



SUBMISSIBLE RESEARCH REPORT IN FULFILLMENT OF MASTER OF MEDICINE IN THE
FIELD OF PUBLIC HEALTH:

TITLE:

THE RELATIONSHIP BETWEEN RESILIENCE, WORK-RELATED TRAUMA AND POST-
TRAUMATIC STRESS DISORDER SYMPTOMS IN EMERGENCY DEPARTMENT DOCTORS
IN JOHANNESBURG, SOUTH AFRICA

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DATE: 16 OCTOBER 2019

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ACKNOWLEDGEMENTS:

Firstly, I would like to give honour to my Lord and Saviour Jesus Christ, who has showed me grace and mercy, and has provided me the strength and endurance needed to see this task to fruition.

I also wish to acknowledge the following individuals who have contributed to the study:

- The study participants who disclosed their experiences of trauma.
- My supervisors Dr. Sumaya Mall and Dr. Sinola Rajaram for their support and encouragement and for engaging my interest in the epidemiology of post-traumatic stress disorder (PTSD).
- Ms. Zvifadzo Matsena-Zingoni and Professor Jonathan Levin for their advice regarding data analysis, their patience and collegiality.
- Mrs Innocentia Vukeya for her administrative support throughout my degree programme.
- My colleagues who have been a pillar of comfort and strength.
- My family for supporting me and accepting my absences in favour of finishing this report

THE RELATIONSHIP BETWEEN RESILIENCE, WORK-RELATED TRAUMA AND POST-TRAUMATIC STRESS DISORDER SYMPTOMS IN EMERGENCY DEPARTMENT DOCTORS IN JOHANNESBURG, SOUTH AFRICA

ABSTRACT:

Posttraumatic stress disorder (PTSD) is preceded by exposure to traumatic events. Emergency department doctors' exposure to traumatic events is ubiquitous yet not all develop PTSD. Resilience may reduce PTSD risk. This study aimed to examine the relationship between resilience, work related traumatic events and PTSD symptoms in emergency medicine doctors in Johannesburg, South Africa. A multi-site, cross-sectional, self-administered electronic survey was distributed to all doctors working in emergency departments in Johannesburg Metropolitan Health District facilities. Linear regression analysis was employed to examine the association between work-related traumatic events and PTSD symptoms. Bullying by colleagues, frequency of traumatic event exposure and single relationship status were associated with higher risk of PTSD symptoms in this sample. Mitigating factors against PTSD symptoms included high levels of resilience, male gender and exposure to victims of violent injury. Results suggest that emergency department doctors may be at risk of PTSD symptoms highlighting the need for mental health care in this population.

KEYWORDS: work-related trauma, PTSD symptoms, doctors, emergency department, resilience, South Africa

INTRODUCTION:

POST TRAUMATIC STRESS DISORDER:

Posttraumatic stress disorder (PTSD) is a psychiatric condition, classified under the umbrella of "Trauma and Stress Related Disorders by the Diagnostic and Statistical Manual (DSM- V) (American Psychiatric Association, 2013). PTSD is preceded by exposure to one or more traumatic events (American Psychiatric Association, 2013). The DSM-IV, requires one or more symptoms from each of the four symptom clusters for the diagnosis of PTSD. These symptom clusters include: i) Intrusive symptoms e.g. Unforeseen, persistent, involuntary, and intrusive upsetting memories of the traumatic event. ii) Avoidance symptoms e.g. Avoidance of people, places, thoughts or feelings that bring up memories of the traumatic event iii) Negative changes in cognition e.g. feeling detached iv) Arousal symptoms e.g. hypervigilance (American Psychiatric Association, 2013). Furthermore, these symptoms should persist for at least a month and impede various aspects of life (American Psychiatric Association, 2013).

Globally, the prevalence of PTSD is thought to be higher than other trauma and stress related disorders in terms of lifetime and 12 month prevalence rates (Kessler R.C et al., 2005). The National Co-morbidity Survey Replication (NCS-R) study, a nationally representative study from the United States of America (USA) estimates the lifetime prevalence of PTSD to be 6.8%, compared to the 12-month prevalence of 3.5% in adult Americans (Kessler R.C et al., 2005). South African PTSD rates, both lifetime (2.3%) and 12-month prevalence (0.6%), are lower than the figures from the USA. The South African Stress and Health Study (SASH) , a nationally representative epidemiological study of psychiatric disorders, highlighted that more than a third (36%) of individuals diagnosed with PTSD in South Africa were classified as presenting with severe PTSD symptoms (Atwoli L et al., 2013). SASH data further suggested that trauma exposure in South Africa is highly prevalent, with over 70% of the population being exposed to at least one potentially traumatizing event in their lifetime (Atwoli L et al., 2013).

PTSD risk is predicted by a complicated interplay of pre-and-post trauma factors that influence an individual's vulnerability to the development of PTSD. A meta-analysis examining fourteen distinct risk factors for PTSD amongst both military and civilian populations found factors associated with events during and post-trauma e.g. trauma severity, additional life stress and lack of social support, demonstrated the strongest correlation to PTSD risk (Brewin CR et al., 2000). While factors such as female gender, co-morbid psychiatric history, lower socio-economic status and previous adversity also predicted PTSD risk, the effect size was relatively

small (Brewin CR et al., 2000). These risk factors have been corroborated by observational epidemiological studies (Xue C et al., 2015, Sayed S et al., 2015, Shalev AY et al., 2019).

LITERATURE REVIEW:

SEARCH STRATEGY:

Databases searched included Pubmed and Psych Info. I did not exclude studies that were older or dated. The search terms were: PTSD and doctors, PTSD AND doctors, PTSD AND healthcare workers AND work related trauma, PTSD AND physicians, PTSD AND residents, Resilience AND doctors, Resilience AND healthcare workers, Resilience AND physicians, Resilience AND residents.

WORK RELATED TRAUMA AND PTSD

A systematic review and meta-regression analysis of worldwide current prevalence and correlates of PTSD in rescue workers determined that rescue workers, in general, have a pooled current prevalence of PTSD that is much higher than that of the general population (Berger W et al., 2012). Mitchell & Everly state that the probability of PTSD development is largely as a result of being in a high-risk, potentially traumatizing circumstance/experience (Mitchell J and Everly G, 1995). Individuals in high-risk occupations, are at a greater than normal risk for the development of PTSD (Mitchell J and Everly G, 1995). A systematic review examining occupation specific PTSD risk identified professional first responders e.g. police officers, firefighters and ambulance personnel to be at an increased risk of traumatic event exposure as part of their daily work, and by implication at higher risk for PTSD acquisition (Skogstad M et al., 2013). While police officers are also deemed first responders, the systematic review by Skogstad highlights professional first responders i.e. other than police officers demonstrate high PTSD prevalence, and that this prevalence is heterogenous amongst the different categories of first responders (Skogstad M et al., 2013). It is the innate nature of work that exposes rescue workers to physical and emotional trauma and places them at particular risk for PTSD (Norris FH et al., 2002). Responders involved in rescue work following the September 2011 attack on the World Trade Centre were assessed for psychological sequelae following involvement in rescue work (Perrin MA et al., 2007). PTSD rates ranged from 6.2% for police officers to 21.2% for volunteers, with an overall prevalence for PTSD in this cohort equating to 12.4% (Perrin MA et al., 2007). Extended duration of time worked on site proved to be a significant risk factor for the development of PTSD (Perrin MA et al., 2007). Similarly, in a study of Greek rescuers who assist with bringing refugees to safety, overall PTSD prevalence

rates were estimated to be 17.1%, with longer duration of work, extended shift hours, and handling refugees, particularly children who have died, being particularly predictive for PTSD in this group (Sifaki-Pistolla D et al., 2017).

PTSD IN DOCTORS:

Work-related traumatic event exposure is not uniform across all clinical disciplines including doctors (Joseph B et al., 2014). Several studies have examined PTSD risk in medical doctors, of assorted clinical disciplines, and suggest that PTSD risk differs depending on clinical discipline (Hollingsworth CE et al., 2018, Wilberforce N et al., 2010, Ruitenburg MM et al., 2012). These studies only focused on in-hospital doctors from high income countries.

PTSD prevalence among doctors, especially residents/registrars/trainees, are higher than that of the general population (Mills LD and Mills TJ, 2005, Klamen DL et al., 1995, Thompson CV et al., 2015), and virtually approximate the PTSD risk in war veterans (de Boer J et al., 2011). Emergency department doctors, from developed countries, have been shown to be at an increased risk possibly as a result of an increased exposure to occupational critical incidents- compared to other physicians (Klasan A et al., 2013, Lazarus A, 2014, Vanyo L et al., 2017), and the incidence of PTSD is found to be greater in this population compared to other specialties (Joseph B et al., 2014). These work place traumatic events include among others, workplace violence, treating victims of trauma, poly-trauma patients with massive haemorrhage, death of a child, treating patients who bear resemblance to the doctor him/herself or a family member or the unsuccessful resuscitation of a patient (Vanyo L et al., 2017). Continuous exposure to trauma, suffering and death could predict risk of the development of PTSD (Cotton P et al., 2016). Repeated trauma exposure is inherent to the nature of emergency medicine and rates of psychological injury remain high in this cohort (McFarlane A and Bryant R, 2007). To my knowledge, there are a paucity of data of the risk of PTSD in emergency department doctors on the African continent (Seedat S, 2013).

WORK RELATED TRAUMA IN THE EMERGENCY DEPARTMENT

Emergency department doctors respond to traumatic injury and death, potentially a stressful situation. When occupational trauma was studied among hospital based medical and nursing staff in the UK from four different specialist departments, namely orthopaedic surgery, plastic surgery, intensive care and accident and emergency, 48% of healthcare personnel reported emotional distress due to the inherent nature of their work itself (Alexander D. A. and Atcheson S. F., 1998). Duty-related critical incidents, defined as 'a sudden unexpected event, that has an

emotional impact sufficient to overwhelm the usually effective coping skills of an individual and cause significant psychological stress' (de Boer J et al., 2011) have the ability to evoke post-traumatic stress symptoms or even PTSD. Psychological stressors associated with work in an emergency department include among others, a demanding working environment, exposure to duty related critical incidents, repeated incidents in short succession, care for a dependent populace, and emotional responses to persons who may be critically ill or on the verge of death (Berger W et al., 2012). It appears that the more intimate the provider is with the injured patient or situation, the more likely they are to screen positive for PTSD (Mitchell J and Everly G, 1995). Furthermore, emergency department healthcare workers are also susceptible to assault (physical/ verbal) by the very patients that they are meant to treat (Mitchell J and Everly G, 1995).

