Moderating Variables in Medical Help-Seeking Following Traumatic Brain Injuries

Research Project

Robyn Mazriel (MZRROB001)

Miranda Moodley (MDLMIR001)

ACSENT Laboratory

Department of Psychology, University of Cape Town

Supervisor: Dr Leigh Schrieff-Elson

Co-Supervisors: Nicholas Reid and Prof Paul Jantz

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NAME: Robyn Mazriel, Miranda Moodley

SIGNATURE: R.Mazriel, M.Moodley

STUDENT NUMBER: MZRROB001, MDLMIR001

ABSTRACT

Traumatic Brain Injury (TBI) is a major cause of disability and death around the world with an annual worldwide prevalence rate ranging from 47 to 618 per 100 000 people (Feigin et al., 2013). TBI has significant long-term (cognitive, behavioural, social) effects on the world's population, which is compounded in resource-poor countries like South Africa. However, many people still do not seek medical help post-TBI. Much of the population have misconceptions regarding TBI which contributes towards poor help-seeking behaviours post TBI. Much of the current literature on medical help-seeking behaviours post-TBI stems from high-income countries while very little information is published on misperceptions of TBI in multicultural, developing world countries, such as South Africa. Therefore, this study aims to better understand what influences people's decisions to seek medical help after receiving a head injury in a South African context. An adapted online survey was administered to 384 first year psychology students at the University of Cape Town (UCT). This study used descriptive analyses to describe current head injury etiology, symptomatology and beliefs regarding injury and management, while multiple regression analyses investigated what variables are likely to predict medical help-seeking behaviours following concussion / mild head injury. Results indicate that having sustained a head injury does not actually predict accurate knowledge and appropriate attitudes towards (mild) head injuries. Additionally, race, gender and socio-economic status proved to be significant predictors of concussion knowledge and concussion attitudes. In conclusion, identifying misconceptions of this nature in a South African context is necessary to inform interventions that may seek to provide appropriate psychoeducation, which may in turn facilitate optimal health-seeking behaviours.

Introduction

Traumatic Brain Injury (TBI) is a major cause of disability and death around the world with an annual worldwide prevalence rate ranging from 47 to 618 per 100 000 people (Feigin et al., 2013). Nell and Brown (1991) previously reported that the annual incidence rate of TBI in South Africa as 361 per 100 000 people. Despite its prevalence, TBI has been termed a silent epidemic because it often goes unrecognized and underreported due to its 'invisible' (i.e., less apparent neurocognitive, emotional and behavioural) effects (McClure, 2011).

TBI has significant long-term effects on the world's population, particularly in developing countries such as South Africa (Jones et al., 2016; Schrieff-Elson, Thomas, & Rohlwink, 2017). These effects include cognitive, behavioural, academic, psychiatric and psychosocial sequelae. There is also a huge economic burden associated with TBI and these adverse effects are more pronounced in developing countries. Despite these effects, many people still do not seek medical help following TBIs of varying severities (Corrigan, Selassie, & Orman, 2010; Gouvier, Prestholdt, & Warner, 1988; McClure, 2011). This is problematic, as even mild TBIs (mTBI) can have far reaching effects on brain and bodily functioning (Corrigan et al., 2010).

Definition and Mechanisms of TBI

There is no universal definition of TBI that spans all healthcare disciplines. Neurologists, neuropsychologists, and psychiatrists use different definitions and criteria that are specific to their field (McClure, 2011). However, TBI is often described as a brain injury that occurs because of an external blunt or penetrating force to the head that causes functional impairment and affects a person's consciousness (Jones et al., 2016; McClure, 2011; Oosthuizen, 2010).

Generally, TBI's are classified as mild, moderate or severe, commonly determined by the Glasgow Coma Scale, a score out of 15 based on motor, verbal and eye-opening responses (Nguyen et al., 2016); the lower the score, the more severe the TBI (Risdall & Menon, 2011). The main causes of TBI are motor vehicle accidents (MVAs), assault, violence, workplace injuries, sport activities and falls (Langlois, Rutland-Brown, & Wald, 2006; Oosthuizen, 2010). These injuries are associated with a range of cognitive (e.g., memory problems), behavioural (e.g., disinhibition), emotional (e.g., irritability), and social (e.g., unemployment) sequelae (Babikian, Merkley, Savage, Giza, & Levin, 2015).

Even with tools used to classify TBI, many cases are misdiagnosed. mTBI is especially prone to misdiagnosis as symptoms, which could easily be missed, usually appear within the first few hours following the brain trauma and for most individuals, dissipate relatively quickly when compared to more severe forms of TBI (Corrigan et al., 2010; Hyder, Wunderlich, Puvanachandra, Gururaj, & Kobusingye, 2007). This makes the initial diagnosis important, as a correct capturing of initial symptoms can aid in the identification of symptoms that need to be monitored over time. However, if universal definitions are not put in place, many initial symptoms will not be considered relevant to the diagnosis (Corrigan et al., 2010; Hyder et al., 2007).

Definitional Inconsistencies

Nguyen et al. (2016) conducted a systematic review on the incidence of TBI which showed that epidemiological data varies among different studies due to the varying and sometimes vague definitions of TBI across studies. Head injury and TBI are terms which are often used interchangeably in TBI research, however Bruns & Hauser (2003) suggests that TBI indicates a trauma to the brain which interferes with brain functioning, while head injury involves no trauma to the brain, but rather involves trauma to the head, scalp or skull.

Definitional inconsistencies are also evident for mTBIs, otherwise referred to as concussions (Carroll, Cassidy, Holm, Kraus, & Coronado, 2004; Ruff & Jamora, 2009). There is no universally accepted definition for mTBI or concussion, and this has implications for both the diagnosis and treatment thereof (Bryant, 2008).

Additionally, although definitions of concussion have generally included a loss of consciousness, this has changed over time (Halstead & Walter, 2010). This inconsistency has resulted in constant debate over whether loss of consciousness is a required symptom for mTBI diagnoses, and therefore part of the definition. These limitations regarding mTBI diagnoses will also result in many individuals who sustain such injuries going misdiagnosed and untreated.

Misconceptions and misinformation

These inconsistencies in defining TBI in its various forms can contribute to misconceptions regarding the injury. There are several studies which have investigated such misconceptions about TBIs. Some of these misconceptions revolve around amnesia, recovery and post injury symptoms of TBI (Gouvier et al., 1988; Hooper, 2006; McClure, 2011). For example, a study conducted by Gouvier et al. (1988) with 221 individuals from the general public of South Louisiana, showed that their sample held significant misconceptions with regards to amnesia, unconsciousness, and recovery. For example, participants in that study believed that once patients awoke from a coma they would be normally responsive and that a second blow to the head could restore a patient's lost memories. However, this is incorrect as patients emerging from a TBI-related coma are often disorientated and can have short term memory loss aside from the possible long term effects (Gouvier et al., 1988; McClure, 2011; Pretorius & Broodryk, 2013).

Most of the participants also believed that recovery was the responsibility of the patient and that a full recovery even from severe TBI was possible (Gouvier et al., 1988). This too is incorrect as severe TBI has many long-term effects, which patients seldom recover from completely (Gouvier et al., 1988; Hooper, 2006; Pretorius & Broodryk, 2013). This misconception could be due to the 'invisibility' of cognitive and behavioural sequelae post-TBI, which often results in people overlooking its severity and therefore believing that a full recovery is possible (McClure, 2011).

In other related studies, Guilmette and Paglia (2004), Pretorius and Broodryk (2013), and Willer, Johnson, Rempel, and Linn (1993) all found that their participants held similar misconceptions about TBI and recovery to the participants in the Gouvier et al. (1988) study. These misconceptions were often shared by families, patients, and medical practitioners. Recovery expectations by friends and family places undue pressure on patients who have sustained a TBI as their loved ones expect them to fully recover when they are still struggling to adjust to their impaired functioning (Gouvier et al., 1988; McClure, 2011; Mokhosi & Grieve, 2004; Pretorius & Broodryk, 2013).

Besides the general public, researchers have found that healthcare providers and educators also hold misconceptions about TBI (Ernst, Trice, Gilbert, & Potts, 2009; Swift & Wilson, 2001; Yuhasz, 2013). These include school psychologists (Hooper, 2006), nursing students (Ernst et al., 2009) and rehabilitation staff and their educators (Farmer & Johnson-Gerard, 1997). One of the common misbeliefs among health care practitioners for example, was that patients with mTBI had a set recovery time with complete recovery after this period. However, even with mTBI, the recovery trajectory varies from patient to patient and some effects can persist for weeks after physical recovery (Alexander et al., 2009; Hooper, 2006; McClure, 2011; Pretorius & Broodryk, 2013).

These results are worrisome as healthcare providers and educators play an important role in the recovery of TBI patients, as well as in informing survivors and their families about the rehabilitation process. Having health care providers and educators who do not know the full extent of a patient's injury and who do not understand the recovery trajectory, can result in incorrect information being communicated to their friends and family, which can hinder their recovery (Alexander et al., 2009; Pretorius & Broodryk, 2013).

Furthermore, many studies have found the media to be a significant source of misinformation about TBI (Casarett, Fishman, MacMoran, Pickard, & Asch, 2005; Gouvier et al., 1988; Pretorius & Broodryk, 2013). Recoveries are often romanticised, which create unrealistic expectations of full recoveries for patients, especially those with severe TBI. These unrealistic expectations can often cause patients to adjust poorly to living with their symptoms, including becoming depressed as a result of their presumed delayed recovery relative to what is portrayed in the media (Gouvier et al., 1988; Mokhosi & Grieve, 2004).

