

Self -Reported Symptoms of Depression and  
Associated Features in Medical Interns at a  
South African Tertiary Health Facility



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## Table of Contents

Declaration.....	iii
Abstract.....	iv
Acknowledgements.....	v
List of Tables.....	vii
List of Figures.....	vii
List of Abbreviations.....	vii
Chapter One.....	1
Background and Significance.....	1
Literature Review.....	2
Aims.....	7
Objectives.....	7
References.....	8
Chapter Two	
Publication Ready Manuscript prepared for the South African Journal Psychiatry.....	14
Abstract.....	14
Introduction.....	15
Materials and Methods.....	16
Results.....	19
Discussion.....	23
Limitations.....	27
Conclusion.....	27
References.....	28
Appendices	
Appendix I: Email Invitation for Interns to Participate in the Study.....	34
Appendix II: Introduction to the Study.....	35
Appendix III: Consent Form.....	37
Appendix IV: Demographic and Related Questionnaire.....	38
Appendix V: Beck Depression Inventory 2.....	43
Appendix VI: Information Pack for Interns.....	45
Appendix VII: UCT Human Research Ethics Committee Approval.....	48
Appendix VIII: Groote Schuur Hospital Research Ethics Committee Approval.....	49
Appendix IX: Submission Guidelines for the South African Journal of Psychiatry.....	50

## Declaration

I, Dr Kaveshin Naidu, hereby declare that the work on which this dissertation/thesis is based on my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Date: 6<sup>th</sup> January 2019

# **Depressive Symptoms and Associated Features in Medical Interns at a Tertiary Hospital**

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**Abstract: Prepared for submission to the South African Journal of Psychiatry (SAJP)**

**Background:** It is known that medical doctors suffer from increased rates of depression with medical interns being most at risk. Despite this, little is known about the prevalence of depression in interns in South Africa.

**Aim:** This study aimed to assess the prevalence of depressive symptoms in interns.

**Setting:** All 91 interns employed at Groote Schuur Hospital, a tertiary hospital in the Western Cape, from January 2017 until May 2018, were invited to participate in the study.

**Methods:** The study was a cross-sectional study. Consenting interns were required to complete a demographic and related questionnaire and the Beck Depression Inventory 2 (BDI-2).

**Results:** Fifty-four (59.3%) of all invited interns participated in the study. Twenty-two interns (41%) reported a Beck Depression Inventory 2 score of 14 or greater. Features associated with a BDI-2 score of 14 or greater, included female gender, a previous diagnosis of depression, seeing a psychotherapist and previously being on antidepressant medication during internship. Other features also significantly associated with higher BDI-2 scores included, suicidal ideation, thoughts of emigration, wanting to leave Medicine and using substances to cope. The most significant associated feature of high BDI-2 scores was feeling “burnt out”.

**Conclusion:** Interns had a higher prevalence of depressive symptoms when compared to the general population. The feeling of being ‘burnout’ was the most significant factor associated with the severity of depressive symptoms. It is imperative that the mental health of both medical students and newly qualified doctors be prioritised, supported and monitored.

**Key Words.** Depressive Symptoms; Burnout; Medical Interns; Beck Depression Inventory 2; South Africa

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## List of Tables

<b>Table</b>	<b>Title</b>	<b>Page Number</b>
Table 1	Features Correlated with BDI-2 scores greater than 13	Page 21
Table 2	Correlations between Outcome and Predictor Variables	Page 22
Table 3	BDI-2 Correlates with Possible Associated Features of Depression	Page 23
Table 4	ANOVA Analysis between the Associated Features of Depression and their BDI-2 Scores	Page 23
Table 5	Table of Regression analysis to Examine Features Associated with Depression and their BDI-2 Scores.	Page 24

## List of Figures

<b>Figure</b>	<b>Title</b>	<b>Page Number</b>
Figure 1	'Wanting to Leave Medicine' predicts 'Burnout' which in turn predicts 'BDI-2 Scores'	Page 24

## List of Abbreviations

GSH	Groote Schuur Hospital
SAJP	South African Journal of Psychiatry
BDI-2	Beck Depression Inventory 2
MDD	Major Depressive Disorder
ICAS	Independent Counselling and Advisory Services
HIV	Human Immunodeficiency Virus
USA	United States of America
HPCSA	Health Professions Council of South Africa
UCT	University of Cape Town
HREC	Human Research Ethics Committee
VIF	Variance Inflation Factor

# Chapter One

## Background and Significance

In South Africa, the Health Professions Council of South Africa (HPCSA) requires newly qualified doctors to undergo a two-year internship prior to registration as independent practitioners. During this time, interns are required to rotate through various specialities including: general surgery, internal medicine, obstetrics and gynaecology, paediatrics, orthopaedics, anaesthetics, primary health care and psychiatry (1,2). Groote Schuur Hospital (GSH) in Cape Town, is a large accredited training facility for medical interns and has an average of ninety medical interns under its employ (1,2).

10

The transition from medical training to internship is recognised as a challenging time for medical interns and has been associated with high levels of stress, burnout and depression (3–9). Burnout is defined as a negative, work related state of mind in otherwise mentally healthy individuals which is characterised by reduced work performance, demotivation, emotional and physical exhaustion and dysfunctional behaviours at work (10,11). There are three elements that define this syndrome including emotional exhaustion, feelings of low personal accomplishment and depersonalisation (10,11). Burnout if unrecognised or unmanaged may lead to depression. A diagnosis of depression however, differs in that it is not confined to a specific work environment but pervades all aspects of a person's life (12,13). It is noted that burnout is associated with a higher prevalence of depressive symptoms (13). Depression is a mood disorder typically characterised by low mood, anhedonia, neurovegetative shift, difficulty concentrating, feelings of worthlessness, guilt and suicidal ideation (14,15).

20

One of the reasons that interns are particularly vulnerable to depression is due to the change of status and responsibility from being a medical student to that of being a doctor (3,16). Adding to this, interns generally lack clinical experience, knowledge and interpersonal and communication skills making it difficult to adapt to a new role and working environment with a higher level of expectations (16). It is also noted that doctors suffer higher rates of depression when compared to the general public (4,7,16–19). The South African Stress and Health Study was a large scale study examining the lifetime and one year prevalence of common mental disorders conducted from 2003 to 2004 (20). In South Africa the lifetime prevalence of depression is 9.7% (20,21). This means that up until the time of the South African Stress and Health Study, 9.7% of the South African population had experienced depression (21).

30

Despite a growing interest internationally in protecting the health of health care professionals and understanding the challenges that they face, there is paucity of data regarding the prevalence of depression in South African medical interns.

## Literature Review

40

An examination of the literature reveals a growing interest in the incidence and prevalence of burnout and depression and their associated features amongst medical interns. There is also an interest in protecting the mental health of health care professionals.

This literature review was not a systematic review, nonetheless the literature was searched in a systematic way. For this study online databases were searched including Medline, Google Scholar, PubMed using the search terms “Depressive symptoms; depression; burnout in medical interns; junior doctors; residents and medical students”. Whilst searching for studies specific to Africa and South Africa there was a paucity of data regarding depressive symptoms amongst doctors. The studies were published from 1994 until 2018. Of the literature searched priority was given to more recent publications as well as those set in Africa, particularly South Africa.