RESILIENCE:

The term resilience signals the ability to maintain a stable equilibrium i.e. to preserve healthy levels of psychological and physical functioning, despite experiencing a potentially disruptive event (critical incident) (Bonanno G, 2004). Resilience encompasses the capacity for self-monitoring, limit setting, and attitudes that foster a positive engagement with obstacles. Though there is a paucity of research on resilience in doctors, in particular, research on first responders (e.g. paramedics, firefighters, etc.) have demonstrated a consistent negative correlation between resilience and PTSD symptoms (Bowler RM et al., 2012) (Pietrantonio L and Prati G, 2008, Streb M et al., 2013) A systematic review conducted to broaden the current understanding of primary care health worker resilience (Robertson HD et al., 2016) suggested that females were more likely to succumb to destructive coping behaviours, and suggests that this could be as a result of competing roles specific to females i.e. challenging nature of work and raising a family with a resultant lack of recreational time (Unrath M et al., 2012). Effect sizes for gender, however, were small (Pietrantonio L and Prati G, 2008). When workplace factors were examined, emotional resilience was decreased with increasing number of hours worked per week (Keeton K et al., 2007). Conversely, emotional resilience was increased by having greater control over time and content of work (Keeton K et al., 2007). The systematic review concludes that health professional resilience is a multifaceted conglomeration of personal traits alongside contextual (social, workplace, personal) features (Robertson HD et al., 2016).

PROBLEM STATEMENT

The literature review suggests that emergency department doctors experience traumatic events in their work environment frequently. Yet there are a paucity of data in any African country examining the relationship between these traumatic events and the onset of PTSD. Examining the relationship between the traumatic events, a range of socio-demographic variables and PTSD symptoms may provide insight for future observational and epidemiological studies.

JUSTIFICATION:

The prevalence of trauma exposure in South Africa is particularly high, with 73.8% of a nationally representative sample of the general population reporting having experienced a potentially traumatic event, with an average of 4.3 occurrences and lifetime and 12-month prevalence rates of PTSD 2.3% and 0.7% respectively (Atwoli L et al., 2013) (Stein DJ et al., 2008) (Herman AA et al., 2009). There have been several studies in South Africa of predictors and correlates of PTSD in specific groups e.g. rape survivors (van der Walt L et al., 2014, Malan S et al., 2011), HIV positive women (Hansrod F et al., 2014) school children and adolescents (Suliman S et al., 2009, Seedat S et al., 2000). As mentioned earlier these analyses have not been conducted among samples of emergency department doctors. Furthermore, we know little of those who do not develop PTSD and what protective factors are reducing the risk of PTSD. The study seeks to contribute to the literature on resilience in relation to PTSD.

STUDY AIM:

Therefore, this study aimed to fill the gaps identified in the literature by examining the relationship between resilience, several work related traumatic events and PTSD symptoms in emergency medicine doctors in Johannesburg Metropolitan District Health Facilities in South Africa.

METHODS:

PARTICIPANTS AND PROCEDURES

Inclusion criteria were: All medical doctors who work in 24-hour accident and emergency departments in the Johannesburg Metropolitan Health District, whether full or part-time. Nurses were not recruited into this study. This decision was taken to reduce potential confounders affecting the nursing experience in the emergency department context. These potential confounders include burnout, the inability to influence what happens in their job environment as they are dependent on instruction from doctors to perform their tasks, and an increased propensity for secondary traumatic stress or compassion fatigue since they are may be

intimately involved with patient care (Adriaenssens J et al., 2015) (Dominguez-Gomez E and Rutledge DN, 2009).

In an attempt to identify all potential study participants, heads of eligible accident and emergency departments at the various hospitals and Community Health Centres (CHCs) and the Head of the University of the Witwatersrand Emergency Medicine Registrar Training Programmeⁱ were approached for a list of the electronic mail (email) addresses of their department staff. Medical intern representatives were also approached for a list of the email addresses of their colleagues. At this stage, a potential convenient sample included: medical internsⁱⁱ, community service doctorsⁱⁱⁱ, medical officers^{iv}, emergency medicine registrars^v and emergency medicine consultants^{vi} with varying experience.

Utilizing Redcap software, an electronic self-administered survey was then distributed by the Heads of Departments from the various health facilities and the University of the Witwatersrand Emergency Medicine Registrar Training Programme. A total of 609 surveys were distributed. If surveys were returned and were incomplete, weekly reminders were sent requesting participants to return a complete survey. If surveys were not returned at all, reminders were also sent to encourage participants to return the survey. These reminders were sent for 3 consecutive weeks.

In addition, after discussion with my supervisors, a second round of data collection was conducted to recruit more complete surveys. At the end of the second survey distribution period, incomplete surveys were discarded.

The recruitment strategies are presented in Figure 1 below:

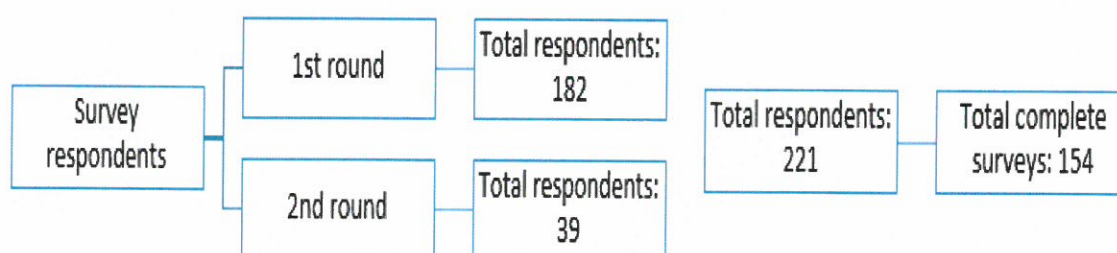


Figure 1

Data were collected over a period of seven months between April and October 2018 from emergency departments including six CHCs, two District Hospitals, one Tertiary Hospital and two Central Hospitals (See Table 1 below for further explanations of the research sites).

A response rate of 38.17% was attained, which mirrors the general online survey response rates of 33% - 37% shown in literature (Nulty D, 2008, Bartel K, 2001).

Table 1: Level of care provided by study sites

	CHC's	District hospital	Tertiary hospital	Central hospital
Care provided	Provides primary health care in addition to 24 hour services (accident and emergency/ maternity)	Provides generalist support and receives referrals from CHC's	Provides specialist support and receives referrals from District /Regional Hospitals	Provides Highly specialized Care
Facilities included in this study	Lenasia South, Hillbrow, Alexandra, Chiawelo, Lillian Ngoyi and Discoverers CHC.	South Rand Hospital, Bheki Mlangeni,	Helen Joseph Hospital	Charlotte Maxeke Johannesburg Academic Hospital and Chris Hani Baragwanath Academic Hospital

Definitions of Health Facilities (National Department of Health: Republic of South Africa, 2012)

MEASURES

Work related traumatic events

Information regarding work related traumatic events was elicited by asking respondents to indicate exposure, on a binary scale, to a list of 13 potential work related traumatic event exposures in the emergency department as documented in previous literature. Two variables (frequency and total number of types of trauma exposed to) were created to gauge level of work related traumatic event exposure.

Potential confounders

In addition to self-reported responses to work related traumatic events, participants also provided demographic and professional information to account for any potential confounders. Predictive confounders from previous literature included positive family history of psychiatric co-morbidity (Allan A et al., 1998) and prior history of trauma (in this study, years worked in emergency department used as a proxy for prior work-related trauma exposure) (Schurr P.P et

al., 1993) (Breslau N et al., 2008). In this study the decision to use years worked in the emergency department as a proxy for prior work-related trauma exposure is supported by previous literature. Specifically the literature demonstrates the heightened risk of PTSD among first responders who have experienced cumulative work-related traumatic exposure over time (Geronazzo-Alman L and et al., 2017). Additionally, female gender (Olf M et al., 2007), the nature and severity of trauma experienced, co-morbid psychiatric disorders (Digangi JA et al., 2013), lack of social support (relationship status used as a proxy for social support in this study) and alcohol dependence (Head M et al., 2016) have also been shown to increase the likelihood of PTSD (Seedat S, 2013), and as such, these variables have been included in the study survey. The use of relationship status as a proxy for social support was informed by literature emphasizing that traditionally marital status has been regarded as a determinant of various forms of well-being (Soons JPM and Liefbroer AC, 2008). Generally, literature supports that married people convey higher levels of well-being compared to those who have never married, are separated or divorced, or widowed (Kamp Dush CM and Amato PR, 2005). Furthermore, involvement in a romantic relationship was found to be predictive of higher perceived social support, with several studies demonstrating that married persons reporting significantly greater support from their significant other compared to single individuals (Prezza M and Pacilli MG, 2002) (Zimet GD et al., 1990). Additionally, the use of relationship status as a proxy for social support is based on the limitation of social capital measurement i.e. that no direct measure exists and often it is measured indirectly with the use of proxy variables.

These potential confounders were included in the final regression model irrespective of their significance in the initial multivariate linear regressions. Furthermore, employment status was included in the final regression model to control for the assumed different traumatic event exposure (in terms of frequency) experienced by full versus part time work in the emergency department.

PTSD symptoms

The Impact of Events revised (IES-R) Scale (Weiss D and Marmar C, 1997) was employed in this study to examine PTSD symptoms in relation to a work related traumatic events. The IES-R is a self-report questionnaire with 22 questions, rated on a 5 point Likert scale (Not at all = 0, A little bit=1, Moderately= 2, Quite a bit= 3, Extremely= 4).

In a study investigating the psychometric properties of the IES-R scale among two samples of male Vietnam veterans, one with a confirmed PTSD diagnosis compared to one with varying

levels of traumatic stress symptoms, the scale showed comparability to the PTSD checklist for DSM-5, screening tool ($\alpha=0.96$)(Creamer M and Failla S, 2003). Similarly, the IES-R scale was shown to be valid ($\alpha=0.94$) in this study. The IES-R scale has shown to be psychometrically sound and accessible and has been used in emergency medical service personnel in both Pakistan and South Africa to examine PTSD and its predictors (Ward CL et al., 2006) (Kerai SM et al., 2017). These studies suggest that the tool is reliable when administered to healthcare workers from low and middle income country contexts. Although the tool is not a diagnostic or screening tool, it is a useful tool for self-report measure for assessing PTSD symptom clusters (i.e. intrusion, avoidance and hyper-arousal)(American Psychiatric Association, 2013).

While there are no reference cut-off scores, a higher overall IES-R score suggests more severe PTSD symptoms. There have been several cut-off values suggested for probable diagnosis of PTSD in literature. However, these cut-off values were based on specific population groups i.e. traumatized substance dependent individuals (Rash CJ et al., 2008) and male Vietnam veterans (Creamer M and Failla S, 2003). The cut off scores suggested may reflect distress associated with PTSD after a traumatic event not a PTSD diagnosis (Motlagh H, 2010).

Participants were asked to identify exposure to a thirteen item work-related trauma inventory, and to indicate which of the identified work-related traumatic events they would consider to be the most severe event. Asking participants to nominate the worst trauma, a method developed by the World Mental Health Survey was employed. This method enables consideration of a wide range of traumas and attempts to reduce bias in addressing PTSD aetiology (Kessler RC et al., 2017) . Furthermore, the worst events approach is ideal when generating PTSD estimates in persons who have experienced one or more traumas in their lifetime (Kessler R.C et al., 1995) (Breslau N, 2002).