Media such as talk shows and soap operas were frequently cited by participants in Gouvier et al. (1988) study as sources of information about TBI. However, these television shows' portrayals of TBI are often inaccurate. For example, Casarett et al. (2005) evaluated the portrayal of TBI and comas in 19 different soap operas and found these portrayals to be unrealistic and optimistic with most patients making a full and quick recovery. In reality, TBI can cause long-term and sometimes permanent disability, especially if severe (Guilmette & Paglia, 2004).

The studies discussed above illustrate that misconceptions about TBI appear to be widespread. However, the samples used in these studies were mainly from the United States of America (Gouvier et al., 1988; Guilmette & Paglia, 2004) and Canada (Willer et al., 1993). Therefore, the data generated by these studies cannot be fully generalized to other contexts, such as to South Africa, with its unique multicultural context.

With South Africa's cultural diversity, come different cultural beliefs including those about TBI. For example, in some (e.g., Black African) cultures, individuals believe that an injury, illness, or tragedy occurs because of witchcraft, ancestral influence or God's will.

Consequently, the way to deal with these misfortunes is to consult with the elders and ancestors of a family, with the treatment resulting in specific rituals being carried out rather than following Western medicine (Mokhosi & Grieve, 2004; Oosthuizen, 2010).

TBI patients across cultures in the study conducted by Mokhosi and Grieve (2004) had a skewed perception of their level of neuropsychological functioning. Despite reporting impairments in learning, planning and memory, these participants had minimal understanding of their impaired functioning. In cases where patients were self-aware of their abilities, depression and anxiety emerged due to feelings of inadequacy (Mokhosi & Grieve, 2004). Mokhosi and Grieve (2004) also showed that African families held onto traditional expectations of the family member who suffered a TBI to carry out their designated chores, despite their injuries.

Results of the few studies of this nature done on TBI in South Africa show that socioeconomic status is also a significant factor that contributes to the understanding of TBI and its recovery process (Levin, 2004; Mokhosi & Grieve, 2004; Oosthuizen, 2010). SES is related to income which can impact on an individual's decision to seek medical care. A significant proportion of South Africans do not have access to healthcare due to poor resource allocation and low SES, and this in turn negatively affects the treatment and rehabilitation of TBI patients (Levin, 2004; Oosthuizen, 2010). In terms of other demographic factors (e.g., race and age) and their impact on understanding TBI/HI's and resulting help-seeking behaviours, research is limited locally and globally. In one recent study – Wallace, Covassin and Moran (2017) found racial differences in their study on concussion knowledge among adolescent athletes. The authors note that race is a proxy for SES and systemic healthcare disparity which impacts help-seeking behaviours.

Impact on help-seeking behaviours

Difficulties in understanding or being misinformed about TBI-related symptoms and recovery can impact the way in which patients view their injuries and consequently their help-seeking behaviours post-injury. For example, many patients do not appreciate that even mTBI can result in post-injury symptomatology, because such a slight knock to the head *should* not cause them any harm and they therefore do not need to seek medical intervention (Pretorius & Broodryk, 2013).

In cultures in which modern medicine is secondary to traditional beliefs and it is difficult to advocate for medical diagnoses and treatment, patients could engage in activities that could worsen their prognosis and recovery (Mokhosi & Grieve, 2004; Oosthuizen, 2010; Pretorius & Broodryk, 2013). For example, a miner with an untreated TBI could be going back to work too soon in conditions that are hazardous to their health. Miners are often surrounded by debris and even a small knock to the head could worsen the post-injury condition. Hence, incorrect help-seeking behaviours and beliefs about TBI can often result in severe repercussions that can further affect functioning.

In sum, differences in how TBI is defined, portrayed, and consequently understood can result in misinformation and misconceptions about TBI, both in terms of severity and recovery trajectories. Hence, providing sufficient knowledge about TBI and its long term effects is important for providing appropriate care. Much of the published literature on this topic stems from studies in high income countries. However, very little is published on misperceptions of TBI in developing world settings like South Africa. Results from the few South African specific studies show that socioeconomic and cultural factors play significant roles in the misunderstanding of TBI and recovery. More studies on these topics are needed to identify misconceptions in a South African context specifically, to understand why people seek alternative or no forms of help post TBI.

Research Aims & Questions

The aim of this study was to better understand what influences people to seek or not seek medical help after sustaining a head injury or TBI (HI/TBI), which results in them being knocked out, experiencing memory loss, and/or being dazed and confused. This study also aimed to understand the kind of help people do seek after a head injury or TBI. Through this study, we investigated these outcomes and the moderating variables associated with help-seeking following TBI, including myths and misconceptions, in South Africa.

Methods

Design and Setting

This study took place at the University of Cape Town and was conducted through an anonymous structured online survey (see Appendix A). This study is positioned within a larger ongoing quantitative research project from the Texas State University lead by Prof Paul Jantz, the aims of which are consistent with those of the current study. The current study was exploratory in nature and aimed to identify prominent variables relevant to medical help-seeking behaviours.

Participants

We used convenience-sampling techniques to recruit participants in the current study. All students who are enrolled in the first-year psychology courses at the University of Cape Town (UCT) were invited to participate in this study. Participants included students of both sexes, fluent in English and ≥ 18 years. Recruitment was done by circulating an advertisement (see Appendix B) to the first-year psychology students using the Department's Student Research Participation Programme (SRPP). Researchers registered in the Department of Psychology at UCT may use this program to recruit participants for their research studies. Undergraduate students registered for psychology courses at UCT are required to participate in research studies to earn SRPP points to be awarded a duly performed certificate (DP) required to write the final course exam.

Inclusion and exclusion criteria: In terms of inclusion criteria, the study sample was restricted to 2017 first year psychology students at UCT with the demographic profile described under participants. Because this study is part of a larger project, which was started at the Texas State University, the sample criteria are similar in nature. Further, the reason that we only included first year students is because second and third year students may have more academic knowledge regarding help-seeking behaviours of HI/TBI, as they may have been exposed to information on this topic during their studies. Exclusion criteria was therefore being <18 years and not being a first-year psychology at UCT.

Measures

This study made use of a single online survey on the Qualtrics platform, hosted at Texas State University. Two adapted self-report measures are incorporated into the survey, the general aim of which is to investigate myths and misconceptions regarding head injury or TBI (including concussions). Additionally, basic demographic questions (e.g., about race, gender, household income and country of origin) were added to understand the sample characteristics. The survey (see Appendix A) employs a combination of response formats including Likert-type scales, dichotomous scales and open-ended questions. In most cases, the open-ended questions required individuals to elaborate on their responses to the scales. The measures incorporated in this survey, are described below.

A Survey of Common Misconceptions about Head Injury and Recovery (CM-TBI). This survey is a commonly used self-report measure, developed to assess the myths and misconceptions individuals hold regarding TBI/head injury and help-seeking behaviours (Linden, Braiden, & Miller, 2013). It is a 40-item measure with each of the survey questions grouped into 7 different domains focusing on specific topics which include: prevention, brain damage, brain injury sequelae, unconsciousness, amnesia, recovery and rehabilitation. There are three to seven items within each domain (Linden et al., 2013).

The items are scored either on a 5-point Likert scale ranging from 1-5 (1 = *Not likely* to 5 = *Very likely*) or a dichotomous scale (e.g. 1 = *True*, 2 = *False*). Participants are also encouraged to provide qualitative feedback in the form of open-ended questions that prompt them to explain their choice of answer for certain questions where the reasoning for their responses may not be clear or elaboration might be helpful.

An initial validation study conducted by Linden et al. (2013) in Northern Ireland, showed that the CM-TBI possessed adequate levels of internal reliability ($\alpha = .75$).

We made use of an adapted version of the questionnaire. Examples of the adaptations are: United States military-related questions were removed as they are not relevant to the South African context. We also changed some of the words (e.g., freshman, all-terrain vehicles and sidewalk) to more commonly used South African words (e.g., first years, 4x4s, and pavement, respectively).

Rosenbaum Concussion Knowledge and Attitudes Survey (RoCKAS-ST). The original aim of this survey was to record the knowledge and attitudes of high-school students regarding concussions (Rosenbaum & Arnett, 2010). This measure, which includes an assemblage of several items from previous TBI/mTBI surveys, has 55 items, divided into 5 sections (Rosenbaum & Arnett, 2010). However, some of the survey items were altered to improve participant comprehension and was further adjusted to a South African context for this study, as previously outlined for the CM-TBI.

The survey used a true/false dichotomous scale as well as a 5-point Likert scale (where 1 = *strongly disagree* and 5 = *strongly agree*). Two total scores comprising the Concussion Attitudes Index (CAI) (range = 1-27) and the Concussion Knowledge Index (CKI) (range = 1-75) is then calculated, where higher scores represent safer attitudes and more knowledge, respectively, regarding concussion.

This measure shows fair to satisfactory test–retest reliability (knowledge items, $r = .67$; attitude items, $r = .79$). Rosenbaum and Arnett (2010) validated this survey and found that internal consistency was adequate ($\alpha = .59$-$.72$).

Procedure

Once we received ethical approval from the Department of Psychology's Research Ethics Committee at UCT (see Appendix C) for our study, we circulated an email (see Appendix B) inviting first year psychology students to participate in the online survey SRPP tab on Vula (UCT's intranet platform. They were then directed to a survey page which began with an informed consent form (see Appendix D) and only those who consented to participate could continue with the survey. The survey was run on two different occasions, one per semester for a window of 3-4 weeks. Once a participant completed the survey, they were thanked for participation and directed to another form, where they could submit their student numbers so that their SRPP points (2 out of the 3 required for the semester) could be allocated. Participants were also emailed a debriefing document once the data collection period was completed (see Appendix E)

Data Analysis

This study made use of the statistical software package SPSS (Version 24). For all analyses, a significance level of $p < .05$ was used. Statistical assumptions were checked and if the assumptions were not upheld, the necessary corrections were implemented.