In a recent meta-analysis published by Mata et al., the pooled prevalence of depression or depressive symptoms in doctors was 28.8% (7). Specifically, physicians in training, including 20.9%- 43.2% of medical interns screened positive for depression. Some studies used self-report instruments and others used clinical interviews to assess mood symptomatology. Various self-report instruments were used, including nine studies that used the Beck Depression Inventory 2 (BDI-2). It is important to note that only three of the studies included in the meta-analysis, made use of clinically structured interviews. This complicates comparison of results as some studies have relied on clinical diagnosis of depression and others on self-reported symptoms. The studies used in this meta-analysis were mostly conducted in North America and only one study from Africa was included. The latter was conducted in Kenya and indicated that at least 62% of interns were moderately affected by their anxiety and burnout (22). These symptoms were associated with, work place bullying, lack of resources such as beds and medical equipment and few health care professionals, high patient load and lack of support from senior colleagues (22). When their ability to care for patients was compromised, medical doctors reported feeling a diminished sense of accomplishment and competence. Their ability to care about themselves as well as their patients was profoundly reduced leading to them feeling demotivated (22).

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70 In a Japanese study it was noted that the prevalence of depression in doctors in training varied from 7% to 35% (16,23). In China a similar study showed prevalence rates of 35% for either anxiety or depression (17). A Taiwanese study showed the prevalence of depression for medical interns across three centres to be 20.9% (18). In another study done in Mexico City, 56% of junior doctors met criteria for depression and 21% reported being diagnosed with major depression during their training (24). A study conducted in South Carolina in the USA showed 42.5% of interns screening positive for depression during their internship year (25). It was noted in a metanalysis that the prevalence of depression in medical students is 27%, and up to 60% in practicing doctors (26). These studies indicate that the prevalence of depression amongst doctors is higher than the general population.

80 In 2009, Rossouw et al. published a study examining the prevalence of burnout and depression in medical doctors working in the Cape Town Metropolitan Municipality community health care clinics and district hospitals. In their sample of 132 doctors, 27% had moderate depression , 3% had severe depression and 76% reported having burnout (10). This particular study included medical interns, community service doctors, medical officers, doctors specialising in family medicine and family physicians or specialists working in the primary health care settings. The authors used the BDI 2 as a self-report instrument. It is important to note that BDI 2 scores were negatively correlated with years of experience i.e. interns who had the least number years of experience had higher BDI 2 scores (10).

90 Notably the study done by Rossouw et al, whilst set in South Africa, did not focus specifically on medical interns and the factors influencing the levels of depression were not explored representing a gap in the literature particularly in a South African context. Furthermore, their study had a total of 11 medical interns (8%) out of their sample of 132 participants (10). This represents a very small subset of their study which may not be generalisable to interns working in other settings.

100 In studies done in the USA, medical students had the highest rates of depressive symptoms compared to doctors in other stages of their career (27). Another study measuring the hair cortisol concentration (as a marker for stress) in medical interns prospectively showed that there was a sudden raise in hair cortisol concentrations during the first few months of internship (28). This correlated with an increase in depressive symptoms during this time. Interestingly as interns approached their second year of internship, the hair cortisol concentration returned to pre-internship levels despite ongoing challenges. These findings imply that first year interns could potentially have higher stress levels associated a greater prevalence of depressive symptoms than second year interns. However in a study conducted in ICU physicians in France, doctors who had practised longer were more prone to depression (13). Interestingly age has not been found to be associated with increased levels of depression (13). This is contrary to current understanding that risk for depression is reduced with more experience (14).

Several features are associated with reduced wellbeing of interns (4). These include long working hours, sleep deprivation, challenging workloads, and lack of time for personal pursuits (8,16,29). In a Japanese study it was shown that 25% of doctors working 80-99 hours per week and 45.5% of doctors working 100 hours per week developed additional symptoms of depression (16). It was also noted that doctors who worked extra-long hours (over 100 hours per week) were at a 7 times greater risk of developing depression compared to those working 60 hours per week (16). Schweitzer has noted that doctors who saw more than 40 patients in a day had increased risk of burnout compared with those that saw fewer patients (30). The same study concluded that those doctors who worked part-time were less likely to feel 'burnt out' compared to their colleagues who worked full time. In addition, doctors who worked in public clinics and hospitals had higher levels of burnout than those who worked in their own practice. Although controversial, Schweitzer proposes that this is because doctors who have their own practices have more control over their environment (30).

120 A study conducted in Saudi Arabia showed that residents with higher stress showed more general health problems which lead to more sick days and inefficiency in daytime work (9). Other features that contributed to higher levels of depression include poor relationships with supervisors, other staff and patients, lack of direction in their careers, lack of autonomy in decision making and frequently changing rotations to different departments (31–33). A lack of social support has also been shown to lead to low levels of wellbeing (19). It has also been noted in a qualitative study by Mata et al., that a lack of social support as well as poor support from colleagues and seniors were some of the major challenges of the internship year (34). Outright bullying and discrimination was also noted to increase stress and depression (26).

130 Two letters to the editor of South African Medical Journal highlighted features that led to increased levels of depression amongst interns in South Africa (33,35). These included long working hours, the high number of patients as well as poor staff relationships, a lack of equipment and occupational exposure to HIV (particularly relevant in South Africa) either through mucosal splash injury or needle stick injury (33,35). A prior history of mental health problems can also predispose to the later development of depression during internship (23).

A study conducted by West et al. amongst internal medicine residents in Mayo Clinic Rochester concluded that depression led to a reduced confidence in performance of clinical tasks, poor quality of patient care and negative perceptions of work as well as an increase in self-reported medical errors (36). This relationship was bidirectional, as medical errors were also associated with an increased incidence of depression. It is estimated that medical doctors who were depressed made 6.2 times more medical errors than their counterparts that were not depressed (16,36). Also of note is that depression

and fatigue also predispose doctors to motor vehicle accidents and occupational exposure to HIV/AIDS (35,37).

150 If left untreated Major depressive disorder (MDD) could result in suicide (14,15). It was noted in the USA that 300-400 physicians commit suicide each year being significantly higher than in the general public (38,39). Goldman et al. noted that medical interns in the USA also had increased thoughts of death in the first three months of internship (39). The prevalence of suicide among medical practitioners in South Africa is not known.

160 It was noted in several different studies that in general, women are more prone to depression than men (4,8,17,18,40,41). In contrast, gender-based research into depression amongst doctors have found variable results. In four different studies, there had been no differences in rates of depression between the genders (13,32,42,43). Interestingly an unpublished South African survey female interns had reported more symptoms associated with depression (33). A similar finding was noted by Goebert et al. and Bailey et al. who observed that there were higher symptoms of depression in female medical students and doctors (26,38,39). A qualitative study by Verdonk et al. established that female medical interns feel more insecure about their capabilities and performance when compared to male interns and were also more uncomfortable to portray a confident self and felt like ‘imposters’ when they did so (44).