Resilience

The Connor Davidson Resilience Scale 10 item (CD-RISC 10), an adaptation of the original 25 item scale, is a 10 item scale intended to measure resilience on a unidimensional, self-reported, 5 point Likert scale (Not true at all = 0, Rarely true =1, Sometimes true = 2, Often true= 3, True nearly all the time = 4) (Campell-Sills L and Stein MB, 2007). Total scores are calculated by the summation of each item score, with higher scores indicating higher resilience. Resilience was categorized using cut off values suggested in previous literature, in which the effects of psychiatric disorder and lifetime trauma history on self-perceived resilience amongst high-risk

women (breast cancer survivors) was assessed utilizing resilience tertile reference scores (Scali J et al., 2012). Validity of the CD-RISC 10 was confirmed in this study ($\alpha = 0.86$). The primary supervisor, Dr Sumaya Mall has permission to use this scale from the authors of the tool.

ETHICAL CONSIDERATIONS

In addition to permission from facility Heads of department, institutional ethics approval from the University of the Witwatersrand Human Ethics Committee was granted for this study.

Participant consent was assumed by the completion of the study questionnaire, subsequent to reading the study information leaflet included in the survey. Participants also indicated consent electronically.

SAMPLE SIZE CONSIDERATIONS:

Sample size considerations were based on a previous meta-analyses of PTSD risk in healthcare workers which suggested a PTSD prevalence of 10% (de Boer J et al., 2011, Berger W et al., 2012). Assuming an infinite population, 5% error and a 10% PTSD prevalence, we estimated a sample size of 138 to attain power of 98%.

DATA ANALYSIS:

Data were analyzed using Stata v13.

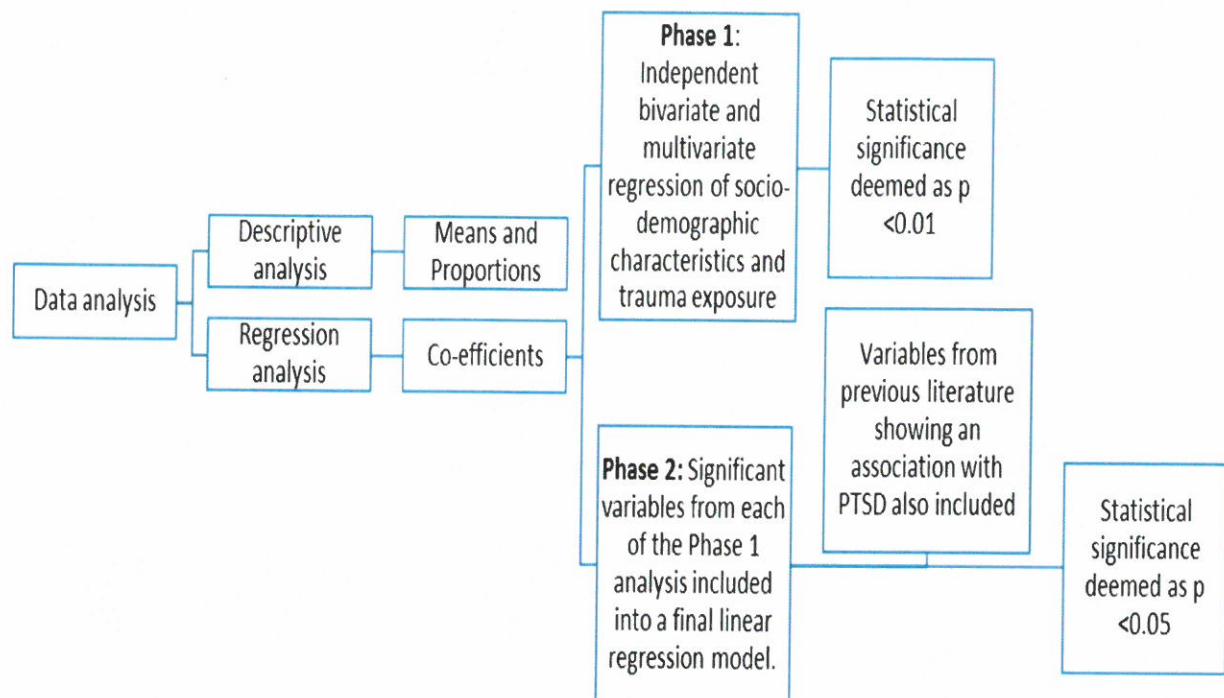
The data analysis stage consisted of several phases:

1. For ease of interpretation, descriptive analysis was conducted using a binary outcome variable (PTSD), which was derived from well documented cut-off reference ranges of the IES-score for PTSD diagnosis (Weiss D.S, 2007). An IES-score of > 33 was considered to be highly suggestive of PTSD. Independent variables were compared with the binary dependent variable (PTSD category) using χ^2 for categorical variables, Fishers exact for cells with less than 5, and Student t-test for continuous variables.
2. Linear regression techniques were then used in the bivariate and multivariate analysis utilizing the continuous IES-score. Regression analysis was performed in three stages.
 - a. Initially socio-demographic characteristics of study participants were regressed with IES-score to identify significant predictors of higher IES-scores. Similarly, a linear regression of traumatic event exposures was conducted to identify significant traumatic event exposures.

- b. Significant variables (defined as $p < 0.10$) from the above two stage multivariate linear regression were then combined in a final multivariate linear regression.
- c. Any positive predictors identified in previous literature were also added into this final model, irrespective of their significance in the preliminary regression analysis. As mentioned earlier, these included positive family history of psychiatric co-morbidity (Allan A et al., 1998) and prior history of trauma (years worked in emergency department used as a proxy for prior work-related trauma exposure) (Schurr P.P et al., 1993) (Breslau N et al., 2008) Additionally, female gender (Olf M et al., 2007), the nature and severity of trauma experienced, co-morbid depression (Digangi JA et al., 2013), lack of social support (relationship status used as a proxy for social support in this study) and alcohol dependence have also been shown to increase the likelihood of PTSD (Seedat S, 2013).

In order to ensure a robust final multivariate model, the decision was made to set the significance level at $p < 0.1$ for the preliminary multivariate analyses, so as to ensure that a wide net of all potentially significant variables be included in the final model for significance estimation when socio-demographic and traumatic event exposure variables were regressed against each other.

For the final multivariate analysis, a significance level was set at $p < 0.05$. A schematic representation of the analysis is provided below (Figure 2)



RESULTS:

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

The socio-demographic characteristics of participants are presented in Table 1 of Appendix 2. A total of two hundred and twenty-one participants responded to this electronic survey, of which one hundred and fifty-four (69.68%) had completed the questionnaire.

The majority of participants were female (55.19%). The mean age of the sample was 31.05 years.

The majority (79.22%) were in relationships, whether married (44.81%), co-habiting (6.49%) or in a partnership (27.92%). Participants practiced emergency medicine primarily full time (71.43%), in central hospitals (64.94%) or were in their internship year of practice^{vii} (42.86%) with a mean number of 1.22 years spent in the emergency department.

While psychiatric illness - whether family history of psychiatric illness (24.03%), or personal co-morbidity (20.78%) - was not highly prevalent among participants, a self-reported diagnosis of depression (16.23%) was the most common psychiatric condition identified in those who indicated a history of personal psychiatric co-morbidity. Although alcohol consumption was relatively common amongst participants (57.79%), only 3.90% met CAGE criteria for alcohol

dependence. See Table 1 in Appendix 2: Data tables for tabulated descriptive analysis of socio-demographic characteristics of study participants.

TRAUMATIC EVENTS OF STUDY PARTICIPANTS:

Traumatic events data are presented in Table 2 of Appendix 2. Participants were highly exposed to work related traumatic events, having been exposed to a mean of 11.45 different types of work related traumatic events out of a possible 13. The most prevalent work related traumatic events included exposure to victims of physical assault (n=153), victims of violent injury (n = 153) and burns victims (n=151). In participants who indicated exposure to 'other' work-related traumatic events not specified in the survey, threat to personal safety (n=12) and bullying by colleagues (n=11) were the most prevalent. Frequency of traumatic events exposure was once a month in the majority of participants (51.30%). See Table 2 in Appendix 2: Data Tables for tabulated descriptive analysis of traumatic events in study participants.

RESILIENCE:

Resilience data are presented in Table 3 of Appendix 2. This study sample report high resilience with the majority ranking in the upper two tertiles i.e. intermediately resilient (n = 56 36.36%) or highly resilient (n=73 (47.40%). See Table 3 of Appendix 2: Data Tables for tabulated descriptive analysis of resilience in study participants.

PTSD PREVALENCE:

The prevalence of PTSD among study participants was 23.38%.

REGRESSION ANALYSIS:

SOCIO-DEMOGRAPHIC CHARACTERISTICS

Bivariate and multivariate linear regression analysis was used to examine the relationship with socio-demographic variables (See Table 4 of Appendix 2). Controlling for all other socio-demographic variables, age, gender and relationship status were statistically significant predictors of PTSD symptoms experienced in response to a traumatic event.

While age (CI: -0.02; 0.99, p =0.06) and being single (CI: 0.11; 23.95, p=0.05) increased the risk of PTSD symptoms, male gender appeared to be protective (CI: -12.20; -1.21, p = 0.02). In addition to the statistically significant variables mentioned above, potential confounders - depression, employment status and alcohol dependence - were selected, for inclusion in the final regression model as they were shown to be predictive for PTSD in previous literature. See

Table 4 of Appendix 2: Data Tables for linear regression analysis of socio-demographic characteristics of study participants.

TRAUMATIC EVENTS:

Bivariate and multivariate linear regression analyses are presented in Table 5 of Appendix 2. Controlling for all other work-related trauma exposure variables, years worked in the emergency department, exposure to victims of violent injury, exposure to suicide victims, bullying by colleagues, physical effects of work, frequency of trauma and displaying high resilience were statistically significant predictors of the risk of PTSD symptoms.

While years worked in the emergency department (CI: 0.08; 1.91, $p=0.03$), exposure to suicide victims (CI: -1.89 ; 24.28, $p=0.09$), bullying by colleagues (CI: 6.91 ; 26.25, $p=0.00$), physical effects of work (CI: -1.41 ; 42.70, $p=0.07$) and exposure to work-related trauma once a week (CI: 2.14 ; 13.99, $p=0.01$) increased PTSD symptoms experienced, high resilience appeared to be protective (CI: -14.72 ; 0.32, $p=0.06$). Exposure to victims of violent injury (CI: -64.92; 3.00, $p=0.07$) also appeared to be protective against PTSD symptoms in response to trauma. In addition to the statistically significant variables mentioned above, the total number of work-related trauma types exposed to was selected for inclusion in the final regression model. See Table 5 of Appendix 2: Data Tables for linear regression analysis of traumatic event exposure of study participants

FINAL REGRESSION MODEL:

The final regression model included all significant ($p<0.1$) variables from the preceding multivariate linear regression models for socio-demographic characteristics and traumatic event exposure of participants. It also included potential confounders identified from previous literature. A final multivariate linear regression was employed to examine PTSD symptoms experienced in response to work-related traumatic events when controlling for significant socio-demographic and work-related traumatic event exposures. The final multivariate linear regression model accounted for 35.75% variance in PTSD symptoms in response to traumatic events as a result of socio-demographic characteristics and work-related trauma exposure ($p=0.001$). See Table 6 of Appendix 2: Data Tables for final linear regression analysis of socio-demographic and work-related traumatic event predictors of PTSD symptoms.