We calculated descriptive statistics (*M, SD, %*) for sociodemographic variables related to the sample. Independent sample t-tests and chi-squared tests of contingencies were then calculated to investigate between-group differences (i.e. HI/TBI vs no HI/TBI) on sociodemographic variables. We also calculated descriptive statistics for head injury symptomology, misconceptions and concussion knowledge and attitudes items.

Lastly, we ran two forward stepwise regression analyses. to determine the predictive power of head injury, age, gender, major, race, SES, medicinal practices on 1) the *Rosenbaum CKI*, and 2) the *Rosenbaum CAI.*

Ethical Considerations

Before any questions were answered, participants completed an online consent form (Appendix D). This form informed participants of the basic nature of the survey such as the risks and rewards as well as the fact that their answers are confidential and that the publication of results would not include any identifying information.

Confidentiality and Anonymity. All information collected from participants was kept confidential. We made use of participant numbers and not names in all the data analyses, as surveys were completed anonymously. Any personal information collected was for record-keeping purposes and for assigning SRPP points and this information was gathered separately from the survey data and could not be tied to survey responses. Additionally, all data was stored on a password protected laptop that only the researchers and their supervisors accessed.

Possible Risks. For participants who had experienced a HI/TBI, there was a risk that answering the survey questions about previous HI/TBIs could have brought up unsettling feelings. Therefore, participants were encouraged to contact the university mental health provider if they felt unsettled as stated in Appendix D.

Additionally, with the survey being online, the internet risk for this study was minimized by placing the survey on a secure server located at the Texas State University, with access through our own secure, password protected university intranet platform, Vula.

Compensation. Participants received compensation in the form of 2 SRPP points for completing the survey which took approximately 40-60 minutes to complete.

Debriefing. After the study, participants were debriefed via email (Appendix E). The relevant contact details of who to contact if any problems were experienced was also given to participants as part of debriefing.

Results

Sample Characteristics

The final sample size for the study was *N*=374. Table 1 presents the key characteristics of the study sample. All participants were between 18 and 44 years old. However, the modal age was 19, with 97.1% of the sample younger than 22 years old. There was no significant difference in terms of age for HI/TBI and no HI/TBI groups, with the mean age being 19 years for both groups ($t(380) = .29$, $p = .77$). Most participants were female. Regarding race, most participants who reported on their race were white (35.8%) followed by Black African (27.7%). Majority of the sample responded to using Western medicine (66.8%).

Of the sample, 147 (38.3) responded that they had previously sustained a head injury. Gender proved to be the only sample characteristic with a significant between group difference, when comparing those with reported HI/TBI to those with no reported HI/TBI on the demographic variables. Males made up most the head injury group (59.3%). However, age, major, race, SES and medicinal practices did not show a significant between-groups difference regarding participants who had a head injury or not.

Table 1

Sociodemographic Characteristics of the Current Sample (N =384)

Variable	Total Sample	Head	No Head	χ^2	*P*	ESE
Gender	384 (100)	147 (38.3)	237 (61.7)	22.3	.00	.24
Male	81 (21.1)	48 (32.65)	33 (13.92)			
Female	293 (76.3)	93 (63.27)	200 (84.39)			
Race						
Prefer not to respond	10 (2.6)	6 (4.08)	4 (1.69)			
Black African	106 (27.7)	37 (25.17)	69 (29.11)			
Coloured	96 (25.1)	39 (26.53)	57 (24.05)			
White	137 (35.8)	52 (35.37)	85 (35.86)			
Indian	19 (5)	7 (4.76)	12 (5.06)			
Asian	5 (1.3)	3 (2.04)	2 (0.84)			
Other	2 (0.5)	1 (0.68)	1 (0.42)			
Prefer to not respond	18 (4.7)	7 (4.76)	11 (4.64)			
Socio-Economic Status (SES)	384 (100)	147 (38.3)	237 (61.7)	9.54	.30	.16
Lowest	34 (8.9)	12 (8.16)	22 (9.28)			
Second lowest	30 (7.8)	14 (9.52)	16 (6.75)			
Low emerging middle	32 (8.3)	11 (7.48)	21 (8.86)			
Emerging middle	24 (6.3)	7 (4.76)	17 (7..17)			
Lower middle	27 (7)	11 (7.48)	16 (6.75)			
Upper middle	37 (9.6)	16 (10.88)	21 (8.86)			
Upper income /Emerging affluent	33 (8.6)	17 (11.56)	16 (6.75)			
Affluent	9 (2.3)	6 (4.08)	3 (1.27)			
I don't know	158 (41.1)	53 (36.05)	105 (44.30)			

Variable	Total Sample	Head Injury	No Head Injury	χ^2	*P*	ESE
Medicine	383 (99.7)	147 (38.4)	236 (61.6)	2.53	.64	.08
Homeopathic	15 (3.9)	6 (4.08)	9 (3.80)			
Western	256 (66.8)	99 (67.34)	157 (66.24)			
Combination	100 (26.1)	40 (27.21)	60 (25.31)			
Traditional	6 (1.6)	1 (0.68)	5 (2.11)			
Other	6 (1.6)	1 (0.68)	5 (2.11)			

Note. For the variables *Major, Gender, Race, SES and Medicine* raw numbers are presented with percentage (relative to the overall sample *N*=384) in parentheses. ESE = effect size estimate (in this case, Cohen's *d* for t-tests and Cramer's *V* for chi-squared tests of contingency and Fisher's exact tests).

Medical care and help-seeking surrounding head injury.

Of the participants who reportedly sustained HI/TBIs, just over half of the participants sought medical care after their HI/TBI. Of these, 13.6 % sought help from family members, 7.7% sought help from a coach or trainer, 58.5% sought face-to-face help from medical professions, and 1.4% sought help from a doctor on the phone/internet. Just over a third of the participants (36.36%) reportedly received a medical diagnosis. The most common medical diagnosis amongst these participants was concussion (24/28; 85.7%), followed by mTBI (3/28; 10.7%). One participant did not have a head injury diagnosis.

The other 49% of participants who did not seek medical care after their head injury mentioned that they did not think it was serious enough or necessary (73.61%), medical care was too expensive (4.16%), they were advised by family and friends instead (6.94%), saw medical personnel at the scene so they did not have to seek medical help afterwards (6.94%), or there were no facilities close by (4.17%). Two participants (2.78%) who did not seek medical help after the head injury sought medical help at a later stage from a school nurse and a doctor.

Mechanism of Head Injury. The most common way in which participants sustained their HI/TBI was through sport or recreational activity (47.6%), followed by falls (21.8%). Motor vehicle accidents (MVAs) accounted for 8.2% of the sample's head injuries while unintentional assault by fists or objects, 4.8%. Accidents while on bicycles were experienced by 4.1% of the participants who had a head injury while intentional assault with fists or an object accounted for 2.7% of the HI/TBIs experienced. The rest of the responses (10.9%) could be accounted for by accidental injuries that were not assaults, (e.g., "unknowingly ran into something and hit my head in the process", "my cousins dropped me on my head and back when they were swinging me by my arms and legs", or "I turned and then I hit a pole").

Most participant HI/TBIs occurred in a sports or recreational area (34.69%), followed by head injuries occurring at their home (23.97%), on a street or highway (10.88%), at someone else's home (8.22%), in a public building (5.44%) and on a farm (4.11%). Responses that did not fit into any of these aforementioned categories (13.01%), reported places such as school, a restaurant and a train station. Most of these head injuries (97.66%) occurred while participants were in South Africa while 2.34% of head injuries took place in other countries (1.56% in high income countries such as the UK and .78% in middle income countries such as Bahrain).

The results in Table 2 suggest that most of the HI/TBIs sustained by participants were relatively mild as the majority of participants (% from previous table) responded to not being knocked out and having had memory loss for any amount of time. However, more than 80% of participants were dazed or confused after sustaining a head injury, although this was most often for less than 30 mins.

Table 2

Length of Time Symptoms Were Experienced for by Participants with Head Injuries (N = 147)

Symptom	Length of time					
	< 1min	1-30min	31min-24hrs	> 24hrs	Total	Not/no
Knocked out post- injury	27 (18.4)	17 (11.6)	1 (0.7)	1 (0.7)	46(31.4)	101 (68.7)
Dazed / confused	47 (32)	53 (36.1)	14 (9.5)	7 (4.8)	121(82.4)	26 (17.7)
Memory loss	3 (2)	11 (7.5)	3 (2)	3 (2)	20(13.5)	127 (86.4)

Note: N's are presented with % in brackets.

Common Misconceptions Regarding HI/TBI.

Table 3 presents the results of the number of participants with misconceptions about HI/TBI in the current study compared to results (for the same questions) reported by Pretorius and Broodryk (2013) for their Stellenbosch University sample. Results show that the amnesia

(53.26%) and unconsciousness (39.69%) were identified as the categories in which most participants had misconceptions, and brain damage (6.14%) as the category in which the fewest number participants had misconceived knowledge. These findings are consistent with that of Pretorius and Broodryk (2013), whose sample was slightly larger.

The items which most of the participants misconceived are printed in bold in Table 3. There were two items for which the outcomes were noticeably different between our sample and Pretorius and Broodryk (2013). Specifically, our sample had a higher percentage of misconceptions on items 3 and 9.