Other features that may also predispose one to depression include having a first degree relative who suffers from depression, with the risk then being two to four times greater, stressful events and transitions periods and substance abuse (24,25). Personality factors such as borderline, avoidant and obsessive-compulsive personality traits can also predispose an individual to developing MDD (41).

170 Although depression may be a serious illness, people can recover if treated. MDD that is treated usually remits within three months and untreated depression can remit spontaneously, within six to thirteen months (25). It is important that patients diagnosed with depression continue antidepressant medication for at least six months after the remission of symptoms in order to prevent relapse. Effective treatments for depression typically include pharmacotherapy in the form of antidepressants alone or in combination with psychotherapy (14).

Whilst employee wellness programs such as the Independent Counselling and Advisory Services (ICAS) are available to interns in the Western Cape, some studies have identified barriers to the utilization of such services (25). These barriers include a lack of time, preference to manage problems on their own, lack of convenient access to mental health care, concerns regarding confidentiality and stigma attached to getting help (25,26,38,43,45). In terms of stigma it was noted in an Australian

180 study that doctors believed that a diagnosis of depression was linked to weakness and reduced competency and that such doctors would have difficulty obtaining employment (26). A similar finding was noted in a Dutch study where medical interns felt they could not be open about emotional difficulties during internship because it would affect their future prospects (44). Interns felt pressure to present themselves as 'professional and self-confident' despite their insecurities and 'show what you know' in order to prove themselves amongst seniors and their peers (44). Another potential barrier includes the belief amongst doctors that stress is something that they need to live with and under-recognition of one's own depression (38,44,45).

190 There may also be maladaptive ways of seeking help which include self-prescribing and obtaining prescriptions from colleagues without proper assessment (45). In a study performed in Mexico City, 21% of interns were at risk for problematic alcohol consumption and 2% of interns consumed recreational drugs once a month (24). It is unclear as to whether this substance use was associated with their internship or due to other reasons.

In conclusion it is now well documented that medical interns are at risk for burnout and depression and if untreated, there could be negative consequences for both the intern and service delivery. The experiences during internship can frame the view that interns have of their profession. Interns who have symptoms of depression are noted to suffer from burnout, cynicism and regret later in their careers (34). Despite this there is generally a lack of data in the South African context with regards to  
200 the challenges facing medical interns and the effect that this has on their mental health. The wellbeing of interns is important, so they may develop into competent doctors who can better care for the communities which they serve.

## Aims

210 The primary aim of this study is to determine the associations between demographic data, previous history of depression, previous or current treatment for depression, and substance use and the self-reported severity of depressive symptomatology of medical interns at Groote Schuur Hospital. The secondary aim is to identify risk factors for the development of depressive symptoms during internship.

## Objectives

- To determine the Beck Depression Inventory 2 scores of medical interns at Groote Schuur Hospital.
- To identify features commonly associated with depression e.g. the subjective feeling of burnout and how these may influence the Beck Depression Inventory 2 scores.
- To contribute to the body of knowledge regarding the wellbeing of medical interns.

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## **Chapter 2: Publication Ready Manuscript prepared for the**

### **South African Journal of Psychiatry**

#### **Depressive Symptoms and Associated Features in Medical Interns at a Tertiary Hospital**

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**Background:** It is known that medical doctors suffer from increased rates of depression with medical interns being most at risk. Despite this, little is known about the prevalence of depression in interns in South Africa.

**Aim:** This study aimed to assess the prevalence of depressive symptoms in interns.

**Setting:** All 91 interns employed at Groote Schuur Hospital, a tertiary hospital in the Western Cape, from January 2017 until May 2018, were invited to participate in the study.

**Methods:** The study was a cross-sectional study. Consenting interns were required to complete a demographic and related questionnaire and the Beck Depression Inventory 2 (BDI-2).

**Results:** Fifty-four (59.3%) of all invited interns participated in the study. Twenty-two interns (40.7%) reported a Beck Depression Inventory 2 score of 14 or greater. Features associated with a BDI-2 score of 14 or greater, included female gender, a previous diagnosis of depression, seeing a psychotherapist and previously being on antidepressant medication during internship. Other features also significantly associated with higher BDI-2 scores included, suicidal ideation, thoughts of emigration, wanting to leave Medicine and using substances to cope. The most significant associated feature of high BDI-2 scores was feeling “burnt out”.

**Conclusion:** Interns had a higher prevalence of depressive symptoms when compared to the general population. The feeling of being ‘burnt out’ was the most significant factor associated with the severity of depressive symptoms. It is imperative that the mental health of both medical students and newly qualified doctors be prioritised, supported and monitored.

**Key Words.** Depressive Symptoms; Burnout; Medical Interns; Beck Depression Inventory 2; South Africa

## Introduction

It is established that doctors suffer increased rates of depression (4,7,9,16–19) and increasingly it is being shown that medical interns (hereafter referenced as interns) are at even higher risk (1–4, 8–13). In South Africa the lifetime prevalence of depression in the general population is 9.7% (21) with little known about the prevalence of depression in South African medical doctors including interns.

In a 2015 meta-analysis published by Mata et al., the pooled prevalence of depressive symptoms in medical doctors was 28.8% with 20.9%–43.2% of interns screening positive for depression (7). Most studies included in this meta-analysis, were done in North America. One study that was conducted in Kenya showed that at least 62% of interns had reported moderate anxiety and burnout and this had affected their ability to care and feel for others and themselves (7,22). In a Japanese study it was noted that interns had a threefold increase in depressive symptoms during the course of their internship (23). A Taiwanese study, showed the prevalence of depression in medical interns across three centres was 20.9% (18). Other research conducted in Mexico City suggested that 56% of junior doctors (including medical interns as well as more senior doctors) had depressive symptoms and 21% had reported being diagnosed with MDD during their training (24).

Possible reasons for this increased risk amongst the interns included the change in status and responsibility from being a student to that of being a doctor (5,9). Interns may also lack interpersonal and communication skills, medical knowledge and experience making it difficult to adapt to a new role and working environment with higher expectations (16). Features associated with poor wellbeing may include poor relationships with supervisors, other staff and patients, minimal sense of control regarding placements, lack of autonomy in decision making, poor social support, frequently changing to different departments and a lack of time for personal pursuits (31–33,46). Several studies have noted that female interns are more at risk of developing depression as opposed to male interns (4,8,17,18,40,41).

A cross-sectional study of 132 medical doctors (including consultants, registrars, medical officers, community service officers and interns) working at 27 different facilities in the Western Cape conducted by means of a self-administered battery, including the Beck Depression Inventory-2 (BDI-2), was published by Rossouw et al. in 2013. The BDI-2 is a self-reported questionnaire widely used in clinical and research settings for screening and rating the severity of depression (47). The study highlighted some of the difficulties that doctors working in South Africa face, which included a heavy work load, long working hours and public system related difficulties (10). The researchers found that interns ( $n=11$ ) who had the least years of experience, had the highest scores on the BDI-2 (10). Although the features associated with these higher BDI-2 scores were not explored, the topic has been one of ongoing debate and speculation.

Burnout is defined as a persistent, negative, work-related state of mind that is characterised by exhaustion, accompanied by distress, and has negative consequences such as reduced effectiveness, decreased motivation and dysfunctional attitudes and behaviours (10,12). There is a complex relationship between burnout and depression. Although burnout in its early stages is confined to a specific work environment, if untreated, can potentially progress, or be comorbid to depression, which would affect all spheres of a person's life (12).