Controlling for all other socio-demographic and work-related traumatic event exposure variables in the model, being single (CI: 1.43; 22.64, $p=0.03$), having been bullied by colleagues (CI: 3.81;

22.52, $p=0.01$) and experiencing work-related trauma once a week (CI: 1.42; 13.08, $p=0.02$) were predictive of increased PTSD symptoms in response to trauma. High resilience was significantly protective against PTSD symptoms (CI: -15.24; -0.07, $p=0.05$). Furthermore, exposure to victims of violent injury was once again shown to be protective against PTSD symptoms ($p=0.05$).

DISCUSSION:

This study yielded a number of interesting findings. First, trauma exposure in the emergency department is inevitable, being inherent in the nature of the work itself. However, not all individuals working in this high trauma setting will develop PTSD symptoms. The PTSD prevalence in this cohort was found to be 23.38%. In this study, a multivariate linear regression model suggests that work-related traumatic events were predictive of PTSD symptoms in emergency department doctors. Bullying by colleagues, frequency of traumatic event exposure and single relationship status were associated with higher PTSD symptoms in emergency department doctors. Mitigating factors against PTSD symptoms included high levels of resilience, male gender and exposure to victims of violent injury. Each of these findings are reflected upon below.

PTSD PREVALENCE:

This study yielded a point prevalence of 23.38% ($n=36$). In a meta-analysis examining PTSD prevalence among physicians, of both genders, the risk factors for the onset of PTSD symptoms were classified into four broad stressors, namely, i) working in conflict zones, ii) on the job stress, iii) treating trauma patients and iv) rural practice. The average PTSD prevalence, overall, in physicians was found to be 14.8% (average range 4.4% – 21.5%). When examining the stressors relevant to this study i.e. work related stress and treating trauma patients, the results were similar to those yielded by my study. The average PTSD prevalence ranged from 12.3% - 21.5%, with physicians who treat trauma patients having a higher PTSD prevalence (21.5%) (Sendler DJ et al., 2016).

SOCIO-DEMOGRAPHIC PREDICTORS OF PTSD SYMPTOMS:

Participants who were single demonstrated significantly higher PTSD symptoms, when compared to participants who were co-habiting with their partners, reiterating the role played by informal support systems in mitigating PTSD risk. When controlling for all other predictors of

PTSD symptoms in this study, male gender was found to be marginally protective against PTSD ($p=0.06$).

Previous studies have found similar results with regard to socio demographic characteristics potentially related to PTSD. When the effects of gender on PTSD risk was examined, women were found to be at higher risk of developing PTSD irrespective of type of trauma (Brewin CR et al., 2000). In a meta-analysis conducted on fourteen separate risk factors for PTSD in trauma exposed adults, intensity of trauma exposure and post-trauma factors such as - amongst others – lack of social support, were the strongest predictors of PTSD development (Brewin CR et al., 2000). There may well be a complex causal pathway associated with gender and PTSD e.g. females experiencing greater prior trauma, or demonstrating increased help seeking behavior, etc.(Brewin CR et al., 2000).

DIFFERENTIAL TRAUMA

Due to the ubiquitous nature of trauma exposure in South Africa, it is not unexpected that this cohort would be exposed to an array of work-related traumatic events. Trauma is pervasive in the South African context, with violence and injury forming part of the quadruple burden of disease which characterizes the country (Pillay-van Wyk V et al., 2016). The diverse nature of these traumatic event exposures is illustrated by the high total number of types of traumatic events exposed to (Mean 11.45, SD: 1.42) in this sample. Again, this multiplicity of traumatic event exposure is not unique to this cohort, and in fact, the majority of South African citizens experience multiple traumas (Williams SL et al., 2007). In contrast to the general population however, doctors working in the emergency department appear to be especially vulnerable to PTSD symptoms, exhibiting a PTSD prevalence almost ten times greater than that of the general South African population (Atwoli L et al., 2013). This could be as a result of traumatic event exposure frequency, given that weekly exposure to the self-nominated worst event trauma was predictive of higher PTSD symptoms ($p=0.02$). The notion that PTSD has a “building block” effect, suggests that it is the cumulative exposure to trauma that influences PTSD risk, supports this postulation (Schauer M et al., 2003). It is thus the repeated occurrence of traumatic stress, whether static or varied in nature, that eventually overwhelms psychological prowess and renders emergency department doctors vulnerable to PTSD.

While not prevalent in this study (20%), bullying by colleagues is the most predictive traumatic event exposure for PTSD symptoms ($p=0.01$). The Workplace Bullying Institute describes workplace bullying as, “a perpetrators need to control the targeted individual and requires

consequences for the targeted individual". These consequences are often negative for the targeted person and may result in physical or emotional injury or illness (Canadian Centre for Occupational Health and Safety). While workplace bullying is deemed to be an occupational health and safety hazard, a fine line exists between workplace bullying and "strong management". Though this "line" is often determined by an individuals' perception, it should always be supported by objective evidence that could be used to substantiate the claim of workplace bullying. The objective test provides for the inclusion of a repeated pattern of unreasonable behavior that poses a risk to an individuals' physical or mental health, to distinguish "true" bullying from an individuals' perception thereof (Brudner A, 2017).

Workplace bullying by colleagues is not uncommon in healthcare organisations (Roche M et al., 2010, Abe K and Henly SJ, 2010, Malinauskiene V and Einarsen S, 2014). Junior doctors are particularly at risk (Samsudin EZ et al., 2018), with between 50% - 84% experiencing at least 1 bullying incident in the last year (Scott J et al., 2008, Quine L, 2002). Common characteristics of workplace bullying emerged in a systematic review examining workplace bullying amongst nurses. Power dynamics were often incongruent, with perpetrators considered to be experts in their field, with the ability to decide whether to share their knowledge and resources with others (Autrey PS et al., 2013, Koh WMS, 2016). Furthermore, victims of workplace bullying were usually of younger age with less experience (Pai HC and Lee S, 2011). These systematic review findings in nurses is particularly interesting when converged with findings from my study in which the majority of respondents who reported bullying by colleagues were trainees i.e. medical interns (45.45%) or registrars (36.36%), and thus at the mercy of their potential perpetrators.

The other worst traumatic event reported was that of exposure to victims of violent injury. This traumatic exposure yielded surprising results, showing a protective effect against PTSD symptoms ($p=0.05$). A plausible explanation for this could be an extension of the so called scarring and mastering hypothesis. Zeiss and Lewinsohn proposed that depression may leave so-called scars which alter personality in ways that increase susceptibility to future depression (Zeiss AM and Lewinsohn PM, 1988, Kendler KS et al., 1993). Dienstbier, however, using the theory of psychophysiological toughness, argues that facing adversity may cultivate subsequent resilience (Dienstbier RA, 1989). This hypothesis has been concurred with by others and referred to as e.g. stress inoculation (Lyons DM and Parker KJ, 2007), thriving (Carver CS, 1998), or steeling (Rutter M, 2006). The theory of psychophysiological toughness proposes that stressors in fact have a positive toughening effect when exposure is limited and the opportunity

for recovery exists. Essentially, an individual masters psychological stress responses, under the correct conditions, when being exposed to stressors i.e. the mastering hypothesis (Seery MD et al., 2010). Drawing on these theories it is possible that exposure to victims of violent injury does not follow a unidirectional path to PTSD symptoms (the scarring effect), but in fact may be enhancing resilience in this cohort (mastering effect). Alternatively, this could be a chance finding given the overwhelming majority (n=153) that are exposed to this particular type of trauma, biasing the result away from the null hypothesis i.e. overestimating the true effect.

RESILIENCE

Resilience has a shielding effect against PTSD symptoms in this study ($p=0.05$). Health professional resilience is a multifaceted conglomeration of personal traits alongside contextual (social, workplace, personal) features (Robertson HD et al., 2016). Though there is a paucity of research on resilience in doctors, in particular, research on first responders have demonstrated consistent links between resilience and PTSD symptoms (Streb M et al., 2013). Pietrantonio and Prati concurred with the protective effect that resilience offers to those who experience critical incidents, and commented that resilience is, in fact, not rare amongst rescue workers (Pietrantonio L and Prati G, 2008). It is plausible that this could be due to, in part, personality traits that generally typify healthcare workers e.g. high self-directedness (conscientious, self-accepting and reliable), high persistence and low harm avoidance (higher tolerance of uncertainty and lower stress of conscience) (Robertson HD et al., 2016).

IMPLICATIONS OF PTSD SYMPTOMS IN HEALTHCARE WORKERS

Help seeking behavior amongst doctors with diagnosable PTSD is often found wanting (Einav S et al., 2008). The so-called “hidden curriculum” – the unwritten, unintended transmission of norms, values and perspectives (Giroux HA and Penna AN, 2012) – promotes a divisive medical culture. The maintenance of a facade of “toughness” or overt confidence often hinders help seeking behavior, exacerbating vulnerability to PTSD (Jin CJ et al., 2012).

PTSD has been shown to decrease the i) quality of care provided by healthcare workers (Hoge CW et al., 2007, Shanafelt TS et al., 2002), ii) work performance (North CS et al., 2002, Einav S et al., 2008), iii) perceived ability to cope with demands of work (Ruitenburg MM et al., 2012), iv) increased risk for medical errors, complications, and even death (Joseph B et al., 2014). The personal ramifications of PTSD in doctors can be debilitating and include a higher propensity for suicide, depression, abuse of substances and divorce/separation (Joseph B et al., 2014).

Several meta-analyses demonstrated that early targeted interventions aimed at symptomatic individuals can reduce PTSD symptom severity (Roberts NP et al., 2010) (Kliem S and Kroger C, 2013) (Bisson JI et al., 2015). Cognitive behavioural interventions that are brief and trauma-focused have demonstrated particular effectiveness (Roberts NP et al., 2010) (Kliem S and Kroger C, 2013) (Bisson JI et al., 2015). The utilization of non-targeted interventions including psychological debriefing post trauma exposure, individual and group psychotherapy, psychoeducation and non-targeted cognitive behavioural therapy programmes, are, however, essentially futile in the reduction of PTSD symptom burden (Bisson JI et al., 2015) (Rose S et al., 2002) (Roberts NP et al., 2009).

While PTSD is a recognized occupational disease in this population and compensable in accordance with the Compensation of Occupational Injuries and Disease Act 1993, occupational health service provision in South Africa is often uncoordinated, fragmented and inequitable (National Department of Health, 2003).