Table 3

Number of participants with misconceptions about TBIs: Items of the CM-TBI questionnaire

		Pretorius & Broodryk, 2013	Current study		
Category	**Item (Correct Response)**	**n = 705**	**Total n = 383**	**Head injury (n = 147)**	**No Head injury (n = 236)**
Prevention	1. You don’t need seatbelts as long as you can brace yourself before a crash (F)	28 (4)	6 (1.57)	4 (2.7)	2 (0.8)
	2. It is more important to use seatbelts on long trips than in driving around town (F)	94 (13.4)	40 (10.44)	17 (11.6)	23 (9.7)
	3. It is safer to be trapped inside a wreck than to be thrown clear (T)	293 (41.6)	**218 (56.92)***	**87 (59.2)**	**131 (55.5)**
	4. Wearing seatbelts causes as many injuries as it prevents (F)	170 (24.1)	63 (16.45)	24 (16.3)	39 (16.5)
	Mean (%)	147 (20.8)	81.75 (21.34)	33 (22.45)	48.75 (20.63)
Brain damage	5. A head injury can cause brain damage even if the person is not knocked out (T)	45 (6.3)	18 (4.7)	7 (4.8)	11 (4.7)
	6. A little brain damage doesn’t matter much, since people only use a part of their brains anyway (F)	23 (3.3)	6 (1.57)	2 (1.4)	4 (1.7)
	7. It is obvious that someone has brain damage because they look different from people who don’t have brain damage (F)	55 (7.8)	9 (2.35)	3 (2.0)	6 (2.5)
	8. Whiplash injuries to the neck can cause brain damage even if there is no direct blow to the head (T)	115 (16.3)	61 (15.93)	21 (14.3)	40 (16.9)

Category	**Item (Correct Response)**	**n = 705**	**Total n = 383**	**Head injury (n = 147)**	**No Head injury (n = 236)**
	Mean (%)	59 (8.4)	23.5 (6.14)	8.25 (5.63)	15.25 (6.45)
Brain injury sequelae	**9. It is common for people with brain injuries to be easily angered (T)**	302 (42.8)	**238 (62.14)***	**101 (68.7)**	**137 (58.1)**
	10. It is possible that a person's personality will change after a brain injury (T)	79 (11.2)	23 (6.01)	7 (4.8)	16 (6.8)
	11. Problems with speech, coordination, and walking can be caused by brain damage (T)	11 (1.6)	6 (1.57)	3 (2.0)	3 (1.3)
	12. Problems with irritability and difficulties controlling anger are common in people who have had a brain injury (T)	143 (20.3)	86 (22.45)	39 (26.5)	47 (19.9)
	13. Most people with brain damage are not fully aware of its effect on their behaviour (T)	146 (20.7)	60 (15.67)	20 (13.6)	40 (16.9)
	14. Brain injury patients usually show a good understanding of their problems because they experience them every day (F)	299 (42.4)	101 (26.37)	36 (24.5)	65 (27.5)
	15. Brain injuries may cause one to feel depressed, sad and hopeless (T)	63 (8.9)	33 (8.62)	10 (6.8)	23 (9.7)
	16. Drinking alcohol may affect a person differently after a brain injury (T)	63 (14.4)	52 (13.58)	16 (10.9)	36 (15.3)
	17. It is common for people to experience changes in behaviour after a brain injury (T)	43 (6.1)	25 (6.53)	14 (9.5)	11 (4.7)

Category	**Item (Correct Response)**	**n = 705**	**Total n = 383**	**Head injury (n = 147)**	**No Head injury (n = 236)**
	Mean (%)	132 (18.7)	69.33 (18.10)	27.33 (18.59)	42 (17.8)
Unconsciousness	18. When people are knocked unconscious, most wake up quickly with no lasting effects (F)	**381 (54)***	189 (49.35)	72 (49.0)	117 (49.6)
	19. People in a coma are usually not aware of what is happening around them (T)	328 (46.6)	142 (37.08)	56 (38.1)	86 (36.4)
	20. Even after several weeks in a coma, when people wake up, most recognize and speak to others right away (F)	265 (37.6)	125 (32.64)	47 (32.0)	78 (33.1)
	Mean (%)	**325 (46.1)***	**152 (39.69)***	**58.33 (39.7)**	**93.67 (39.7)**
Amnesia	21. People usually have more trouble remembering things that happen after an injury than remembering things from before (T)	242 (34.4)	176 (45.95)	69 (46.9)	107 (45.3)
	22. Sometimes a second blow to the head can help a person remember things that were forgotten (F)	100 (14.1)	80 (20.89)	24 (16.3)	56 (23.7)
	23. A person with a brain injury may have trouble remembering events that happened before the injury, but usually does not have trouble learning new things (F)	**438 (62.1)***	**223 (58.22)***	**87 (59.2)**	**136 (57.6)**
	24. People with brain injury can forget who they are and not recognise others, but be normal in every other way (F)	**621 (88)***	**337 (87.99)***	**134 (91.2)**	**203 (86.0)**
	Mean (%)	**350 (49.7)***	**204 (53.26)***	**78.5 (53.4)**	**125.5 (53.15)**

Category	Item (Correct Response)	n = 705	Total n = 383	Head injury (n = 147)	No Head injury (n = 236)
Recovery	25. Recovery from a brain injury usually is complete in about 5 months (F)	176 (24.9)	57 (14.88)	15 (10.2)	42 (17.8)
	26. Complete recovery from a severe brain injury is not possible, no matter how badly the person wants to recover (T)	331 (46.9)	**203 (53.00)***	**86 (58.5)**	**117 (49.6)**
	27. Once a person is able to walk again, his/her brain is almost fully recovered (F)	89 (12.6)	56 (14.62)	21 (14.3)	35 (14.8)
	28. Slow recovery may continue even 1 year after injury (T)	53 (7.6)	24 (6.27)	7 (4.8)	17 (7.2)
	29. People who have had one brain injury are more likely to have a second one (T)	**194 (70)***	**302 (78.85)***	**124 (84.4)**	**178 (75.4)**
	30. It is necessary for a person to go through a lot of physical pain to recover from a brain injury (F)	118 (16.8)	69 (18.02)	17 (11.6)	52 (22.0)
	31. Once a person with a brain injury realises where they are, they will always be aware of this (F)	189 (26.8)	82 (21.15)	28 (19.0)	53 (22.5)
	32. A person who has recovered from a head injury is less able to withstand a second blow to the head (T)	263 (37.3)	168 (43.86)	65 (44.2)	103 (43.6)
	33. A person who has a brain injury will be 'just like new' in several months (F)	64 (9.1)	26 (6.79)	9 (6.1)	17 (7.2)
	34. Asking persons who have had a brain injury about their progress is the most accurate, informative way to find out how they have progressed (F)	209 (29.7)	124 (32.38)	52 (35.4)	72 (30.5)

Category	Item (Correct Response)	n = 705	Total n = 383	Head injury (n = 147)	No Head injury (n = 236)
	35. It is good advice to remain completely inactive during recovery from a brain injury (F)	130 (18.5)	64 (16.71)	17 (11.6)	47 (19.9)
	36. Once a person recovering from a brain injury feels 'back to normal' the recovery process is complete (F)	71 (10)	34 (8.88)	10 (6.8)	24 (10.2)
	37. How quickly a person recovers depends mainly on how hard he or she works at recovering (F)	340 (48.2)	154 (40.21)	56 (38.1)	98 (41.5)
	Mean (%)	194 (27.6)	104.77 (27.35)	39 (26.54)	65.77 (27.86)
Rehabilitation	38. 'Cognitive' refers to thinking processes such as memory, attention and learning (T)	33 (4.7)	18 (4.70)	7 (4.8)	11 (4.7)
	39. 'Cognitive' refers to the ability to move your body (F)	166 (23.6)	35 (9.14)	14 (9.5)	21 (8.9)
	40. The primary goal of brain injury rehabilitation is to increase physical abilities such as walking (F)	**360 (51.1)***	115 (30.03)	43 (29.3)	72 (30.5)
	Mean (%)	187 (26.5)	56 (14.62)	22.67 (14.53)	34.67 (14.7)

Concussion Knowledge and Attitudes: RoCKAS ST

CKI.

General. The mean CKI for all participants was 20.62 (*SD*= 3.29, range = 5-27, modal score = 22), which is fairly high against the upper cut-off score for this index, which is 27, indicating that participants appeared to have a fair amount of knowledge regarding concussion. Within the CKI, there were however major misconceptions were regarding items 2 5, 9, 11, 12, 14 (see table 6), which more than 50% of participants got incorrect. More than 70% of the sample had misconceptions about item 14, while more than 80% of the sample had misconceptions about item 9. Participants only had minor errors in identifying valid symptoms of head injuries (items 34-41).

HI/TBI Injury vs No HI/TBI Injury. The mean CKI for participants with a head injury (*M*=20.26, *SD*=3.45, range = 5-27) was similar those with no head injuries (*M*=20.84, *SD*=3.17, range = 5-27) with the modal score for both groups being 22. Participants with head injuries and those without head injuries seemed to perform similarly on the CKI, generally showing good concussion knowledge. On item 14, however, more participants with no HI/TBIs reported less accurate responses than that those with head injuries.

CAI.

General. The mean CAI for all (n=384) participants was 58.56 (*SD*= 6.94 modal score = 62). Within the CAI, less than 40% of the participants displayed any “unsafe responses” compared to misconceptions on the CKI where more than 50% of participants had incorrect knowledge regarding concussions. “Unsafe responses” were reported by participants on items 25, 27, 29, and 30.