440 Internship typically involves long working hours, with associated chronic sleep deprivation, which has been associated with numerous negative outcomes including negative mood changes, memory loss, over optimistic risk taking, increased motor vehicle accidents and needle stick injuries with possible occupational exposure to HIV (35). A study examining occupational stress and burnout among South African medical practitioners concluded that working overtime, poor organisational support, making critical 'on the spot' decisions lead to increased symptoms of burnout (48). Seeing more than forty patients per day, was also noted to increase symptoms of burnout. A retrospective study conducted among South African doctors noted that 37.3% of doctors had reported feeling burnt out during their internship and that doctors who worked part time were less likely to experience burnout (30).

450 Many features have been correlated with MDD. These include reduced confidence in the performance of clinical tasks, poor quality patient care, and an increase in self-reported medical errors (36,46). MDD can potentially be a devastating and incapacitating disorder. If left untreated it could result in suicide (14,15). Rubin has estimated that 300-400 physicians in the USA successfully die by suicide each year (38). In the USA, interns have been shown to have increased thoughts of death in the first three months of internship (39).

There is a lack of research exploring the prevalence of depressive symptoms in interns and the features associated with the development of these symptoms in medical interns in South Africa.

460 Having recognised this gap in the literature, this study aimed to explore these questions in interns employed at a tertiary academic hospital in Cape Town, South Africa.

## Materials and Methods

### **Study Setting and Ethical Approval**

Prior to professional registration as a medical doctor, the Health Professional Council of South Africa (HPCSA) requires that all newly qualified doctors undergo a two year internship, during which medical graduates can practise their skills under supervision at an accredited institution (2,35). Ethical approval for the project was obtained from the Human Research Ethics Committee (HREC) of the

470 Faculty of Health Sciences at University of Cape Town (UCT) and ethical clearance was granted for the study was granted by GSH where the study was conducted. Groote Schuur Hospital (GSH) is a large tertiary academic health facility, situated in the Western Cape (1). The hospital has approximately ninety medical interns who rotate through multiple medical and surgical specialties

Potential ethical problems included protecting the confidentiality of the participants, ensuring that all participants have access to convenient and appropriate mental health care services and that participants receive appropriate feedback.

A meeting was arranged for interns to participate in the study. The meeting took place on the 12 April 2018. All participants were given a consent form to sign. This consent form highlighted that participation was voluntary, that participants could withdraw from the study at any time and there would be no financial remuneration in return for their participation in the study.

480 To ensure confidentiality and anonymity, no identifying data was asked on the “Demographic and Related Questionnaire” nor on the BDI-2 and equally consent forms were collected separately to other questionnaires. Each participant received an information pack detailing the symptoms of burnout and depression and pathways for accessing mental health care services should they feel they require it and the contact details of the UCT HREC, should they have any questions or want a referral to facilitate pathways to further care, the contact details of the researchers were provided. Feedback will be given to all participants as soon as the research has been concluded.

### **Research Design**

490 This study was a cross-sectional observational study. All 91 interns employed at GSH between January 2017 and May 2018 were sent an email invitation to participate in the study. All interns first read the aims of the study and that participation in the study was voluntary and confidential. Then gave written informed consent. (See Appendices II and II). There were no exclusion criteria. During the meeting, interns were introduced to the study and given a consent form, a demographic questionnaire, a BDI-2 and a related questionnaire (see details below) to complete.

### **Statistical Analysis**

All analyses were completed using SPSS version 25. The threshold for statistical significance ( $\alpha$ ) was set at .05, unless otherwise noted. For each analysis described below, the appropriate effect size was calculated.

500 Descriptive statistics were generated for all variables to ensure normality of distributions. Means and standard deviations were used to describe continuous variables, and proportions for categorical variables. A series of Mann-Whitney *U* tests compared BDI-2 scores across various demographic and associated features. Thereafter, a backwards linear regression analysis was performed to determine whether significant variables from the univariate analyses predicted depressive symptomology.

BDI-2 scores were coded as continuous variables. Sex was coded as a categorical variable; having 2 levels (male and female). All other predictor variables were coded having 2 levels (yes and no). Dummy coding was applied to the variable Burnout, such that ‘not at all burnout’ was the reference group.

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### **Sampling and Materials**

The demographic questionnaire was designed to obtain demographic characteristics of the interns as well as information about features commonly associated with depression. This questionnaire was drawn up by the research team for the purposes of this study and is not a validated tool that has been used in other settings.

The demographic questionnaire obtained information about participant’s age, gender, marital status and the year of their internship. Information regarding features associated with depression included a) a prior diagnosis of depression or a mental health illness, b) duration of treatment, c) family history of depression, d) previous or current suicidal ideation or attempts, e) substance use history as well as the frequency and duration of use etc. (See appendix IV for the full questionnaire). Other commonly noted consequences of depression, as noted in the literature were also asked. This included the desire to emigrate or leave clinical medicine. The presence of other hobbies or pastimes were also asked e.g. exercise, spending time with friends or family, meditation or participating in religious or spiritual activities.

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Because of the strong association between burnout and depression, a Likert scale question regarding the subjective feeling of burnout was asked. Participants were asked to rate their subjective feelings of burnout on a scale either “not at all burnt out”, “slightly burnt out”, “moderately burnout” or “severely burnt out.”

Whilst the study was largely quantitative in nature at the end of the questionnaire the participants were given an opportunity to comment on any other features that they felt would impact on their mental health. This introduced a very small qualitative component with regards the interns experience of internship.

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The BDI-2 measures the behavioural manifestations of depression and comprises of 21 symptoms or clinical features of depression with various statements rated on a scale of 0-3 (47). A score of zero indicates the absence of a symptom and a score of 3 indicates its greatest severity. It is important to note that the BDI-2 has not been validated in the South African context.

A total score of below 14 on the BDI-2 would indicate minimal self-reported symptoms of depression. A total score of between 14-19 would indicate mild self-reported features of depression and a score between 20-28 would indicate moderate self-reported symptoms of depression and a score greater than 28 would indicate severe self-reported symptoms of depression. A self-reported score of 14 or above was considered significant for the purposes of this study.

## Results

### **Depression during Internship**

Out of a possible 91 interns invited to join in the study, 57 (62.6%) agreed to participate. Three participants handed in incomplete questionnaires and were consequently excluded from the study. This led to a final participation rate of 59.3%. Thirty-two interns (59.2%) had a BDI-2 score of below 14, indicating minimal self-reported symptoms of depression, 9 (16.7%) had scores between 14-19 which indicated mild self-reported symptoms, 6 (11.1%) had scores between 20-28 which indicated moderate self-reported symptoms, and 7 (12.9%) had scores greater than 29 indicated severe self-reported symptoms of depression. The mean BDI-2 Score was 14 and the median was 11, with the range being 0-47.

Based on the demographics, 19 female interns (35.1%) reported symptoms of depression with 11 female interns (20.4 %) who had moderate to severe self-reported depressive symptoms. Three male interns (5.5%) reported symptoms of depression with two male interns (3.7 %) having reported moderate to severe self-reported symptoms of depression as indicated by a total BDI-2 score of 20 or greater.