LIMITATIONS:

This study relied on self-reported PTSD symptoms, which could be problematic in numerous ways

- i. Self-reported symptoms are reliant on the self-awareness of the respondents, and it is thus plausible that the use of clinician guided interviews may have indeed elicited a significantly higher symptom prevalence (Cody MW et al., 2017). It is also a reasonable assumption that clinician guided interviews may have estimated lower symptom prevalence given their clinical expertise to interrogate and classify symptoms.
- ii. Due to traumatic dissociation, there remains the risk of recall bias, as all potentially traumatizing events may not be remembered (Freyd JJ, 1994).
- iii. As this was a voluntary study, the potential for refusal bias due to the potentially re-traumatizing nature of this survey is plausible (Newman E and D, 2009). An analysis of non-response could not be conducted as no data was available for non-responders.

Electronic distribution of the study survey could account for the low response rate (Nulty D, 2008). Due to the complex myriad of factors that predict PTSD outcomes, our study is limited in that it does not take into account other factors e.g. childhood trauma or recent stressors, which may confound the relationship of work-related traumatic events and PTSD symptoms in this

cohort (Brewin CR et al., 2000). Additionally, given the cross-sectional nature of this study, temporality cannot be established. Furthermore, PTSD symptoms was only explored in one health district, and this may reflect a unique population.

Bullying by colleagues could have been under reported and further longitudinal or cohort studies to elucidate these issues are thus recommended to explore this premise.

CONCLUSION:

The evidence generated by this study highlights the vulnerability of emergency department doctors to PTSD risk. Drawing from Brewins' meta-analysis (Brewin CR et al., 2000) on the predictors of PTSD risk, the most significant risk factors for the acquisition of PTSD are those associated with events during and post trauma exposure. Secondary prevention strategies are thus well placed to address PTSD symptom burden in this population. Mental health surveillance programmes aimed at early detection of PTSD symptoms and rapid intervention are thus recommended for emergency department doctors. Pre-placement strategies, as informed by a risk assessment based, to select the most resilient individuals for work in the emergency department could also be considered to lessen the PTSD symptom burden experienced by emergency department doctors. This pre-placement strategy is governed by the Occupational Health and Safety Act (85 of 1993) and aims to provide appropriate protection for vulnerable employees who are exposed to work-related hazards or threats to their well-being. New recruits into the emergency department should be screened for existing PTSD vulnerability, and those found to be especially at risk should be adequately educated regarding the inherent traumatizing nature of emergency department work. Once identified, at risk doctors should be offered additional support that is confidential and non-punitive.

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PLAGIARISM DECLARATION

I, Ché Linderts (Student number: 1586745), am a student registered for the degree of MMed Public Health Medicine in the academic year 2019.

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.

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Date: 16 October 2019

APPENDIX 2: DATA TABLES

TABLE 2:

DESCRIPTIVE ANALYSIS OF TRAUMATIC EVENTS IN STUDY PARTICIPANTS (N=154)

VARIABLE	N (%)	NO PTSD (%)	PTSD (%)
Sudden unexpected death of a patient			
No	5(3.25)	5(100.00)	0(0.00)
Yes	149(96.75)	113(75.84)	36(24.16)
Death of a baby or child			
No	11(7.14)	10(90.91)	1(9.09)
Yes	143(92.86)	108(75.52)	35(24.48)
Resuscitation of baby or child			
No	5(3.25)	4(80.00)	1(20.00)
Yes	149(96.75)	114(76.51)	35(23.49)
Car crash victims			
No	5(3.25)	1(20.00)	4(80.00)
Yes	149(96.75)	117(78.52)	32(21.48)
Train crash victims			
No	55(35.71)	40(72.73)	15(27.27)
Yes	99(64.29)	78(78.79)	21(21.21)
Victims of physical assault			
No	1(0.65)	1(100.00)	0(0.00)
Yes	153(99.35)	117(76.47)	36(23.53)
Victims of sexual assault			
No	11(7.14)	10(90.91)	1(9.09)
Yes	143(92.86)	108(75.52)	35(24.48)
Victims of violent injury			
No	1(0.65)	0(0.00)	1(100.00)
Yes	153(99.35)	118(77.12)	35(22.88)
Verbal abuse of self by patients or their relatives			
No	9(5.84)	8(88.89)	1(11.11)
Yes	145(94.16)	110(75.86)	35(24.14)

Burn victims			
No	3(1.95)	3(100.00)	0(0.00)
Yes	151(98.05)	115(76.16)	36(23.84)
Suicide victims			
No	9(5.84)	9(100.00)	0(0.00)
Yes	145(94.16)	109(75.17)	36(24.83)
Threat of personal violence			
No	29(18.83)	26(89.66)	3(10.34)
Yes	125(81.17)	92(73.60)	33(26.40)
Assault of self by patients or their relatives			
No	95(61.69)	74(77.89)	21(22.11)
Yes	59(38.31)	44(74.58)	15(25.42)
Other trauma exposures			
No	99(64.29)	80(80.81)	19(19.19)
Yes	55(35.71)	38(69.09)	17(30.91)
Other trauma exposure categories in those who indicated other trauma exposure			
No description of other trauma given	13(23.64)	10(76.92)	3(23.08)
Health system factors	4(7.27)	3(75.00)	1(25.00)
Mass casualty	3(5.45)	2(66.67)	1(33.33)
Threat to personal safety	12(21.82)	9(75.00)	3(25.00)
Bullying by colleagues	11(20.00)	4(36.36)	7(63.64)
Child abuse	4(7.27)	4(100.00)	0(0.00)
Racial discrimination	2(3.64)	2(100.00)	0(0.00)
Physical effects of work	2(3.64)	0(0.00)	2(100.00)
Professional uncertainty	3(5.45)	3(100.00)	0(0.00)
Threat of litigation	1(1.82)	1(100.00)	0(0.00)
Frequency of most traumatic exposure			
Once a month	79(51.30)	66(83.54)	13(16.46)
Once a week	42(27.27)	28(66.67)	14(33.33)
2-3 times a week	19(12.34)	13(68.42)	6(31.58)
Almost daily	14(9.09)	11(78.57)	3(21.43)
Total number of types of trauma exposed to			
	Mean: 11.45	Mean: 11.38	Mean: 11.67
	SD: 1.42	SD: 1.51	SD: 1.07

Years worked in ED	Mean: 1.22 SD: 2.75	Mean: 0.94 SD: 2.05	Mean: 2.14 SD: 4.21
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TABLE 3:

DESCRIPTIVE ANALYSIS OF RESILIENCE IN STUDY PARTICIPANTS (N=154)

Resilience	N (%)	NO PTSD (%)	PTSD (%)
Low	25(16.23)	18(72.00)	7(28.00)
Intermediate	56(36.36)	45(80.36)	11(19.64)
High	73(47.40)	55(75.34)	18(24.66)

TABLE 4:

SOCIO-DEMOGRAPHIC PREDICTORS OF PTSD SYMPTOMS IN RESPONSE TO WORK RELATED TRAUMA

VARIABLE	<u>BIVARIATE ANALYSIS</u>			<u>MULTIVARIATE ANALYSIS</u>		
	CO- EFF*	CI **	P***	CO- EFF*	CI**	P***
Age	0.20	-0.09 ; 0.49	0.18	0.48	-0.02 ; 0.99	0.06
Sex						
Male	-5.39	-10.41 ; -0.37	0.04	-6.71	-12.20 ; -1.21	0.02
Female	Base					
Relationship Status:						
Single	13.69	2.36 ; 25.01	0.02	12.03	0.11 ; 23.95	0.05
In a relationship	10.18	-0.75 ; 21.12	0.07	7.81	-3.64 ; 19.25	0.18
Married	10.97	0.43 ; 21.50	0.04	5.83	-5.59 ; 17.26	0.31
Divorced	17.30	-15.36 ; 49.96	0.30	9.24	-24.91 ; 43.38	0.59
Co-Habiting	Base					
Facility Level						
District Hospital	-7.07	-18.32 ; 4.18	0.22			

Regional Hospital	-3.79	-13.55 ; 5.97	0.44			
Central Hospital	0.97	-5.91 ; 7.86	0.78			
Community Health Centre	Base					
Staff Category						
Intern	2.73	-6.84 ; 12.31	0.57			
Medical officer	4.92	-5.67 ; 15.51	0.36			
Registrar	6.30	-3.99 ; 16.58	0.23			
Consultant	3.00	-9.37 ; 15.37	0.63			
Community service	Base					
Employment status in the emergency department						
Full- time	-0.98	-6.58 ; 4.63	0.73	-4.99	-11.44 ; 1.46	0.13
Part- time	Base					
Family history of psychiatric illness						
Yes	2.85	-3.07 ; 8.76	0.34			
No	Base					
Personal history of psychiatric co-morbidity						
Yes	6.30	0.13 ; 12.46	0.05			
No	Base					
Psychiatric co-morbidity						
Anxiety-related disorder						
Yes	1.46	-7.99 ; 10.90	0.76			
No	Base					
Depression						
Yes	7.83	1.07 ; 14.58	0.02	2.27	-14.37 ; 18.91	0.79
No	Base					
Other mood related disorder						
Yes	9.73	-21.76 ; 41.24	0.54			
No	Base					
Other not specified						
Yes	-4.41	-22.73 ; 13.91	0.64			
No	Base					
Alcohol consumption						

Yes	1.04	-4.09 ; 6.17	0.69			
No	Base					
Criteria met for alcohol dependence (in those who consume alcohol)						
Yes	14.23	0.95 ; 27.51	0.04	10.50	-17.45 ; 38.44	0.46
No	0.30	-4.86 ; 5.47	0.91	1.81	-22.33 ; 25.94	0.88
Not applicable	Base					

*CO-EFF depicts the co-efficient of the IES-R score

** CI depicts the 95% confidence interval

***P depicts the p-value

TABLE 5:
TRAUMA EVENT PREDICTORS OF PTSD SYMPTOMS IN RESPONSE TO WORK RELATED TRAUMA

VARIABLE	BIVARIATE ANALYSIS			MULTIVARIATE ANALYSIS		
	CO-EFF*	CI**	P***	CO-EFF*	CI**	P***
Years worked in ED	0.90	-0.01 ; 1.82	0.05	1.00	0.08 ; 1.91	0.03
Sudden unexpected death of a patient						
Yes	9.64	-4.57 ; 23.85	0.18			
No	Base					
Death of a baby or child						
Yes	7.30	-2.47 ; 17.07	0.14			
No	Base					
Resuscitation of baby or child						
Yes	6.54	-7.72 ; 20.79	0.37			
No	Base					
Car crash victims						
Yes	-17.86	-31.86 ; -3.85	0.01			
No	Base					
Train crash victims						
Yes	0.67	-4.61 ; 5.96	0.80			

No	Base					
Victims of physical assault						
Yes	10.39	-21.11 ; 41.89	0.51			
No	Base					
Victims of sexual assault						
Yes	7.30	-2.47 ; 17.07	0.14			
No	Base					
Victims of violent injury						
Yes	-37.92	-68.87 ; -6.97	0.02	-30.96	-64.92 ; 3.00	0.07
No	Base					
Verbal abuse of self by patients or their relatives						
Yes	5.54	-5.23 ; 16.30	0.31			
No	Base					
Burns victims						
Yes	18.69	0.60 ; 36.77	0.04			
No	Base					
Suicide victims						
Yes	14.98	4.45 ; 25.51	0.01	11.20	-1.89 ; 24.28	0.09
No	Base					
Threat of personal violence						
Yes	5.50	0.92 ; 11.92	0.09			
No	Base					
Assault of self by patients or their relatives						
Yes	1.92	-3.28 ; 7.12	0.47	Omitted due to collinearity		
No	Base					
Other trauma exposures						
Yes	5.40	0.19 ; 10.62	0.04			
No	Base					
Other trauma exposure categories in those who indicated other trauma exposure						
No description of other trauma given	4.22	-4.88 ; 13.32	0.36	3.31	-6.32 ; 12.94	0.50