HI/TBI Injury Vs No HI/TBI Injury. The mean CAI for participants with a HI/TBI (*M*=58.54, *SD*=7.90; range = 32-75) was similar to the mean of those with no HI/TBI (*M*=58.57, *SD*=6.28; range = 42-75), which is reasonable against the cutoff of 75. The deficit between the cut-off and group mean scores does, however, suggest some “unsafe response” and perhaps ideas among the participants. Participants with HI/TBIs have a 10-point lower minimum score for concussion attitudes than the no HI/TBI participants indicating that the participant with the poorest score on the CAI had sustained a HI/TBI.

Table 4

Misconceptions: Rosenbaum Concussion Knowledge and Attitudes Survey—Student Version (RoCKAS-ST) (N=384)

Item (Correct Answer)	*(n = 384)* *Total*	*(n=147)* *Head Injury*	*(n=237)* *No Head Injury*
Section 1			
1.* There is a possible risk of death if a second concussion occurs before the first one has healed. (True)	60 (15.6)	25 (17.0)	35 (14.8)
2.* People who have had one concussion are more likely to have another concussion. (True)	**247 (64.3)**	97 (66.0)	150 (63.3)
3.* Cleats help athletes' feet grip the playing surface. (True)	44 (11.5)	21 (14.3)	23 (9.7)
4.* In order to be diagnosed with a concussion, you have to be knocked out. (False)	72 (18.8)	28 (19.0)	44 (18.6)
5.* A concussion can only occur if there is a direct hit to the head. (False)	**219 (57)**	84 (57.1)	135 (57.0)
6.* Being knocked unconscious always causes permanent damage to the brain. (False)	42 (10.9)	19 (12.9)	23 (9.7)
7.* Symptoms of a concussion can last for several weeks. (True)	51 (13.3)	21 (14.3)	30 (12.7)
8.* Sometimes a second concussion can help a person remember things that were forgotten after the first concussion. (False)	95 (24.7)	42 (28.6)	53 (22.4)

Item (Correct Answer)	*(n = 384)* *Total*	*(n=147)* *Head Injury*	*(n=237)* *No Head Injury*
10.* If you receive one concussion and you have never had a concussion before, you will become less intelligent. (False)	19 (4.9)	12 (8.2)	7 (3.0)
11.* After 10 days, symptoms of a concussion are usually completely gone. (True)	**230 (59.9)**	91 (61.9)	138 (58.2)
12.* After a concussion, people can forget who they are and not recognize others but be perfect in every other way. (False)	**241 (62.8)**	97 (66.0)	144 (60.8)
13.* Concussions can sometimes lead to emotional disruptions. (True)	42 (10.9)	21 (14.3)	21 (8.9)
14.* An athlete who gets knocked out after getting a concussion is experiencing a coma. (True)	**269 (70.1)**	**91 (61.9)**	**178 (75.1)**
15.* There is rarely a risk to long-term health and well-being from multiple concussions. (False)	83 (21.6)	34 (23.1)	49 (20.7)
Section 2			
Scenario 1: While playing in a game, Player Q and Player X collide with each other and each suffers a concussion. Player Q has never had a concussion in the past. Player X has had 4 concussions in the past.			
16.* It is likely that Player Q's concussion will affect his long-term health and well-being. (False)	108 (28.1)	41 (27.9)	67 (28.3)
17.* It is likely that Player X's concussion will affect his long-term health and well-being. (True)	47 (12.2)	21 (14.3)	26 (11.0)
Scenario 2: Player F suffered a concussion in a game. She continued to play in the same game despite the fact that she continued to play in the same game despite the fact that she continued to feel the effects of the concussion.			

Item (Correct Answer)	*(n = 384)* *Total*	*(n=147)* *Head Injury*	*(n=237)* *No Head Injury*
18.* Even though Player F is still experiencing the effects of the concussion, her performance will be the same as it would be had she not suffered a concussion. (False)	55 (14.3)	26 (17.7)	29 (12.2)
Section 3			
19. I would continue playing a sport while also having a headache that resulted from a minor concussion. (Strongly Disagree**)	47 (12.2)	18 (12.2)	29 (12.2)
20. I feel that coaches need to be extremely cautious when determining whether an athlete should return to play. (Strongly Agree)	22 (5.7)	**15 (10.2)**	**7 (3.0)**
21. I feel that concussions are less important than other injuries. (Strongly Disagree)	13 (3.4)	8 (5.4)	5 (2.1)
22. I feel that an athlete has a responsibility to return to a game even if it means playing while still experiencing symptoms of a concussion. (Strongly Disagree)	22 (5.7)	9 (6.1)	13 (5.5)
23. I feel that an athlete who is knocked unconscious should be taken to the emergency room. (Strongly Agree)	20 (5.2)	7 (4.7)	13 (5.5)
Section 4			
Scenario 1: Player R suffers a concussion during a game. Coach A decides to keep Player R out of the game. Player R's team loses the game.			

Item (Correct Answer)	*(n = 384)* *Total*	*(n=147)* *Head Injury*	*(n=237)* *No Head Injury*
24. I feel that Coach A made the right decision to keep Player R out of the game. (Strongly Agree)	22 (5.7)	11 (7.5)	11 (4.6)
25. Most athletes would feel that Coach A made the right decision to keep Player R out of the game. (Strongly Agree)	**125 (32.5)**	44 (29.9)	84 (34.2)
Scenario 2: Athlete M suffered a concussion during the first game of the season. Athlete O suffered a concussion of the same severity during the semifinal playoff game. Both athletes had persisting symptoms.			
26. I feel that Athlete M should have returned to play during the first game of the season. (Strongly Disagree)	16 (4.2)	6 (4.1)	10 (4.2)
27. Most athletes would feel that Athlete M should have returned to play during the first game of the season. (Strongly Disagree)	**124 (32.3)**	47 (32.0)	77 (32.5)
28. I feel that Athlete O should have returned to play during the semifinal playoff game. (Strongly Disagree)	18 (4.9)	11 (7.5)	7 (3.0)
29 Most athletes feel that Athlete O should have returned to play during the semifinal playoff game. (Strongly Disagree)	**139 (36.2)**	47 (31.9)	92 (38.8)
Scenario 3: Athlete R suffered a concussion. Athlete R's team has an athletic trainer on the staff.			

Item (Correct Answer)	*(n = 384)* *Total*	*(n=147)* *Head Injury*	*(n=237)* *No Head Injury*
30. I feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play. (Strongly Agree)	**131 (34.1)**	52 (35.4)	79 (33.3)
31. Most athletes would feel that the athletic trainer, rather than Athlete R, should make the decision about returning Athlete R to play. (Strongly Agree)	101 (26.3)	38 (25.9)	63 (26.6)
Scenario 4: Athlete H suffered a concussion and he has a game in two hours. He is still experiencing symptoms of concussion. However, Athlete H knows that if he tells his coach about the symptoms, his coach will keep him out of the game.			
32. I feel that Athlete H should tell his coach about the symptoms. (Strongly Agree)	14 (3.6)	6 (4.1)	8 (3.4)
33. Most athletes would feel that Athlete H should tell his coach about the symptoms (Strongly Agree)	110 (28.6)	42 (28.6)	68 (28.7)
Section 5			
34.*Headache (Legitimate)	22 (5.7)	10 (6.8)	12 (5.1)
35.*Sensitivity to Light (Legitimate)	89 (23.2)	34 (23.1)	55 (23.2)
36.*Difficulty Remembering (Legitimate)	72 (18.8)	28 (19)	44 (18.6)
37.*Drowsiness (Legitimate)	98 (25.5)	40 (27.2)	58 (24.5)
38.*Feeling in a "Fog" (Legitimate)	155 (40.9)	62 (42.2)	95 (40.1)
39.*Feeling Slowed Down (Legitimate)	132 (34.4)	57 (38.8)	75 (31.6)

Item (Correct Answer)	*(n = 384)* *Total*	*(n=147)* *Head Injury*	*(n=237)* *No Head Injury*
40.*Difficulty Concentrating (Legitimate)	75 (19.5)	33 (22.4)	42 (17.7)
41.*Dizziness (Legitimate)	23 (6.0)	11 (7.5)	12 (5.1)

Note. *All these questions relate to the Concussion Knowledge Index (CKI). While all unmarked questions in this table relate to the Concussion Attitudes Index (CAI).
**Incorrect responses totaled excluded respondents who chose neutral responses. Therefore, participants who scores 1 and 2 on these questions were tallied as incorrect responses.

Regression analyses

We used two multiple regression analyses to test if head injury, age, gender, SES, race and medicinal practices were significant predictors of concussion knowledge and attitudes amongst university students. All assumptions for both regression models were met.

For the first linear regression model, the predictive value of head injury, age, gender, major, race, SES, medicinal practices on the *Rosenbaum Concussion Knowledge Index*, tested by a forward stepwise linear regression, was statistically significant, F (3,370) = 23.17, $p < .001$, where gender, race and SES explained 16% of the model (Table 5). However, of the three variables in the final model, the beta values suggest that race ($\beta = .35$, $p < .001$) has a larger significant predictive effect on concussion knowledge than SES ($\beta = .12$, $p = .02$) and Gender ($\beta = .11$, $p = .02$).