The participants were equally divided between first year and second year of internship. It was shown however 11.1% (n= 6) of first year interns experienced moderate to severe self-reported symptoms of depression as opposed to 12.9 % (n=7) of second year interns who reported the same.

Antidepressants had been prescribed to eight interns (14.8%) during their internship, but only four (7.4%) reported taking them at the time of assessment. These antidepressants had been prescribed by general practitioners for three interns and by a psychiatrist by the remaining five. The eight interns who were prescribed antidepressants during their internship had significantly higher BDI-2 scores compared with the rest of the interns ( $U= 65, p = .003, r= 0.39$ ). The four interns currently using

antidepressants did not have significantly higher BDI-2 scores compared to the rest of the interns. ( $U = 60, p = .200, r = 0.18$ )

Also, to note at the time of data collection, three interns (5.5%) were seeing a psychologist and using antidepressants simultaneously. Three interns (5.5%) reported seeing a psychologist without being on antidepressants and one intern (1.8%) reported taking antidepressants without seeing a psychologist.

Worryingly six interns reported that they had thought about taking their own life and this correlated with more self-reported symptoms of depression. Almost every one of the interns reported subject feeling of burnout as well as having too little time to attend to their own or significant others' needs. Eight interns reported using substances to cope with the stressors of internship (see Table 1 below).

### **Depression/psychiatric illness and pathways to care prior to internship**

Eight interns (14.8%) had previously been diagnosed with depression prior to their internship, and an additional five interns (9.3%) with a psychiatric illness, other than depression (e.g. Bipolar Disorder, Generalised Anxiety Disorder, Eating Disorder, Attention deficit disorder) Five of the eight interns saw a therapist for their depression, and all eight had been previously prescribed antidepressants. These eight interns, who had a prior diagnosis of depression had significantly higher BDI-2 scores compared to the rest of the interns ( $U = 85.5, p = .014, r = 0.33$ ). The six interns who saw a therapist for their depression had significantly higher BDI-2 scores compared to the rest of the interns ( $U = 62, p = .022, r = 0.31$ ). It was unclear whether the eight interns previously diagnosed with depression were the same eight interns who were currently prescribed antidepressant medication.

### **Variables associated with BDI-2 scores**

Female interns had significantly higher BDI-2 scores compared to males ( $p = .005$ ). Interns who reported suicidal thoughts during their internship, those who used substances to cope during their internship, those who were considering emigration because of current working conditions, and those considering leaving Medicine because of their internship had significantly higher BDI-2 scores (all  $p < .036$ ; see Table 1).

Seven (12.9%) interns cited that work place bullying and not being treated with respect as a major problem and contributing factor to their mental state. It is noted that three interns who cited work bullying as a source of stress also reported moderate to severe symptoms of depression. Five interns (9.2%) reported that long working hours and the associated sleep deprivation was associated with their feeling depressed however only two interns who cited this had mild self-reported symptoms of depression.

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There was a statistically significant difference in BDI-2 scores among participants with different subjective levels of burnout ( $F(3,53) = 5.77, p = .002$ ). Post-hoc comparisons revealed that interns reported being ‘moderately burnt out’ had significantly higher BDI-2 scores compared to interns who reported ‘not at all burnt out’ or being ‘slightly burnt out’ ( $p = .019$  and  $p = .044$  respectively). Further, interns who reported themselves as ‘severely burnt out’ had significantly higher BDI-2 scores compared to interns who were not burnt out or slightly burnt out ( $p = .002$  and  $p = .001$  respectively).

### Regression Analysis

610 A backwards linear regression model was conducted to assess the combined association between significant variables found in the univariate analyses and depressive symptomology (see Table 2)<sup>1</sup>. The variables “Gender”, “Emigration”, and “Wanting to Leave Medicine” were entered in the first block, and “Burnout” in the second block. None of the data violated assumptions of independence. Some of the independent variables in the regression were highly correlated (see Table 2)

**Table 1.** Features Correlated with BDI-2 scores greater than 13:

	<i>N</i>	Median (IQR)	<i>U</i>	<i>P</i>	ESE
<b>Gender</b>			178	.005	0.38
Male	19	7 (3 - 11)			
Female	35	15 (9 - 25)			
<b>Considered taking own life</b>			53	.010	0.34
Yes	6	28.5 (15.5 - 41)			
No	48	11 (5 - 16.75)			
<b>Substance used to cope</b>			98.5	.036	0.28
Yes	8	24 (8 - 38)			
No	46	11 (5 - 16.5)			
<b>Lack of time for relationships</b>			24.5	.008	0.34
Yes	50	11.5 (5.75 - 21.75)			
No	4	3.5 (0.75 - 6.25)			
<b>Emigration</b>			155.5	.003	0.40
Yes	37	15 (8.5- 25)			
No	17	5 (3 - 11.5)			
<b>Leaving Medicine</b>			113.5	<.001	0.49
Yes	37	16 (9.5 - 26.5)			
No	16	5.5 (3.25 - 10.75)			

*Note.* Self-reported depressive symptom severity represented by BDI-2 total scores. ESE = effect size estimate, in this case, *r*.

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<sup>1</sup> Although the variables *intern taking own life*, *using substances to cope*, and *lack of time for relationships* were significantly associated with BDI-2 scores in the univariate analyses, they were not entered into the linear regression due to the limited number of participants who answered yes to these questions.

**Table 2.** Correlations between Outcome and Predictor Variables

	BDI-II	Gender	Emigration	Leaving medicine	Burnout (slight)	Burnout (moderate)	Burnout (severe)
BDI-II [outcome]	1.00	-.296*	.326*	.455**	-.341*	.182	.365*
Gender		1.00	-.190	.038	.152	-.010	-.269*
Emigration			1.00	.341*	-.270*	.151	.352*
Leaving Medicine				1.00	-.560**	.211	.337*
Burnout (slight)					1.00	-.581**	-.415*
Burnout (moderate)						1.00	-.367*
Burnout (severe)							1.00

*Note.* Values presented are Pearson's correlation coefficients.

In Model 1, “Emigration” was the least significant predictor of BDI-2 scores ( $p = .689$ ) and was removed from Model 2. Model 2 was statistically significant and indicated that “Wanting to Leave Medicine” and “Burnout” were the only significant predictors of BDI-2 scores. Overall, the initial regression model explains 36% of the variance in participants’ BDI-2 scores (see Table 3 and 4). Since the variable “Gender” was not a significant predictor in Model 2, it was removed and ran a final backwards regression (entering Wanting to Leave Medicine in the first block, and “Burnout” in the second block; see Table 5).