Health system factors	7.21	-6.93 ; 21.34	0.32	5.22	-8.63 ; 19.06	0.46
Mass casualty	6.94	-11.13 ; 25.01	0.45	6.97	-10.45 ; 24.39	0.43
Threat to personal safety	-2.30	-12.10 ; 7.50	0.64	-4.09	-13.81 ; 5.63	0.41
Bullying by colleagues	15.24	5.44 ; 25.04	0.00	16.58	6.91 ; 26.25	0.00
Child abuse	1.61	-14.12 ; 17.33	0.84	5.74	-10.00 ; 21.47	0.47
Racial discrimination	4.11	-17.92 ; 26.13	0.71	-3.58	-25.16 ; 18.00	0.74
Physical effects of work	20.11	-1.92 ; 2.13	0.07	20.65	-1.41 ; 42.70	0.07
Professional uncertainty	0.27	-17.80 ; 18.35	0.98	0.41	-17.25 ; 18.08	0.96
Threat of litigation	-12.39	-43.39 ; 18.60	0.43	-9.90	-40.20 ; 20.40	0.52
No	Base					
Frequency of most traumatic event						
Almost daily	0.44	-8.46 ; 9.34	0.92	2.75	-6.33 ; 11.83	0.55
Once a week	8.58	2.72 ; 14.45	0.00	8.07	2.14 ; 13.99	0.01
2-3 times a week	6.01	-1.84 ; 13.85	0.13	5.50	-2.66 ; 13.66	0.19
Once a month	Base					
Total number of types of trauma exposed to	1.84	0.07 ; 3.60	0.04	-1.37	-6.93 ; 4.20	0.63
Resilience						
Intermediate	-5.22	-12.75 ; 2.31	0.17	-5.98	-13.64 ; 1.67	0.12
High	-5.61	-12.86 ; 1.64	0.13	-7.20	-14.72 ; 0.32	0.06
Low	Base					

*CO-EFF depicts the co-efficient of the IES-R score

** CI depicts the 95% confidence interval

***P depicts the p-value

TABLE 6:

PREDICTORS OF PTSD SYMPTOMS IN RESPONSE TO WORK-RELATED TRAUMA

VARIABLE	CO-EFFICIENT	CONFIDENCE INTERVAL	P-VALUE
Age	0.24	-0.16 ; 0.66	0.23
Gender			
Male	-4.84	-9.93 ; 0.25	0.06
Female	Base		
Relationship status			
Single	12.03	1.43 ; 22.64	0.03
In a relationship	9.02	-1.19 ; 19.24	0.08
Married	7.22	-3.27 ; 17.71	0.18
Divorced	15.02	-18.27 ; 48.32	0.37
Co-Habiting	Base		
Depression			
Yes	3.30	-3.66 ; 10.27	0.35
No	Base		
Employment			
Full-time	-1.89	-7.63 ; 3.86	0.52
Part-time	Base		
Years in emergency department	0.89	-0.11 ; 1.90	0.08
Total number of types of trauma exposed to	1.37	-0.65 ; 3.39	0.18
Victims of violent injury			
Yes	-30.53	-60.38 ; -0.67	0.05
No	Base		
Suicide victims			
Yes	7.81	-3.93 ; 19.54	0.19

No Base

Other trauma exposure categories in those who indicated other trauma exposure

No description of other trauma given	1.76	-7.09 ; 10.61	0.70
Health system factors	2.64	-11.35 ; 16.62	0.71
Mass casualty	6.48	-10.52 ; 23.50	0.45
Threat to personal safety	-6.31	-16.65 ; 4.03	0.23
Bullying by colleagues	13.17	3.81 ; 22.52	0.01
Child abuse	4.02	-11.47 ; 19.59	0.61
Racial discrimination	-1.86	-22.83 ; 19.10	0.86
Physical effects of work	14.02	-7.23 ; 35.27	0.19
Professional uncertainty	-3.89	-20.73 ; 12.95	0.65
Threat of litigation	-4.62	-33.34 ; 24.11	0.75
No	Base		

Frequency of most traumatic exposure

Almost daily	4.09	-5.94 ; 11.38	0.54
Once a week	7.25	1.42 ; 13.08	0.02
2-3 times a week	2.72	-4.00 ; 12.17	0.32
Once a month	Base		

Resilience

Intermediate	-7.51	-15.26 ; 0.25	0.06
High	-7.65	-15.24 ; -0.07	0.05
Low	Base		

Alcohol dependence

Yes	10.63	-2.32 ; 23.57	0.11
No	0.63	-5.00 ; 6.25	0.83
Not applicable	Base		

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TRAUMATIC STRESS (PTSD) SYMPTOMS IN EMERGENCY MEDICINE DOCTORS IN JOHANNESBURG, SOUTH AFRICA

1. BACKGROUND:

Posttraumatic stress disorder (PTSD), classed under “Trauma and Stress Related Disorders (1) in the Diagnostic and Statistical Manual (DSM- V), is a psychiatric condition preceded by a traumatic event e.g. direct experience of rape, sexual assault, physical violence or witnessing a traumatic event. PTSD, which could be preceded by one or more such traumatic events, can be debilitating with symptom clusters including 1. Re-experiencing. 2. Avoidance. 3. Hyperarousal. (See Figure 1) (1).

The established diagnosis of Post-Traumatic Stress Disorder (PTSD) first appeared in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) in 1980(3), prompted by war veterans returning from the Vietnam War who experienced what was then termed a “gross stress reaction”(4) . Globally, several studies have explored risk of PTSD in the military sphere as well as among civilians who have experienced or witnessed a traumatic event or several traumatic events (5, 6).

According to global studies, PTSD remains amongst the most frequently occurring trauma-and-stress related disorders, both in terms of lifetime and 12 month prevalence rates (7). The National Comorbidity Survey Replication (NCS-R) study (done in the USA), estimates the lifetime prevalence of PTSD to be 6.8% (7), compared to the 12-month prevalence of 3.5% in adult Americans(7). The South African Stress and Health Study (SASH), suggests lower rates for both lifetime and 12 month prevalence at 2.3% and 0.6% respectively (8) in South Africa. Furthermore, PTSD bore the highest percentage of severe cases, with an estimated 36% of affected individuals, being severely ill (8). The SASH also demonstrated that exposure to at least one potentially traumatizing event was particularly prevalent, with over 70% of the population being exposed. (8).

Several studies suggest that while only a fraction of individuals who experience a traumatic incident will go on to develop PTSD, the vast majority will encounter some form of a stress reaction (9). This stress reaction is predicted by a complicated interplay of pre-and-post trauma factors that influence an individual’s vulnerability to the development of PTSD (9)These factors include family history (9), prior history of trauma (10), life events (10) and, individual personality(10). Additionally, female gender, the nature and severity of trauma experienced, co-morbid psychiatric disorders and lack of social support have also been shown to increase the likelihood of PTSD(11).

In South Africa, there remains a paucity of research regarding PTSD risk in healthcare providers, and medical doctors in particular, with many studies done either at a national level amongst civilians (8), or amongst specific interest groups

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workers consistently show higher PTSD prevalence rates, with studies (done in the UK) estimating PTSD rates in this population ranging from 20% - 21%,(23, 24), with an additional one third showing evidence of some degree of psychiatric co-morbidity (25). Closer to home, Western Cape Province ambulance service workers revealed that 88% reported having experienced a critical incident in the past 2 months alone(26) as compared to Swedish ambulance drivers, of whom only 61.6% reported having *ever* experiencing a critical incident (27), with PTSD prevalence rates of 6.67% (28) –uncharacteristically low in comparison to the global estimate prevalence of 15% (28). Authors however did caution these rates must be reviewed with skepticism as the instrument utilized was not calibrated for this context (28).

PTSD IN HEALTHCARE WORKERS

Emergency room doctors perform some of the most taxing work in the medical fraternity, with one of their core competencies involving responding to traumatic injury and death. Duty-related critical incidents, defined as ‘a sudden unexpected event that has an emotional impact sufficient to overwhelm the usually effective coping skills of an individual and cause significant psychological stress’(21) have the ability to evoke post-traumatic stress symptoms or even PTSD, as well as other mental health conditions such as anxiety, and depression(21). Psychological stressors associated with emergency medicine include amongst others, a demanding working environment – due to exposure to duty related critical incidents, repeated incidents in short succession, care for a dependent populace, and emotional responses to persons who may be critically ill or on the verge of succumbing.(29) Additionally, they are also susceptible to assault (physical/verbal) by patients (17). When occupational trauma was studied in departments dealing with trauma, 48% of healthcare personnel reported emotional distress due to the inherent nature of their work itself (30). In a cohort of surgical trainees in the UK, 16% of subjects had pathological symptoms consistent with acute stress reaction or PTSD according to psychological screening(31), with those having higher/more predictive PTSD scores being more likely to have repeated years of training, having witnessed more severe pain, traumatic injury and patients with acute haemorrhage (31). Similarly, when the prevalence of secondary traumatic stress (STS) – a predictor of PTSD- was studied among emergency nurses from three general community hospitals in California, 33% met all criteria for STS, with 85% reporting at least one symptom in the past week (32).

There have been reports of PTSD in physicians subsequent to responding to mass casualty events, with physicians who are involved with patient mortality, developing PTSD symptomatology at a greater rate compared to physicians who did not observe patient death(33), echoing a study done on pre-hospital and in-hospital care providers including paramedics, nurses, trauma surgeons, emergency medicine physicians, and residents, in which it appeared that the more intimate the provider is with the injured patient or situation, the more likely they are to screen positive for PTSD

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i.e. to preserve healthy levels of psychological and physical functioning, despite experiencing a potentially disruptive event (critical incident) (42). Though there is a paucity of research on resilience in doctors, in particular, research on first responders have demonstrated consistent links between resilience and PTSD symptoms. In a study examining the effects of resilience and sense of coherence (SOC) on PTSD symptoms in paramedics, Streb and colleagues demonstrated that a negative correlation exists between PTSD and resilience and SOC (43), with 19.2% of the total variance in symptom severity explained by these variables(43). Pietrantonio and Prati concurred with the protective effect that resilience offers to those who experience critical incidents, and commented that resilience is in fact not rare amongst rescue workers (44).