Table 5
Concussion Knowledge Index: Final regression model (N = 384)

Modeling Step / Predictor	*B*	*β*	*t*	*p*	95% CI Lower	95% CI Upper	Semi-partial correlation
Final model							
(Constant)	15.14		16.6	.000***	13.34	16.93	
Race	.99	.35	7.28	.000***	.73	1.26	.35
SES	.13	.12	2.45	.015*	.03	.23	.12
Gender	.79	.11	2,39	.017*	.14	1.43	.11

Note. CI = confidence interval. Overall R^2 = .16; Overall adjusted R^2 =.15; F(3, 370) = 23.17, *$p < .05$. **$p < .01$. ***$p < .001$

For the second linear regression, the predictive value of age, major, race, gender, SES, medicinal practices and head injury on *Rosenbaum Concussion Attitudes Index*, tested by a forward stepwise linear regression, also reached statistical significance, F (2,371) = 17.08, p < .001, with the variables of race and SES explaining 8.4% of the variance in concussion attitudes. Age, major, gender, medicinal practices and head injury had no significant predictive value for Concussion Attitudes. In our model, race seems to have the greatest influence on Concussion Attitudes ($\beta = .24$, $p < .001$), while the predictive value for SES is slightly lower but still significant ($\beta = .13$, $p = .009$).

Table 6
Concussion Attitudes Index: Final regression model (N = 384)

Modeling Step / Predictor	*B*	*β*	*t*	*p*	95% CI Lower	95% CI Upper	Semi-partial correlation
Final model							
(Constant)	51.63		42.38	.000***	49.24	54.03	
Race	1.53	.24	4.72	.000***	.89	2.17	.24
SES	.324	.13	2.62	.009**	.08	.57	.13

Note. CI = confidence interval. overall R^2 = .18; overall adjusted R^2 =.18; *F* (3, 320) = 23.97, $p < .001$.
*$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

The aim of this study was to better understand what influences people to seek or not seek medical help after sustaining a HI/TBI. In this study, we also aimed to understand the kind of help people do seek after a HI/ TBI. Additionally, predictive variables of concussion knowledge and attitudes were investigated to understand myths, misconceptions and general HI/TBI symptoms in South Africa.

Overall, in this study we found that of the participants who sustained a head injury, most of the symptoms, and therefore injuries experienced by participants, were mild in nature. Almost 60% of those participants reportedly sought appropriate medical care. However, even participants with head injuries had similar misconceptions to those without head injuries regarding HI/TBI and concussion knowledge. Regression analyses showed that significant predictors of concussion knowledge and attitudes in this university sample were race, gender and SES.

Regarding head injuries (rates and mechanisms) and help-seeking behavior in the sample

Approximately 38% of the sample responded to having sustained a head injury. Common diagnoses were mTBI and concussion. Most the reported head injury symptoms (e.g. being knocked out or being dazed and confused) were experienced for less than 30 minutes, suggesting mild injuries.

Our results also showed that just under 50% of participants sustained their head injuries through a sport or recreational activity, while the second most common mechanism of injury was falls. These results are inconsistent with epidemiological studies of HI/TBI especially from developing world countries and even some global studies, where the most common causes of HI/TBI were motor vehicle accidents, falls and violence (Gouvier et al., 1988; Gururaj, 2002; Hyder et al., 2007; Nell & Brown, 1991; Puvanachandra & Hyder, 2009). Developed countries, on the other hand, reportedly have significantly higher percentages of sport HI/TBIs (18.2%) compared to developing countries (1%) (Li., Zhao, Yu, & Zhang, 2016). Our study sample did however include university students with demographics which are distinct from those reported in the aforementioned studies.

Almost 60% of the sample actually sought care after sustaining a head injury. However, of those who did not seek medical care, more than 70% of participants thought that their injuries were not serious enough to warrant such care. Even though symptoms may not be visible at the time of injury, negative consequences may still occur. Even if injuries are perceived as mild, they can still have ‘invisible’ effects on cognition, emotion and behaviour (McClure, 2011). Interestingly, while most participants with head injuries sought formal medical care, a fair proportion of participants sought post-injury advice from friends and family (13.6%). While seeking advice from medical practitioners post TBI/HI may be deemed best, this can be problematic, given that, as Ernst et al. (2009) have shown, even some healthcare providers have misconceptions about the effects and the recovery process of HI/TBIS generally. However, the problem with seeking medical advice from non-medical sources may be even more pervasive and problematic as these friends and family members may also have misconceptions regarding head injuries (which may be more profound than among medical staff), which would result in the perpetuation of incorrect knowledge and beliefs regarding TBI / HI (Guilmette & Paglia, 2004).

Common Misconceptions Regarding TBI

CM-TBI categories of questions. Misconceptions were present in each of the seven categories that are assessed in the CM-TBI questionnaire, with most misconceptions shown on the questions relating to amnesia and unconsciousness. Participants reported the least misconceptions in the category of brain damage. These findings are similar to those of previous studies in which the common misconceptions among general university students (Pretorius &

Broodryk, 2013), nursing students (Ernst et al., 2009), and sports coaches (McLeod, Schwartz, & Bay, 2007) were investigated.

CM-TBI individual questions. With regards to the individual items in the CM-TBI, the most common misconceptions held by participants in the current study included the belief that it safer to be thrown clear of a car wreck than to be trapped inside, that complete recovery from a severe brain injury is possible, and that it is not common for people with brain injuries to be easily angered. These three specific misconceptions were unique to the current study as they have not been identified in previous research that made use of the CM-TBI survey (Ernst et al., 2009; Pretorius & Broodryk, 2013). However, between study differences in misconceptions may be due to sample demographic differences. Our study used first year undergraduate students, while Pretorius and Broodryk (2013) used undergraduates with differing years of study.

Additional common misconceptions also included, for example, the belief that people with a brain injury can forget who they are and not recognize others, but be normal in every other way; and that people who have had one brain injury are not more likely to have a second one. These misconceptions have been reported in a previous study, which could suggest that some common misconceptions about HI/TBISs are more pervasive and shared amongst the general public, including university students, for example, than others (Pretorius & Broodryk, 2013).

In sum, in our sample, misconceptions are evident in key areas of knowledge regarding TBI, even when an individual had personally sustained a such an injury. While this finding is in line with some research on misconceptions surrounding HI/TBIS (Cusimano, Zhang, Topolovec-Vranic, Hutchison, & Jing, 2017), the results on the relationship between sustaining a HI/TBI and associated misconceptions, varies (Chapman & Hudson, 2010; Pappadis, Sander, Struchen, Leung, & Smith, 2011). The rates of misconception for overall categories and specific items of the CM-TBI did not differ significantly between the HI/TBI and No HI/TBI groups in the current study, suggesting that there may be other variables that can influence an individual’s misconceptions about HI/TBIS.

Concussion Knowledge and Attitudes

General. In terms of knowledge and attitudes regarding concussion, we found that less than 40% of participants chose any “unsafe” responses for the CAI, while more than 50% of participants had incorrect responses to questions testing concussion knowledge. Knowledge refers to factual information surrounding concussion while attitude refers to the way in which an individual thinks or feels regarding concussion scenarios.

CKI.

General. Participants scored poorly on a number of items in the CKI, with the mean index score being fairly high (close to the upper cut-off score of 27, which represents accurate concussion knowledge). However, there was much variation in this score and many low scores which translates to poor knowledge of concussion. Poor concussion knowledge often leads to incorrect help seeking behaviours as well as poor safety precautions being taken to prevent TBI/Concussions.

Head/TBI Injury Vs No Head/TBI Injury. Participants who sustained a HI/TBI and those who did not performed similarly generally, except on item 14 (*An athlete who gets knocked out after getting a concussion is experiencing a coma*), where more participants with no HI/TBI had misconceptions than those with HI/TBI. Viljoen (2016) also found similar incorrect knowledge amongst high school rugby players and a senior amateur rugby club. These misconceptions surround the actual experience of sustaining a head injury and the treatment thereafter. Such inaccurate information can result in incorrect concussion treatments, such as not getting a medical check-up if the person feels fine at the time, as well as incorrect safety measure precautions (Pretorius & Broodryk, 2013). For example, people who've had a concussion may not know that they are more likely to sustain a second concussion and may therefore not wear protective headgear in sports which increases their chances of having a second concussion.

CAI.

General. Participants scored fairly well on the CAI where their mean scores were close the upper range of 70. This indicates a fair amount of safe attitudes and practices amongst participants. However, there were still some unsafe attitudes within the sample. Unsafe attitudes as demonstrated in both our study and Viljoen's (2016) study are likely to result in incorrect behaviours (such as returning to play a sport after a blow to the head) which is likely to worsen the injury (Patton, McIntosh, & Kleiven, 2013; Williams, 2013). The population may not even know that their responses are "unsafe" and can therefore exacerbate their injury without knowing it.

HI/TBI Vs No H/TBI. Overall, mean scores for both groups were fairly similar. This means that HI/TBI does not seem to predict concussion attitudes. The "unsafe responses" reported in this section are similar to the findings by Viljoen (2016) who conducted a study on concussion knowledge and attitudes amongst South African rugby players from 14 to over 21 years. However, responses in Viljoen's (2016) study were not analysed in terms of HI/TBI or no HI/TBI, but rather by rugby clubs and teams.

Regression analyses

Our regression models showed that gender, race and SES were significant predictors of concussion knowledge and that race and SES were also significant predictors of concussion attitudes.

Gender. Gender proved to be a small but significant predictor of concussion knowledge. Males seemed to report fewer misconceptions on the CKI than females. Differences in gender could be attributed to the fact that a larger proportion of males in the sample reported having sustained a HI/TBI. Therefore, by implication, males might have scored better because of their experience with concussions/TBIs. Understanding the origin of these gender differences may be helpful in knowing who to target in interventions as previous studies have only focused on gender differences in sustaining a head injury and not on their knowledge thereof (Frommer et al., 2011; Puvanachandra & Hyder, 2009).