**Table 3** BDI-2 Correlates with Possible Associated Features of Depression

Model	R	R Square	Adjusted R Square	Std. Error of Estimate	R Square Change	F Change	Sig. F Change	Durbin-Watson
1	0.652	0.425	0.350	8.62	0.425	5.668	<.001	
2	0.650	0.423	0.362	8.54	-0.002	0.162	.689	1.979

1. Predictors: Gender, Emigration, Leaving Medicine, Burnout (slight), Burnout (moderate), Burnout (severe)
2. Predictors: Gender, Leaving Medicine, Burnout (slight), Burnout (moderate), Burnout (severe)
3. Dependent variable: BDI-2 scores

**Table 4** ANOVA Analysis between the Associated Features of Depression and their BDI-2 Scores

Model	Sum of squares	Df	Mean Square	F	Sig.
1 Regression	2524.08	6	420.68	5.668	<.001
Residual	3414.22	46	74.22		
Total	5938.30	52			
2 Regression	2512.04	5	502.41	6.892	<.001
Residual	3426.26	47	72.90		
Total	5938.30	52			

1. Predictors: Gender, Emigration, Leaving Medicine, Burnout (slight), Burnout (moderate), Burnout (severe)
2. Predictors: Gender, Leaving Medicine, Burnout (slight), Burnout (moderate), Burnout (severe)
3. Dependent variable: BDI-2 scores

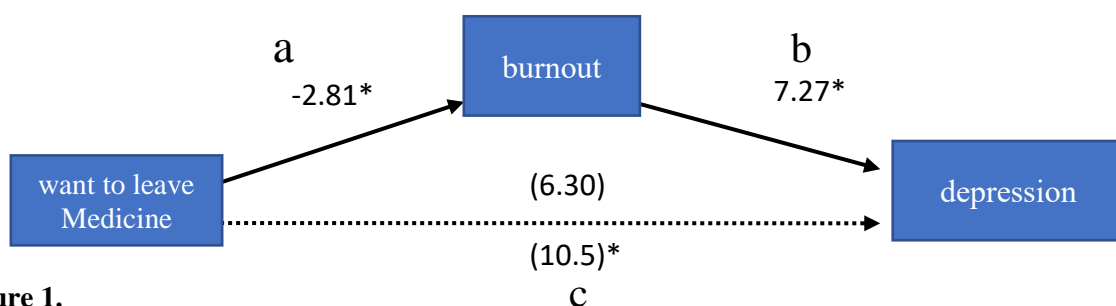
Overall, the final model which included Wanting to Leave Medicine and Burnout explained 33% of the variance in participants’ BDI-2 scores ( $R = .617$ ,  $\text{Adjusted } R^2 = .329$ ,  $F [4,52] = 7.37$ ,  $p < .001$ ). The final regression equation was:  $y = -7.37 + 9.04 (\text{Leaving Medicine}) + 13.74 (\text{Burnout slight}) + 16.78 (\text{Burnout moderate}) + 20.15 (\text{Burnout severe})$ . The Beta coefficients indicate that severe Burnout was the strongest predictor of BDI-2 scores (see Table 5).

**Table 5:** Table of Regression analysis to Examine Features Associated with Depression and their BDI-2 Scores.

Variables	<i>B</i>	Std. Error	Beta	<i>T</i>	<i>p</i>
<b>Model 2</b>					
Constant	-5.12	5.96		-0.86	.395
Gender	-4.94	2.65	-0.22	-1.87	.069
Leaving Medicine	10.08	3.18	0.44	3.17	.003*
Burnout (slight)	13.21	5.62	0.61	2.35	.023*
Burnout (moderate)	15.31	5.41	0.69	2.83	.007*
Burnout (severe)	17.31	5.77	0.66	3.00	.004*
<b>Final regression analysis</b>					
Constant	-7.37	5.99		-1.23	.224
Leaving Medicine	9.04	3.21	.392	2.82	.007*
Burnout (slight)	13.74	5.76	.635	2.39	.021*
Burnout (moderate)	16.78	5.49	.751	3.06	.004*
Burnout (severe)	20.15	5.70	.772	3.53	.001*

\**p* < .005.

660 A mediation analysis was conducted (see Figure 1) to determine whether Wanting to Leave Medicine predicts BDI-2 scores indirectly through Burnout. To conduct this test, Burnout was dichotomised (Level 1: Not at all and Slight; Level 2: Moderate and Severe). The Sobel test was significant (Sobel  $Z = -1.97, p = .049$ ), indicating that Wanting to Leave Medicine predicts BDI-2 scores through Burnout. Therefore, Burnout is the sole predictor of depressive symptomology.



**Figure 1.**

## Discussion

670 The primary aim of this study was to determine the associations between demographic data, previous history of depression, previous or current treatment for depression, and substance use and the self-reported severity of depressive symptomatology of medical interns at Groote Schuur Hospital. The secondary aim is to identify risk factors for the development of depressive symptoms during internship.

In our sample, 22 (40.7%) out of the 54 interns showed features of depression (indicated by a BDI-2 score greater than 13). This is comparable to international literature showing that the symptoms of depression among interns far exceeds that of the general population of South Africa which at the time of South African Stress and Health Study was 9.7% (21).

680 Female interns have been shown to have higher BDI-2 scores when compared to males interns (4,8,17,18,40,41). Our findings are similar in that thirty five percent female interns reported a higher prevalence of depressive symptoms compared to only five percent of males.

Contrary to the literature we found that first year interns reported less symptoms of depression compared to those in their second year. In contrast Rossouw et al. showed that the BDI-2 scores were negatively correlated to years of experience (10). In this study, when severity of depression is examined it is noted that three first year interns had BDI-2 scores of 29 or greater indicating severe depression as opposed to four second year interns who had scores of 29 or greater. Seeing that our sample size is relatively small and from one centre in the Western Cape, we would require further research to see if second year interns have higher BDI-2 scores than first year interns.

690 In our study, risk factors for developing symptoms of depression, included female gender and having a prior diagnosis of a mental illness and having the subjective experience of being moderately or severely burnt out. Currently being in psychotherapy was associated with higher BDI-2 scores. One could speculate that the five interns who had experienced more severe symptoms of depression then sought help from a therapist. Whilst the research shows this association it cannot be said whether it could be causative or consequential.

700 Interestingly the four interns who were currently taking antidepressants did not have significantly higher BDI-2 scores when compared to the rest of this interns. This highlights the importance of early diagnosis, continued support and compliance on medication. Interns who were previously on antidepressant treatment during internship could have potentially had an improvement in their depressive symptoms which could have led them to stopping treatment. It is concerning that whilst 24.1% (n=13) of our total sample reported moderate to severe symptoms of depression, only 1.8% (n=1) was currently on antidepressants only and 5.5% were receiving psychotherapy only and three (5.5%) were receiving a combination of the two. This potentially means 46.2% (n=6) of the interns

who had moderate to severe symptoms of depression, were not on any treatment presently. This represents a large treatment gap. This was also shown in other studies where interns have a preference to manage problems on their own, believing that stress is a part of the job, fearing the stigma associated with seeking help, lack of convenient mental health care services and possibly the fear of being viewed as impaired (25,26,38,45,49).

710 More than 90% ( $n= 50$ ) of all participants had commented that because of lack of time, both their relationships and personal pursuits were being compromised. These results are concerning as reduced engagement with hobbies and loved ones also predisposes to a burnout and depression (50). Fifty-one participants (96%) in the study reported the subjective feeling of burnout during their internship. The prior study by Rossouw et al., indicated that 76% of their sample displayed some degree of burnout. This is considerably high in our population. The important difference between this and the Rossouw et al., study was that their study also included senior medical officers and specialists.