A systematic review conducted to broaden the current understanding of primary care health worker resilience (45) revealed that females were more likely to succumb to destructive coping behaviours, and suggests that this could be as a result of competing roles or needs experienced by females i.e. challenging nature of work and raising a family with a resultant lack of recreational time (46). Effect sizes for gender, however, were small (45). Furthermore, studies focused on the association of personality traits and resilience, revealed that resilient physicians were typified by high self-directedness (conscientious, self-accepting and reliable), high persistence and low harm avoidance (higher tolerance of uncertainty and lower stress of conscience) (45). When workplace factors were scrutinized, emotional resilience was decreased with and increasing number of hours worked per week (47). Conversely, emotional resilience was increased by having greater control over time and content of work (47). The systematic review concludes that health professional resilience is a multifaceted conglomeration of personal traits alongside contextual (social, workplace, personal) features(45).

3. JUSTIFICATION:

The prevalence of trauma exposure in South Africa is particularly high, with 73.8% of a nationally representative sample of the general population reporting having experienced a potentially traumatic event (8), with an average of 4.3 occurrences (8) and lifetime and 12-month prevalence rates of PTSD 2.3% and 0.7% respectively (8).

While there has been a focus on PTSD in victims of trauma, PTSD in those who care for the injured has not been well studied. Critical incident rates as well as mental health illness, specifically PTSD, remains undocumented in this population, and I postulate that South African PTSD rates might be greater than those in literature from the developed world, given potential higher exposure to traumatic events.

4. HYPOTHESIS

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Definitions of Health Facilities(2)

7.3 STUDY POPULATION:

All emergency medicine specialists, registrars and other doctors who work in 24 hour emergency departments in the City of Johannesburg district facilities will be enlisted to be enrolled in this study.

7.4 SAMPLING:

7.4.1 SAMPLE SIZE:

While operational statistics for the ALL individual facilities were not available at the time of drafting this protocol, I will extrapolate data obtained from different levels of care. Thus, assuming the same trends, the total amount of doctors in Johannesburg Metro emergency departments equates to 295. Utilising EPI info software, with an assumed PTSD prevalence of 50% (given that the precise prevalence in this population is not known), my sample size would need to be 167. With an estimated 20% rate for non-response, the sample size required would be 201.

7.4.2 SAMPLING STRATEGY:

The heads of the emergency medicine departments for all eligible City of Johannesburg health district facilities will be approached in order to:

- Formally introduce myself and my proposed dissertation
- To ascertain whether there are any departmental academic meetings or similar fora, at which all doctors will be present.
 - If these fora exist: I will present my proposed study and invite doctors to participate at this juncture
 - If these fora do not exist: I will obtain the contact details of the doctors from the head of unit and forward my study information sheet via email along with a REDCAP link to my questionnaire.

DR CHE LINDERTS
RESEARCH PROTOCOL: 1586745
THE RELATIONSHIP BETWEEN RESILIENCE, WORK RELATED TRAUMA AND POST
TRAUMATIC STRESS (PTSD) SYMPTOMS IN EMERGENCY MEDICINE DOCTORS IN JOHANNESBURG, SOUTH AFRICA

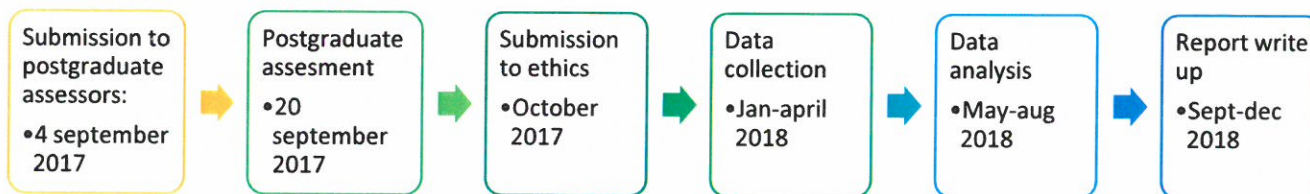
To describe the demographic characteristics of emergency medicine doctors	DEMOGRAPHIC QUESTIONNAIRE	Continuous variables will be analysed with Means (SD) or Medians (IQR) Categorical variables will be analysed with frequencies or proportions
If work related trauma is associated with PTSD symptoms among emergency medicine doctors	WORK-RELATED TRAUMA QUESTIONNAIRE IMPACT OF EVENTS SCALE REVISED QUESTIONNAIRE	WORK- RELATED TRAUMA: Continuous variables will be analysed with Means (SD) or Medians (IQR) Categorical variables will be analysed with frequencies or proportions IMPACT OF EVENTS SCALE: Items are rated on a 5 point Likert scale ranging from 0 (not at all) to 4(extremely). This tool yields a total score which ranges from 0 to 88. Means (SD) will be used to analyse subscales of intrusion, hyperarousal and avoidance, in addition to total scores
If any personal factors are associated with resilience to PTSD among emergency health workers in the Gauteng Province of South Africa	CONNOR DAVIDSON REVISED RESILIENCE SCALE	CONNOR DAVIDSON RESILIENCE SCALE: 10 items are each rated on a 5 point scale (0-4), with higher scores reflecting greater resilience. Means will be used to analyse this tool
To determine the association between explanatory variables (work related trauma) and outcome (PTSD)	UNIVARIATE ANALYSIS: Chi square test will be used to determine if there are differences in PTSD between those doctors who have work-related trauma exposure. A p-value of <0.05 will be regarded as statistically significant MULTIVARIATE ANALYSIS: Logistic regression analysis will be conducted to determine association between work-related trauma and PTSD	

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ELECTRONIC QUESTIONNAIRE COMPLETION: Consent will be assumed on the completion of the electronic survey. A brief description of the dissertation will be provided prior to commencement of the questionnaire, and should the participant not wish to complete the questionnaire, it will be terminated. REDCAP software enables this process through its auto-terminate function should participants indicate that they are not willing to participate.

MANUAL QUESTIONNAIRE COMPLETION: Informed consent forms will form part of the study pack distributed to eligible participants. Manual completion of the informed consent form will thus be required as proof of consent to study participation.

13. PROJECT TIMELINE:



14. BUDGET: This is a self-funded research project. The only foreseeable expenditure will be that of transport cost to the facilities (an estimated R700) and stationery cost for the printing of my data collection tool (an estimated R 1000).

*******END*******

DR CHE LINDERTS
RESEARCH PROTOCOL: 1586745

THE RELATIONSHIP BETWEEN RESILIENCE, WORK RELATED TRAUMA AND POST
TRAUMATIC STRESS (PTSD) SYMPTOMS IN EMERGENCY MEDICINE DOCTORS IN JOHANNESBURG, SOUTH AFRICA

FIGURE 2:

DATA ANALYSIS PLAN

OBJECTIVE	VARIABLE	ANALYSIS
To describe the demographic characteristics of emergency medicine doctors in Johannesburg Metropolitan District Health Facilities in South Africa	CONTINUOUS VARIABLES: ○ Age ○ Length of employment CATEGORICAL VARIABLES: ○ Gender ○ Relationship status ○ Facility level at which employed ○ Professional category ○ Family psychiatric history ○ Personal psychiatric history	Continuous variables will be analysed with Means (SD) or Medians (IQR) Categorical variables will be analysed with frequencies or proportions
If work related trauma is associated with PTSD symptoms among emergency medicine doctors	EXPOSURE TO WORK-RELATED TRAUMA Dichotomous variables relating to the types of potentially traumatizing exposures experienced while at work SUBJECTIVE MOST TRAUMA: Respondents will be asked to respond to what they think the MOST traumatic exposure is TRAUMA SEVERITY: Frequency of the most traumatic exposure is categorically measured as a proxy for trauma severity IMPACT OF EVENT: Subjective responses the most traumatic exposure is measured and correlated to PTSD criteria	EXPOSURE TO WORK-RELATED TRAUMA: As this is a dichotomous variable, it will be analysed using counts and percentages SUBJECTIVE REFLECTION OF THE MOST TRAUMATIC EXPOSURE Counts and percentages will be used to analyse this variable TRAUMA SEVERITY: Counts and percentages will be used to analyse this variable IMPACT OF EVENT: Items are rated on a 5 point Likert scale ranging from 0 (not at all) to 4 (extremely). This tool yields a total score which ranges from 0 to 88. Means (SD) will be used to analyse subscales of intrusion, hyperarousal and avoidance, in addition to total scores
If any personal factors are associated with resilience to PTSD among emergency health workers in the Gauteng Province of South Africa	CONNOR DAVIDSON REVISED RESILIENCE SCALE	Means (SD) and medians (IQR) will be used to analyse this tool
To determine the association between explanatory	UNIVARIATE ANALYSIS: Chi square test will be used to determine if there are	

DR CHE LINDERTS
RESEARCH PROTOCOL: 1586745
THE RELATIONSHIP BETWEEN RESILIENCE, WORK RELATED TRAUMA AND POST
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UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM:

PRINCIPLE INVESTIGATOR: DR CHE LINDERTS

CONTACT DETAILS: che.linderts@wits.ac.za

HREC CLEARANCE NUMBER: M171195

TITLE OF RESEARCH PROJECT:

The relationship between resilience, work related trauma and post-traumatic stress (PTSD) symptoms in emergency medicine doctors in Johannesburg, South Africa.

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is entirely voluntary and you are free to decline participation. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you agree to take part.

This study has been approved by the Health Research Ethics Committee at University of Witwatersrand and will be conducted according to the ethical guidelines and principles of the International Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research

WHAT IS THIS RESEARCH STUDY ALL ABOUT?

This study aims to explore the relationship between work related trauma, resilience and PTSD symptoms in emergency medicine doctors in the Johannesburg Metropolitan Health District.

The primary inclusion criteria for this study is being a medical doctor, currently employed (both full and part-time) in the accident and emergency department in a 24 hour facility within the Johannesburg Metropolitan Health District.

HOW HAVE PARTICIPANTS BEEN IDENTIFIED?

In facilities where a forum for joint meetings exists, participants are approached for participation following a brief description of the proposed study. These participants will be approached to

complete manual self-administered questionnaires. Where these fora do not exist, contact details have been obtained from the head of unit, for electronic completion of the questionnaire.

WHO WILL BE SELECTED?

There will be no randomization or selection criteria as all qualifying doctors will be approached for potential participation

WHY HAVE YOU BEEN INVITED TO PARTICIPATE?

It is my hypothesis that the unique nature of work done in the emergency department may be placing accident and emergency medicine doctors at particular risk for the development of PTSD symptoms. While hypothesis has been proven in other study populations, there remains a paucity of research regarding PTSD risk in healthcare providers, and medical doctors in particular.

WILL YOU BENEFIT FROM TAKING PART IN THIS RESEARCH?

It is the overarching aim of this research to highlight the potentially traumatizing nature of work done in the accident and emergency department, and make recommendations for support strategies to assist employees in the event of psychological distress as a result of work

ARE THERE ANY RISKS INVOLVED IN YOUR TAKING PART IN THIS RESEARCH?

Given the sensitive nature of this dissertation, there is the potential for psychological distress as a result of engaging with work-related trauma experiences

WHAT WILL HAPPEN IN THE UNLIKELY EVENT OF SOME FORM OF INJURY OCCURRING AS A DIRECT RESULT OF YOUR TAKING PART IN THIS RESEARCH STUDY?