Race. Race was the strongest predictor for CKI and CAI scores in this sample. The effect of race in both models are consistent with a previous study (Wallace et al., 2017). However, because race can be a proxy for non-biological factors such as language, SES and quality of completed education (House, 2017; Putzke, Richards, Hicken, & DeVivo, 2002), as also suggested by Wallace et al (2017), it is premature to over interpret this outcome without further investigation into these related variables first.

SES. SES was a significant predictor for both concussion knowledge and attitude. With regards to scores on the CKI, scoring on the overall test gradually increased as annual household income increased. This trend was not evident on the CAI, however.

Previous studies have found that SES affects the type and quality of care that people receive (Hoofien, Vakil, Gilboa, Donovick, and Barak, 2002). Poor medical care may result in a lack of quality knowledge and care instructions that patients receive regarding their condition. Seeking poor quality care is highly problematic as people who treat head injuries, but do not specialise therein, are also likely to have incorrect knowledge regarding head injuries (Yuhasz, 2013).

Limitations and future directions

This study made use of a university sample through convenience sampling. Therefore, the current findings cannot be generalised beyond the sample population. In this study we used a self-report online survey. The inherent problems with self-report measures in terms of socially desirable responses and unreliability are well known in the literature (Blanche, Blanche, Durrheim, & Painter, 2006). However, validity check questions were used to see if information was correct. With regards to the length of the survey, participants seemed to become fatigued towards the latter part of the survey. This was evident when participants had to explain their choices to previous questions; many explanatory questions were answered poorly with very brief or no explanation. However, responses to open ended questions were coded and grouped together so that displaying categories made more sense than individual responses. Despite these limitations, a survey based study was ideal in terms of maximizing the number of participants reached and is consistent with other research studies on this nature.

Conclusion

Misconceptions and misinformation regarding HI/TBIS are not uncommon. Such inaccurate information could affect help-seeking behaviours and can be detrimental to the recovery process. Therefore, providing sufficient knowledge about HI/TBI and its immediate as well as long term effects is important for providing appropriate care and interventions. Identifying misconceptions in a South African context is necessary to inform interventions that may seek to provide context-appropriate psychoeducation, which may in turn facilitate optimal health-seeking behaviours.

References

Alexander, T., Fuller, G., Hargovan, P., Clarke, D., Muckar, D., & Thomson, S. (2009). An audit of the quality of care of traumatic brain injury at a busy regional hospital in South Africa. *South African Journal of Surgery, 47*(4), 120-126.

Babikian, T., Merkley, T., Savage, R. C., Giza, C. C., & Levin, H. (2015). Chronic aspects of pediatric traumatic brain injury: Review of the literature. *J Neurotrauma*, *32,* 1849-1860. doi:10.1089/neu.2015.3971

Blanche, M. T., Blanche, M. J. T., Durrheim, K., & Painter, D. (Eds.). (2006). *Research in practice: Applied methods for the social sciences*. Cape Town: Juta and Company Ltd.

Bruns, J., & Hauser, W. A. (2003). The epidemiology of traumatic brain injury: A review. *Epilepsia, 44*(1), 2-10. doi:10.1046/j.1528-1157.44.s10.3.x

Bryant, R. A. (2008). Disentangling mild traumatic brain injury and stress reactions. *New England Journal of Medicine*, *358*(5), 525-527. doi:10.1056/NEJMe078235

Carroll, L., Cassidy, J., Holm, L., Kraus, J., & Coronado, V. G. (2004). Methodological issues and research recommendations for mild traumatic brain injury: the WHO Collaborating Centre Task Force on Mild Traumatic Brain Injury. *Journal of Rehabilitation Medicine, 43*, 113-125. doi:10.1080/16501960410023877

Casarett, D., Fishman, J. M., MacMoran, H. J., Pickard, A., & Asch, D. A. (2005). Epidemiology and prognosis of coma in daytime television dramas. *Bmj*, *331*(7531), 1537-1539. doi:10.1136/bmj.331.7531.1537

Chapman, R. C., & Hudson, J. M. (2010). Beliefs about brain injury in Britain. *Brain injury*, *24*(6), 797-801. doi:10.3109/02699051003709607

Corrigan, J. D., Selassie, A. W., & Orman, J. A. L. (2010). The epidemiology of traumatic brain injury. *The Journal of Head Trauma Rehabilitation*, *25*(2), 72-80. doi: 10.1097/htr.0b013e3181ccc8b4

Cusimano, M. D., Zhang, S., Topolovec-Vranic, J., Hutchison, M. G., & Jing, R. (2017). Factors affecting the concussion knowledge of athletes, parents, coaches, and medical professionals. *SAGE open medicine*, *5*, 2050312117694794. doi:10.1177/2050312117694794

Ernst, W., Trice, A., Gilbert, J., & Potts, H. (2009). Misconceptions about traumatic brain injury and recovery among nursing students. *Journal of Head Trauma Rehabilitation, 24*(3), 213-220. doi:10.1097/HTR.0b013e3181a7ecd8

Farmer, J. E., & Johnson-Gerard, M. (1997). Misconceptions about traumatic brain injury among educators and rehabilitation staff: A comparative study. *Rehabilitation psychology, 42*(4), 273. doi:10.1037/0090-5550.42.4.273

Feigin, V. L., Theadom, A., Barker-Collo, S., Starkey, N. J., McPherson, K., Kahan, M., & Jones, K. (2013). Incidence of traumatic brain injury in New Zealand: a population-based study. *The Lancet Neurology, 12*(1), 53-64. doi:10.1016/ S1474-4422(12)70262-4

Frommer, L. J., Gurka, K. K., Cross, K. M., Ingersoll, C. D., Comstock, R. D., & Saliba, S. A. (2011). Sex differences in concussion symptoms of high school athletes. *Journal of athletic training, 46*(1), 76-84. doi:10.4085/1062-6050-46.1.76

Ghajar, J. (2000). Traumatic brain injury. *The Lancet, 356*(9233), 923-929. doi:10.1016/S0140-6736(00)02689-1

Gouvier, W. D., Prestholdt, P. H., & Warner, M. S. (1988). A survey of common misconceptions about head injury and recovery. *Archives of Clinical Neuropsychology*, *3*(4), 331-343. doi:10.1093/arclin/3.4.331

Guilmette, T. J., & Paglia, M. F. (2004). The public's misconceptions about traumatic brain injury: A follow up survey. *Archives of Clinical Neuropsychology*, *19*(2), 183-189. doi:10.1016/S0887-6177(03)00025-8

Halstead, M. E., & Walter, K. D. (2010). Sport-related concussion in children and adolescents. *Pediatrics, 126*(3), 597-615. doi:10.1542/peds.2010-2005

Hoofien, D., Vakil, E., Gilboa, A., Donovick, P. J., & Barak, O. (2002). Comparison of the predictive power of socio-economic variables, severity of injury and age on long-term outcome of traumatic brain injury: Sample-specific variables versus factors as predictors. *Brain Injury, 16*(1), 9-27. doi:10.1080/02699050110088227

Hooper, S. R. (2006). Myths and misconceptions about traumatic brain injury: Endorsements by school psychologists. *Exceptionality, 14*(3), 171-182. doi:10.1207/s15327035ex1403_5

House, E. R. (2017). Evaluation and the Framing of Race. *American Journal of Evaluation*, *38*(2), 167-189. doi:10.1177/1098214017694963

Hyder, A. A., Wunderlich, C. A., Puvanachandra, P., Gururaj, G., & Kobusingye, O. C. (2007). The impact of traumatic brain injuries: a global perspective. *NeuroRehabilitation*, *22*(5), 341-353. doi: 10.1080/17518420701714726

Jones, K. M., Kydd, R., Broadbent, E., Theadom, A., Barker-Collo, S., Edwards, H., & Feigin, V. L. (2016). Brain drawings following traumatic brain injury (TBI) and links to illness perceptions and health outcomes – Findings from a population-based study. *Psychology & Health, 31*(10), 1182-1202. doi:10.1080/08870446.2016.1193178

Langlois, J. A., Rutland-Brown, W., & Wald, M. M. (2006). The epidemiology and impact of traumatic brain injury: A brief overview. *The Journal of Head Trauma Rehabilitation, 21*(5), 375-378. doi:10.1097/00001199-200609000-00001

Levin, K. (2004). Paediatric traumatic brain injury in South Africa: Some thoughts and considerations. *Disability and Rehabilitation*, *26*, 306-314. doi:10.1080/09638280032000174089

Li, M., Zhao, Z., Yu, G., & Zhang, J. (2016). Epidemiology of traumatic brain injury over the world: a systematic review. *General medicine: open access*, *4*(5), e275-e275. doi:10.4172/2327-5146.1000275

Linden, M. A., Braiden, H., & Miller, S. (2013). Educational professionals' understanding of childhood traumatic brain injury. *Brain injury*, *27*(1), 92-102. doi:10.3109/02699052.2012.722262

McClure, J. (2011). The role of causal attributions in public misconceptions about brain injury. *Rehabilitation psychology, 56*(2), 85. doi:10.1037/a0023354

McLeod, T. C. V., Schwartz, C., & Bay, R. C. (2007). Sport-related concussion misunderstandings among youth coaches. *Clinical Journal of Sport Medicine*, *17*(2), 140-142.

Menger, R., Menger, A., & Nanda, A. (2016). Rugby headgear and concussion prevention: misconceptions could increase aggressive play. *Neurosurgical focus, 40*(4), 1-7. doi: 10.3171/2016.1.FOCUS15615.

