumatic brain injuries return to active service and other work roles in the SANDF, not all of these members remain in these positions/jobs. It is not known what factors help members to remain in their positions, and what factors make it difficult for them to remain in active service. This research project aims to find out what these factors are so that service members with traumatic brain injuries may be better helped by occupational therapy services to remain in active service.

I am inviting you to take part in this study. This information sheet is given to help you understand why the study is being done and to decide if you would like to participate. Please read the information on what the project involves below. If you have any questions please feel free to ask.

The purpose of the study

To investigate the factors that help and the factors that make is difficult for service members who have had a Traumatic Brain Injury (head injury)) to remain in active service in the SANDF. **What does the study involves:**

If you choose to take part in the study, it will take about 30 minutes of your time. In this time, the researcher will ask you a few questions to see how you are able to think and remember. She will then give you a questionnaire to fill in which focuses on the factors that help or make it more difficult to remain in active service in the SANDF after having a head injury. If you prefer, the researcher can read through the questionnaire with you and fill in your answers for you.

Your rights as a participant:

It is entirely your choice to take part in the study you can refuse to take part or stop at any time without giving any reason and without any consequences.

Confidentiality

If you choose to participate in the study, the information that you share with the researcher is strictly confidential. Your name will only be known to the researcher and will be kept separate from all the information that you share. No names will appear on data sheets and will not be published in the results of the study.

If you would like a copy of the research results once these become available, please let the researcher know.

For any concerns please contact me on 012 314 0850/ thembimaredi2gmail.com

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg ("Committee"). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Regards

Thembeka Maredi

APPENDIX H



sa military health service

Department:
Defence
REPUBLIC OF SOUTH AFRICA

Informed Consent for patients

I understand that taking part in the research will take about 30 minutes. My ability to think and remember will first be assessed by researcher. I will then complete a questionnaire (with or without the help of the researcher) about the factors that help or make it difficult to remain in active service in the SANDF after a head injury.

I have read the aims and objectives of the research and I was able to ask questions. Any question that I had was answered by the researcher. I have not been forced to participate in any way.

I understand that taking part in this project is my choice and that I may stop at any time, and without giving reasons. I am aware that the results of this project will be used to support service members who have had a head injury in returning to work and remaining in active service. The results of the research may be published in a journal but my privacy will be guaranteed.

I am aware that I shall receive a signed and dated copy of this informed consent document. I hereby give consent to participate in this project.