720 Thirty-nine (68.5%) interns reported wanting to emigrate because of current or possible future working conditions. This is a great concern considering the scarcity of doctors within South Africa (35,51). It was noted by Mayosi et al. that approximately 30% of medical doctors had emigrated to other countries and approximately 58% were considering emigrating. Within this population of interns the desire to emigrate due to current or future working conditions is much higher, which could lead to a potential loss of resources for South Africa. This includes the high cost to train such doctors who would not be practising in the country (51). Of note, interns with higher BDI-2 scores were more likely to want to leave clinical medicine.

730 During their internship, six interns (11.1%) reported “thinking about taking their own life”. This symptom of depression was noted to correlate with higher BDI-2 scores than those who did not have suicidality. It was noted by Goldman et al. and Guille et al. that there is an increase in suicidal ideation in the first three months of internship (39,52). Interestingly in our study it was noted that five interns who had suicidal ideation were in their second year of internship and only one was in their first year. This highlights the importance of identifying interns who could be of greater risk to experience serious suicidality and to continually provide support for interns throughout their internship.

Eight interns (14.8%) reported using substances (prescription medication and illicit substances) to help them cope with the stresses of internship. Three interns did not specify which substances they used and four reported using anxiolytics or hypnotics to help them to sleep and one admitted to using cannabis and diazepam. Eleven interns (20.3%) used alcohol as a coping mechanism. The use of alcohol and substances were associated with significantly higher BDI-2 scores. The median BDI-2 score for interns who engaged in substance use was 24. The use of substances in this group was greater than anticipated. In a previous study done in Mexico City, 21% of interns were at risk for problematic

alcohol use and 2% of interns consumed recreational drugs once per month (24). It is also possible that these interns may be using alcohol and other substances to manage their depressive symptoms.

740 Workplace bullying has been shown to be a risk factor for the development of burnout and depression in international studies (31–33,46). Other features included, staff shortages and long work hours as contributing to decreased well-being.

In our study the most significant risk factor for the reporting of depressive symptoms was the subjective feeling of being moderately to severely burnout. This is important to note that further research in the field of burnout and its prevention can help prevent the development of depressive symptoms in interns.

### Limitations

750 There are several limitations to this study. As this is was cross-sectional study, causality cannot be determined. Ideally a prospective study measuring the BDI-2 scores at the beginning of internship and following up the scores during the course of internship, could then determine whether there is an increase in BDI-2 scores as time progresses. Because the demographic and related questionnaire and the BDI-2 were self-administered, there could be an over or under reporting of symptoms. Whilst the BDI-2 is considered by many to be the ‘gold standard’ instrument in the measurement of depressive symptoms, its use has not yet been validated in a South African context.

760 Due to the small sample size, it is not possible to determine bidirectionality between burnout and depression and wanting to leave medicine. More robust studies, with larger sample sizes would be required for this. Although this study focussed on depression and not burnout, because of the suggested strong association between the two it is highly recommended that future research uses more established questionnaires to describe and measure burnout.

The study was conducted in a single tertiary hospital in the Western Cape and the results may not be generalisable to the rest of the country or even to the province.

### Conclusion

This study represents a small subset of interns and the challenges that they face in South Africa. There is an indication that interns employed at Groote Schuur Hospital are at risk for developing depression. The most significant factor associated with reported symptoms of depression was a subjective feeling of being moderately to severely ‘burnt out’. Some features to look at would and educating senior staff about the effect that work place bullying has on their junior colleagues. It is noted that some interns

770 do have maladaptive coping strategies including alcohol and substance use. Also, concerning is the number of interns with suicidal ideation. Onsite counselling may also help provide more support to interns. Screening of interns in need of mental health services, may help to also provide better support to interns at risk of developing depression and burnout. Larger studies involving more interns across all provinces is needed to adequately assess the challenges that interns face and how to best assist them so that they may develop into well-adjusted clinicians who better serve the communities they treat.

### Dedication

This article is dedicated to the late Prof. Bongani Mawethu Mayosi, our dean.

### Acknowledgments

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## Appendices

### Appendix I: Email Invitation for Interns to Participate in the Study

Dear Intern

You are hereby, invited to participate in a study titled, “*Self-Reported Symptoms of Depression and Associated Factors in Medical Interns at a South African Tertiary Health Facility*”

Internship is recognised as a highly stressful experience.

This study is aims to investigate the presence of depressive symptoms amongst medical interns and the associated factors. In international literature it has been noted that medical interns have a high prevalence of depressive symptoms and this is directly associated with the stress of the internship training. There is, however, a paucity of data examining depression amongst South African interns. This study aims to fill that gap so that we may better understand the prevalence of depressive symptoms in medical interns currently employed at Groote Schuur Hospital and may also provide better support services for medical interns in the future.

An information pack will be given to all interns on the day that the study will be conducted. This provides some information about depression and pathways for you to seek health care should you require it.

Participation in this study is voluntary and should you choose to participate you will be required to anonymously complete two questionnaires. One is a demographic and related questionnaire and the other is the Beck Depression Inventory II which is considered the “gold standard” instrument in the self-reported symptoms of depression. If you choose to participate, you are welcome to only answer those questions which you feel comfortable answering.

Should you choose not to participate this will not affect your internship training in any way.

A meeting will be held for you to participate in the study, on 12 April 2018 at 13:00 at Klein Schuur just next to Lecture Theatre 2 at New Main Building Groote Schuur Hospital. Refreshments will be provided for all medical interns present.

Thank you for considering to participate in this study.

Kind Regards

Dr Kaveshin Naidu (Primary Investigator)

Dr J.R. Torline

Dr H.B. Thornton

## Appendix II: Introduction to the Study

Dear Intern

Thank you for taking part in this study titled, “Self-Reported Symptoms of Depression and Associated Factors in Medical Interns at a South African Tertiary Health Facility.”

Internship is a highly stressful experience. Sadly, there is very little South African data looking specifically at interns and the rates of depression that they experience. There was a single study done by Rossouw et al titled “The Prevalence of Burnout and Depression in medical doctors working in the Cape Town Metropolitan Municipality community health care clinics and district hospitals of the Provincial Government of the Western Cape: a Cross Sectional Study” This study showed that doctors experienced higher rates of depression compared with the South African public with medical interns having a particularly high incidence.

The reason for conducting this study is to better understand the current prevalence of depressive symptoms amongst medical interns and some of the challenges that you are currently facing and your ways of dealing with these challenges. This is in an attempt to provide better resources for you during your internship training as well as for the interns who rotate through Groote Schuur Hospital in the future. Depending on the results of this study, this study can be a foundation for future research.

Participation in this study requires you to fill in two questionnaires, anonymously. It should take approximately 10-15 minutes for you to complete. The first questionnaire is a demographic and related questionnaire and the second is the Beck Depression Inventory II which is the gold standard self-administered tool for identifying depressive symptoms.

Participation in this study is voluntary and you may choose to not participate and this will have no bearing on your internship training. If you do decide to participate and you may answer only those questions you feel comfortable with. If you decide not to participate please place the blank demographic questionnaire and Beck Depression Inventory into the envelope and return it to the box on exiting the meeting. With the envelopes being sealed no one will know if the questionnaires are completed or blank.