Mokhosi, M. T., & Grieve, K. W. (2004). African families' perceptions of traumatic brain injury. *South African Journal of Psychology, 34*(2), 301-317. doi:10.1177/008124630403400208

Nell, V., & Brown, D. S. (1991). Epidemiology of traumatic brain injury in Johannesburg—II. Morbidity, mortality and etiology. *Social Science & Medicine, 33*(3), 289-296. doi:10.1016/0277-9536(91)90363-H

Nguyen, R., Fiest, K. M., McChesney, J., Kwon, C. S., Jette, N., Frolkis, A. D., & Pringsheim, T. (2016). The international incidence of traumatic brain injury: A systematic review and meta-analysis. *Canadian Journal of Neurological Sciences, 43*(6). doi:10.1017/cjn.2016.290

Oosthuizen, D. (2010). *Families of children with traumatic brain injuries: Stressors and needs in the South African context.* (Doctoral dissertation), University of Cape Town.

Pappadis, M. R., Sander, A. M., Struchen, M. A., Leung, P., & Smith, D. W. (2011). Common misconceptions about traumatic brain injury among ethnic minorities with TBI. *The Journal of head trauma rehabilitation, 26*(4), 301-311. doi:10.1097/HTR.0b013e3181e7832b

Patton, D. A., McIntosh, A. S., & Kleiven, S. (2013). The biomechanical determinants of concussion: finite element simulations to investigate brain tissue deformations during sporting impacts to the unprotected head. *Journal of applied biomechanics, 29*(6), 721-730. doi:10.1123/jab.29.6.721

Pretorius, C., & Broodryk, M. (2013). Misconceptions about traumatic brain injuries among South African university students. *South African Journal of Psychiatry, 19*(3), 75-79. doi:10.7196/sajp.436

Putzke, J. D., Richards, J. S., Hicken, B. L., & DeVivo, M. J. (2002). Predictors of life satisfaction: a spinal cord injury cohort study. *Archives of physical medicine and rehabilitation, 83*(4), 555-561. doi:10.1053/apmr.2002.31173

Puvanachandra, P., & Hyder, A. A. (2009). The burden of traumatic brain injury in Asia: a call for research. *Pak J Neurol Sci, 4*(1), 27-32.

Risdall, J. E., & Menon, D. K. (2011). Traumatic brain injury. Philosophical Transactions of the Royal Society of London B. *Biological Sciences, 366*(1562), 241-250. doi:10.1098/rstb.2010.0230

Rosenbaum, A. M., & Arnett, P. A. (2010). The development of a survey to examine knowledge about and attitudes toward concussion in high-school students. *Journal of Clinical and Experimental Neuropsychology, 32*(1), 44-55. doi:10.1080/13803390902806535

Ruff, R. M., & Jamora, C. W. (2009). Myths and mild traumatic brain injury. *Psychological Injury and Law*, *2*(1), 34. doi:10.1007/s12207-009-9029-4

Schrieff-Elson, L. E., Thomas, K. G. F., & Rohlwink, U. K. (2017). *Pediatric Traumatic Brain Injury: Outcomes and Rehabilitation*. Textbook of Pediatric Neurosurgery, 1–28. doi:10.1007/978-3-319-31512-6_150-1

Swift, T., & Wilson, S. (2001). Misconception about brain injury among the general public and non-expert health professionals: An exploratory study. *Brain Injury, 15*, 149-165. doi:10.1080/026990501458380

Viljoen, C. T. (2016). *Concussion knowledge among South African rugby players* (Doctoral dissertation, University of the Free State).

Wallace, J., Covassin, T., & Moran, R. (2017). Racial disparities in concussion knowledge and symptom recognition in American adolescent athletes. *Journal of racial and ethnic health disparities*, 1-8. doi:10.1007/s40615-017-0361-1

Willer, B., Johnson, W. E., Rempel, R. G., & Linn, R. (1993). A note concerning misconceptions of the general public about brain injury. *Archives of Clinical Neuropsychology, 8*, 461-465. doi:10.1093/arclin/8.5.461

Williams, J. (2013). Concussion Knowledge and Attitudes in English Football (Soccer).

Yuhasz, J. E. (2013). Misconceptions about traumatic brain injury among correctional health care professionals *Journal of Correctional Health Care*, *19*, 135-143. doi:10.1177/1078345812474644

Appendix A

Survey

(Please see separate attachment for full survey document)

Appendix B

Advertisement distributed through the SRPP system.

Subject: Research Invitation - Medical Help-Seeking Following Traumatic Brain Injuries

First year students are invited to participate in a study on Moderating Variables in Medical Help-Seeking Following Traumatic Brain Injuries Including Myths and Misconceptions for 2 SRPP points.

Details about the study: Researchers at the Psychology department in association with Prof Paul Jantz at Texas State University are running a study on Medical Help-Seeking Following Traumatic Brain Injuries. Due to standardization procedures, we are only recruiting ***first year PSY1004F***. Participation will involve an online survey regarding myths and misconceptions of TBIs and concussions. It should take 60 minutes (at most) to complete. At the end of the survey, you will fill out a form with your student number and will receive 2 SRPP points. This study has been approved by the Department of Psychology's Research Ethics Committee.

How to participate: If you would like to find out more about the study and sign up to participate, please go to the SRPP site on VULA and find the study details and participant sign-up sheet under the sign up tab on the left-hand side of the VULA page.

Appendix C

Ethical Approval Form

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3417
Fax No. (021) 650 4104

09 June 2017

Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Robyn and Miranda

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *Moderating Variables in Medical Help-Seeking Following Traumatic Brain Injuries*. The reference number is PSY2017 -019.

I wish you all the best for your study.

Yours sincerely

University of Cape Town
ΨPSYCHOLOGY DEPARTMENT
Upper Campus
Rondebosch

Lauren Wild (PhD)
Associate Professor
Chair: Ethics Review Committee

Appendix D

Online Informed Consent Form from Survey

You are being asked to be part of a research project. The researcher is trying to learn more about the circumstances in which people sustain a head injury, the medical care people receive afterward, and the lasting consequences of head injury. Specifically, it examines head injury that results in being knocked out, experiencing memory loss, and/or being dazed and confused. If you agree to be part of this research, you will be asked to take a survey of about 75 questions. It should take approximately 40 to 60 minutes to finish the survey. The research is being conducted by Robyn Mazriel and Miranda Moodley, as part of their research for their Honours degree in psychology. Their contact details are as follows: robzmazriel@gmail.com or moodleymiranda@gmail.com. Dr Leigh Schrieff-Elson is supervising their project. Her contact details are as follows: leigh.schrieff-elson@uct.ac.za, Tel: 021 650 3708.

We are inviting all first year psychology students to participate in the survey. If you complete only the first part of the survey, you will receive 1 SRPP point; if you complete both parts 1 and 2 of the survey, you will receive 2 SRPP points.

The researcher does not think that there are any serious risks to you, but some of the questions may be personal. For example, if you report that you have had a head injury that resulted in being knocked out, experiencing memory loss, and/or being dazed and confused, you will be asked questions about your injury (an example: “Did you receive a medical diagnosis for your head injury?”).

With one exception, you may choose not to answer any question(s) for any reason. The exception is: you must answer the second question ("Have you ever had an injury to your head..."). If answering any questions in this survey results in unsettling feelings for you, you should speak to a mental health provider at the UCT Student Wellness Centre, Ivan Toms Building, 28 Avenue, Mowbray Rhodes, Rhodes Drive, Mowbray, Cape Town, 7700; Tel: 021

650 1017. Other than receiving SRPP credits, there are no direct benefits to you for participating in this research. However, society may benefit from the results.

The survey is anonymous; however, you will have to include your student number at the end of the survey so that your SRPP points may be awarded to you. Only those directly involved in the study will have access to the data. The researchers will keep the survey results on a password protected laptop for five years and then they will destroy the survey results. Only the researchers and their supervisors will have access to the survey data.

Participation is voluntary. You are therefore free to withdraw your consent and to stop participating in this research study at any time. If you do withdraw your consent, there will be no penalty. You will only receive SRPP points for parts of the questionnaire completed in full (part 1 and/or part 2). Data already collected may be used.

This project (REF NUMBER) was approved by the UCT Department of Psychology's Human Research Ethics Committee on //2017. Pertinent questions or concerns about the research, research participant's rights, and/or research-related injuries to participants should be directed to Rosalind Adams Rosalind in the Psychology Department at 021-650- 3417

Statement of Consent: I have read this consent form and agree to be in this study, with the understanding that my participation is voluntary and I may withdraw my consent at any time. I understand that clicking the button below indicates that I have read the description of the study, understand any risks involved, and I agree to participate.

Appendix E

Debriefing Email

Thank you for participating in the Help-Seeking Behaviors after TBI survey. Your responses were greatly appreciated. The information below will inform you of what to do if you have any concerns regarding your participation in the survey. It will also provide you with information regarding why the survey was run and what we aim to gather from this research project.

Concerns: If you experience any unsettling feelings or anxiety related to filling in this survey, please speak to a mental health provider at the UCT Student Wellness Centre, Ivan Toms Building, 28 Avenue, Mowbray Rhodes, Rhodes Drive, Mowbray, Cape Town, 7700; Tel: 021 650 1017.

You can also contact the researchers or their supervisor if you have any complaints or queries: Supervisor: Dr Leigh Schrieff-Elson (schrieff-elson@uct.ac.za; Tel: 021 650 3708); Researchers: Robyn Mazriel (robzmazriel@gmail.com) and Miranda Moodley (moodleymiranda@gmail.com).

Aims: This study is part of a larger study that is being run at the Texas State University by Prof Paul Jantz. These studies aim to understand what decision factors influence individuals to seek help after TBIs. Therefore, identifying these factors in a South African context can help inform interventions that may seek to provide appropriate psychoeducation, which may in turn facilitate optimal health-seeking behaviours.

For any further questions, please contact the researchers involved in this study