In the event of psychological distress being experienced as a direct result of your taking part in this study, kindly contact Tamara Zanella (clinical psychologist) for psychological support

FACILITATE

Olive Crest Estate
North Riding
Johannesburg
2169

TEL: [079 887 3187](tel:0798873187)

WHO WILL HAVE ACCESS TO YOUR RESPONSES?

Anonymity will be maintained through the use of questionnaires which do not contain any identifying variables. Furthermore, only the principle investigator and supervisors will be privy to this database, which will be stored in a password controlled folder.

WILL YOU BE PAID TO TAKE PART IN THIS STUDY AND ARE THERE ANY COSTS INVOLVED?

No remuneration will be awarded for participation in this study. Costs to participants would include the consultation fee should psychological support be required

DECLARATION BY PARTICIPANT:

By completing the survey below, I agree to take part in a research study entitled **THE RELATIONSHIP BETWEEN RESILIENCE, WORK RELATED TRAUMA AND POST TRAUMATIC STRESS (PTSD) SYMPTOMS IN EMERGENCY MEDICINE DOCTORS IN JOHANNESBURG, SOUTH AFRICA.**

I declare that:

- I have read this information and consent form and it is written in a language with which I am fluent/ comfortable
- I have had a chance to ask questions and all my questions have been answered
- I understand that taking part in this study is **VOLUNTARY**, and I have not been pressurized to take part
- I may choose to leave this study at any point, and will not be penalized or prejudiced in any way

YOU ARE BEING INVITED TO TAKE PART IN A MMED RESEARCH PROJECT.

An information leaflet describing the project is included in the survey. You can access it by clicking "No" to the question "have you read the participant information leaflet".

BY COMPLETING THE SURVEY, THE RESEARCHER ASSUMES THAT:

You consent to being part of the study entitled the relationship between resilience, work related trauma and post traumatic stress (PTSD) symptoms in emergency medicine doctors in Johannesburg, South Africa.

You have read the information leaflet and that it was written in a language with which you are fluent/ comfortable.

You understand that taking part in this study is VOLUNTARY, and you have not been pressurized to take part

Thank you!

Have you read and understood the information leaflet?

☐ Yes
☐ No

Kindly read the information leaflet prior to completion of this survey

[Attachment: "PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM.docx"]

Do you voluntarily consent to participation in this study?

☐ Yes
☐ No

Demographic Information

3	Age at enrollment	
4	What is your gender?	☐ Male ☐ Female
5	What is your current relationship status?	☐ Single ☐ In a relationship ☐ Married ☐ Divorced ☐ Co-Habiting ☐ Widow/Widower
6	Where are you currently employed?	☐ Community Health Centre ☐ District Hospital ☐ Regional Hospital ☐ Central Hospital
7	What is your professional category?	☐ Intern ☐ Community Service ☐ Medical Officer ☐ Registrar ☐ Consultant
8	How many years have you been working in the emergency department? (if < 12 months, put 0 in the space provided and proceed to the next question)	
9	How many months have you been working in the emergency department? (If these months are in addition to years noted above, kindly include them)	
10	What is your employment status in the emergency department?	☐ Full-time employ ☐ Part-time employ
11	Do you have a family history of psychiatric co-morbidity?	☐ Yes ☐ No
12	Have you ever suffered from any psychiatric co-morbidity?	☐ Yes ☐ No
13	If yes, what psychiatric condition do you suffer from?	☐ Anxiety related disorder ☐ Depression ☐ Other Mood related disorder e.g. Bipolar ☐ Psychotic disorder ☐ Other psychiatric condition not listed above
14	Do you consume alcohol?	☐ Yes ☐ No
15	Have you ever felt you should cut down on your alcohol use?	☐ Yes ☐ No

-
- L6 Have people annoyed you by criticising your alcohol use? ☐ Yes
☐ No
-
- L7 Have you ever felt bad or guilty about your alcohol use? ☐ Yes
☐ No
-
- L8 Have you ever had a drink first thing in the morning to steady your nerves? ☐ Yes
☐ No
-

Have you ever been exposed to any of the following potentially traumatic events while at work?

	Yes	No
19) Sudden UNEXPECTED death of a patient	☐	☐
20) Death of a baby/child	☐	☐
21) Resuscitation of a baby/child	☐	☐
22) Car crash victims	☐	☐
23) Train crash victims	☐	☐
24) Victims of physical assault	☐	☐
25) Victims of sexual assault	☐	☐
26) Victims with injuries due to violent assault e.g. gunshots	☐	☐
27) Burns patients	☐	☐
28) Suicide victims	☐	☐
29) Threat of personal violence e.g. by patients or their relative	☐	☐
30) Verbal abuse by patients or their relatives	☐	☐
31) Personal physical assault by a patient or their relatives	☐	☐

32) While at work, have you experienced other traumatic experiences, not listed above, that you would consider especially distressing?

33) Of the above trauma experiences, which would YOU consider the MOST distressing? (provide only the question number of the most distressing trauma experience as listed above)

34) How often (in the last month) have you been exposed to the trauma experience that you have highlighted as the most distressing?

- ☐ Once a month
☐ Once a week
☐ 2-3 times a week
☐ Almost daily

Below is a list of difficulties people sometimes have after stressful life events.

Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to the trauma experience (WHILE AT WORK) that you have identified as being the MOST SIGNIFICANT

	Not at all	A little bit	Moderately	Quite a bit	Extremely
35) Any reminder brought back feelings about it	☐	☐	☐	☐	☐
36) I had trouble staying asleep	☐	☐	☐	☐	☐
37) Other things kept making me think about it	☐	☐	☐	☐	☐
38) I felt irritable and angry	☐	☐	☐	☐	☐
39) I avoided letting myself get upset when I thought about it or was reminded of it	☐	☐	☐	☐	☐
40) I thought about it when I didn't mean to	☐	☐	☐	☐	☐
41) I felt as if it hadn't happened or wasn't real	☐	☐	☐	☐	☐
42) I stayed away from reminders of it.	☐	☐	☐	☐	☐
43) Pictures about it popped into my mind	☐	☐	☐	☐	☐
44) I was jumpy and easily startled.	☐	☐	☐	☐	☐
45) I tried not to think about it.	☐	☐	☐	☐	☐
46) I was aware that I still had a lot of feelings about it, but I didn't deal with them.	☐	☐	☐	☐	☐
47) My feelings about it were kind of numb	☐	☐	☐	☐	☐
48) I found myself acting or feeling like I was back at that time.	☐	☐	☐	☐	☐
49) I had trouble falling asleep	☐	☐	☐	☐	☐
50) I had waves of strong feelings about it.	☐	☐	☐	☐	☐
51) I tried to remove it from my memory	☐	☐	☐	☐	☐
52) I had trouble concentrating.	☐	☐	☐	☐	☐
53)					

Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.

☐
☐
☐
☐
☐

4) I had dreams about it.

☐
☐
☐
☐
☐

5) I felt watchful and on-guard.

☐
☐
☐
☐
☐

6) I tried not to talk about it.

☐
☐
☐
☐
☐

The following questions are designed to measure your resilience. Please choose the most correct response to each question

	Not true at all	Rarely true	Sometimes true	Often true	True nearly all the time
57) I am able to adapt when changes occur	☐	☐	☐	☐	☐
58) I can deal with whatever comes my way	☐	☐	☐	☐	☐
59) I try to see the humorous side of things when I am faced with problems	☐	☐	☐	☐	☐
50) Having to cope with stress can make me stronger	☐	☐	☐	☐	☐
51) I tend to bounce back after illness, injury, or other hardships	☐	☐	☐	☐	☐
52) I believe I can achieve my goals, even when there are obstacles	☐	☐	☐	☐	☐
53) Under pressure, I stay focussed and think clearly	☐	☐	☐	☐	☐
54) I am not easily discouraged by failure	☐	☐	☐	☐	☐
55) I think of myself as a strong person when dealing with life's challenges and difficulties	☐	☐	☐	☐	☐
56) I am able to handle unpleasant or painful feelings such as sadness, fear and anger	☐	☐	☐	☐	☐



R14/49 Dr C Linderts

**HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M171195**

NAME: Dr C Linderts
(Principal Investigator)
DEPARTMENT: School of Public Health
Department of Community Health
Medical School
University

PROJECT TITLE: The relationship between resilience, work-related trauma and post-traumatic stress (PTSD) symptoms in emergency medicine doctors in Johannesburg, RSA

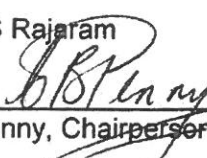
Clearance Certificate re-issued on 29/05/18 to reflect addition of Helen Joseph Hospital

DATE CONSIDERED: 24/11/2017

DECISION: Approved unconditionally

CONDITIONS: Valid for C Maxeke, CH Baragwanath, H Joseph, S Rand & B Mlangeni Hospitals & Lenasia S, Hillbrow, Alexandra, Chiawelo, L Ngoyi & Discoverers Clinics

SUPERVISOR: Drs S Mall and S Rajaram

APPROVED BY: 
Professor CB Penny, Chairperson, HREC (Medical)

DATE OF APPROVAL: 25/04/2018

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on 3rd floor, Phillip V Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/We fully understand the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report.** The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in **November** and will therefore be due in the month of **November** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



HUMAN RESEARCH ETHICS
COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research & Post Graduate Affairs)

TO: Dr C Linderts
School of Public Health
Department of Community Health
Medical School
University

E-mail: clinderts@gmail.com

CC: Supervisor: Drs S Mall and S Rajaram <sumaya.mall@gmail.com>
and <HREC-Medical.ResearchOffice@wits.ac.za>

FROM: Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 25/04/2018

REF: R14/49

PROTOCOL NO: M171195 (*This is your ethics application study reference number. Please quote this reference number in all correspondence relating to this study*)

PROJECT TITLE: *The relationship between resilience, work-related trauma and post-traumatic stress (PTSD) symptoms in emergency medicine doctors in Johannesburg, RSA*
Clearance Certificate re-issued on 29/05/18 to reflect addition of Helen Joseph Hospital

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to the Government funding of the University.

A handwritten signature in black ink, appearing to be 'IB' or similar initials.

MSWorks2000/Iain0007/Clearscan.wps

FOOTNOTES:

ⁱ The registrar training programme is a four-year training programme for medical practitioners (doctors) to train as specialists in various programmes.

ⁱⁱ A medical intern is a medical practitioner (doctor) who has an undergraduate medical degree, but who practices under supervision for two compulsory years.

ⁱⁱⁱ A community service doctor is an independent medical practitioner (doctor) who has completed their medical internship, but who is currently completing their compulsory 1-year community service contract

^{iv} A medical officer is a medical practitioner (doctor) who is an independent practitioner, having completed a compulsory two-year internship and a 1-year community service contract.

^v An emergency medicine registrar is an independent medical practitioner (doctor) who is training in the specialist field of emergency medicine

^{vi} A consultant is a medical practitioner (doctor) who has completed specialist training in emergency medicine

^{vii} Medical interns completing a clinical rotation in the emergency department, in part fulfillment of their internship year of practice