Name of participant_____

Signature of participant_____

Place_____

Date_____

Witness_____Signature_____

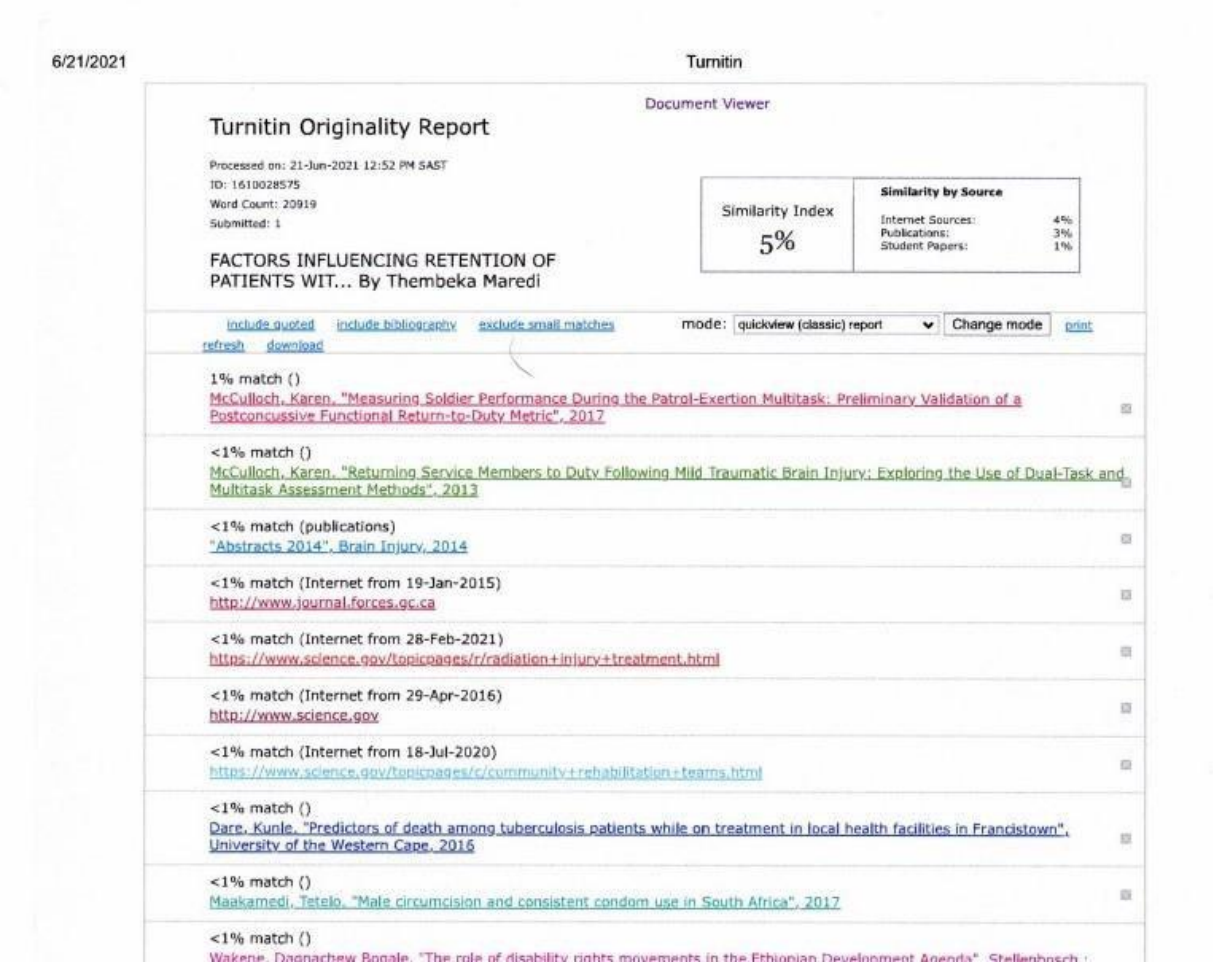
Statement by the researcher

I have provided verbal and written information regarding this project in a language that is fully understood by the participant.

I agree to answer any future questions concerning the project as best as I can.

APPENDIX I

Turnitin Report



6/21/2021 Turnitin

Document Viewer

Turnitin Originality Report

Processed on: 21-Jun-2021 12:52 PM SAST
ID: 1610028575
Word Count: 20919
Submitted: 1

FACTORS INFLUENCING RETENTION OF PATIENTS WIT... By Thembeka Maredi

Similarity Index	Similarity by Source	
5%	Internet Sources:	4%
	Publications:	3%
	Student Papers:	1%

include quoted include bibliography exclude small matches mode: quickview (classic) report Change mode print refresh download

1% match ()
McCulloch, Karen, "Measuring Soldier Performance During the Patrol-Exertion Multitask: Preliminary Validation of a Postconcussive Functional Return-to-Duty Metric", 2017

<1% match ()
McCulloch, Karen, "Returning Service Members to Duty Following Mild Traumatic Brain Injury: Exploring the Use of Dual-Task and Multitask Assessment Methods", 2013

<1% match (publications)
"Abstracts 2014", Brain Injury, 2014

<1% match (Internet from 19-Jan-2015)
http://www.journal.forces.gc.ca

<1% match (Internet from 28-Feb-2021)
https://www.science.gov/topicpages/r/radiation+injury+treatment.html

<1% match (Internet from 29-Apr-2016)
http://www.science.gov

<1% match (Internet from 18-Jul-2020)
https://www.science.gov/topicpages/c/community+rehabilitation+teams.html

<1% match ()
Dare, Kunle, "Predictors of death among tuberculosis patients while on treatment in local health facilities in Francistown", University of the Western Cape, 2016

<1% match ()
Maakamedi, Tetelo, "Male circumcision and consistent condom use in South Africa", 2017

<1% match ()
Wakene, Dagnachew Bogale, "The role of disability rights movements in the Ethiopian Development Agenda", Stellenbosch