The study is a cross sectional study which means that you will complete the questionnaires and submit them. There will be no follow up study. You will receive no financial reimbursement for participating in this study.

The data will be extracted from the questionnaires and be electronically entered into a password protected database. Once the data has been analysed, the study will be complete. The results of the study will be submitted to the University of Cape Town’s Department of Psychiatry as a part of the requirements of the MMed (Psychiatry) degree. The results may also be presented at a conference and submitted as journal article for publication. We will ensure that the results are also disseminated to the

Western Cape Department of Health and the intern coordinator and management at Groote Schuur Hospital. This is to ensure that they are aware of the results and this may encourage greater support and services for interns in the future.

Some of the questions asked in the demographic and related questionnaire and Beck Depression Inventory 2 may elicit difficult emotions.

On exiting the venue everyone will be given an information pack regarding how to access local mental health care services.

### Appendix III: Consent Form



I have read the above information and I willingly and voluntarily agree to participate in the study titled, “Self-Reported Symptoms of Depression and Associated Factors in Medical Interns at a South African Tertiary Health Facility”

I understand that participation is voluntary and I may choose to answer only those questions which I feel comfortable answering.

I understand that I have a right to ask questions about any aspect of this study and can withdraw from this study at anytime.

There is no special advantage or disadvantage in participating in this study.

I have been informed that all information will be treated as confidential, but will be used in a publication in a medical journal. My name will not appear in the publication and it will not be possible to identify me in this publication.

I consent to participate in the above research and understand that my responses will not affect my internship training in any way.

I understand that participation in this study may elicit difficult emotions and have I have been informed about pathways to care should this occur.

I also understand that I will not receive any financial reimbursement for my participation in the study.

The information above has been explained to me in English.

Print name of participant: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Place: Groote Schuur Hospital

Primary Investigator: Dr Kaveshin Naidu

Contact Details: 072 730 7237

Email: kaveshinnaidu@gmail.com

Main Supervisor: Dr Helena Thornton

Cell: 084 690 2288

Email: helena.thornton@uct.ac.za

Co-Supervisor: Dr John Torline

Human Research Ethics Committee at University of Cape Town

Old Main Building of Groote Schuur Hospital, Floor E53,

Room 46, Observatory 7925

Reception Contact Number: (021) 404 7682

“Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society.”

Appendix IV: Demographic and Related Questionnaire

Thank you for taking part in this research. Please indicate your response by circling the appropriate answer or write in your response where space is provided.

All questions are voluntary, and you are welcome to only answer those questions that you feel comfortable with.

1. What is your age in years?
  
2. How would you describe your gender?  
Female          Male          Other
  
3. What is your current relationship status? (you are free to answer more than one)  
Single Relationship    MarriedSeparated    Divorced    Widowed    Other
  
4. Are you currently in first or second year internship?  
First Year    Second Year
  
5. Are you currently seeing a psychologist or counsellor?  
Yes          No
  
6. Did you see a psychologist or counsellor during the course of your internship?  
Yes          No
  
7. If you have seen a psychologist or counsellor during the course of your internship, was Internship part of the reason you saw them ?  
Yes          No
  
8. Have you taken antidepressant medication during the course of your internship?  
Yes          No

9. Are you currently taking antidepressants?  
Yes No
10. If you have been taking antidepressants during your internship who has prescribed them for you?  
General Practitioner Psychiatrist Colleague or Friend Self-prescribed
11. Have you ever been treated for depression prior to starting your internship?  
Yes No
12. If yes, when were you first diagnosed with depression? (you can just state the year which you when you were first diagnosed?)
13. Have you been diagnosed or treated for any other psychiatric illness prior to starting internship ?  
Yes No
14. If yes, what diagnosis/es did you receive and in what year were you diagnosed?  
Diagnosis:  
Year:
15. If you were previously diagnosed with depression/ another psychiatric disorder for how long were you treated?
16. If you were previously diagnosed with depression, did you see a counsellor/therapist psychologist?  
Yes No
17. If yes, then for how long did you attend psychotherapy/counselling?

18. If you were previously diagnosed with depression did you receive antidepressant treatment?  
Yes No
19. If you did receive antidepressant treatment how long were you on the treatment for?
20. Did you access any non-medical (alternative or holistic treatments) for the treatment of depression during the course of your internship? (e.g. homeopathic remedies, energy healing, acupuncture, massage, etc)  
Yes No
21. Do you have a first degree relative who has been diagnosed / treated for depression?  
Yes No
22. Prior to internship, have you ever, considered taking your own life?  
Yes No
23. During internship have you ever considered taking your own life?  
Yes No
24. Have you made any suicide attempts prior to internship?  
Yes No
25. Have you made any suicide attempts during the course of your internship?  
Yes No
26. Have you been concerned about a fellow intern having depression?  
Yes No
27. Have you been concerned about a fellow intern feeling suicidal?  
Yes No

28. Do you know of a fellow intern who has tried to kill themselves?  
Yes No
29. Have you ever had occupational exposure to HIV/AIDS?  
Yes No
30. What is the longest duration (in hours) that you have been required to work during internship?
31. Do you feel supported by your senior colleagues?  
Yes No
32. Have you used alcohol during the course of your internship as a means of coping with work related or personal difficulties?  
Yes No
33. Have you used any substances during the course of your internship as a means of coping with work related difficulties? (e.g. prescription medication, cannabis, drugs etc)  
Yes No
34. Please specify which substances you used during your internship in order to cope?
35. What would you consider the main forms of relaxation that you engage in during internship?  
Exercise Religious activities Mindfulness or Spending quality time with  
meditation-based practice friends and family
36. If there is another form of relaxation that you have engaged in during your internship please specify?

37. Do you find that your engagement in personal pursuits is compromised because of lack of time?  
Yes No
38. Do you feel that your personal relationships are compromised because of a lack of time?  
Yes No
39. Would you consider yourself suffering from “burnout” during your internship?  
Not at all burnt out Slightly burnt out Moderately burnt out Severely burnt out
40. Have you considered emigrating because of your current working conditions?  
Yes No
41. Have you ever considered leaving clinical medicine as a result of your experiences as an intern? (Either to go into lab-based work, hospital administration or to choose an entirely different career path?)  
Yes No
42. Do you have any further comments with regards to your internship training and factors that could potentially affect your mental health?

Appendix V

Beck Depression Inventory 2



Name: \_\_\_\_\_ Marital Status: \_\_\_\_\_ Age: \_\_\_\_\_ Sex: \_\_\_\_\_

Occupation: \_\_\_\_\_ Education: \_\_\_\_\_

**Instructions:** This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

<p><b>1. Sadness</b></p> <p>0 I do not feel sad.</p> <p>1 I feel sad much of the time.</p> <p>2 I am sad all the time.</p> <p>3 I am so sad or unhappy that I can't stand it.</p> <p><b>2. Pessimism</b></p> <p>0 I am not discouraged about my future.</p> <p>1 I feel more discouraged about my future than I used to be.</p> <p>2 I do not expect things to work out for me.</p> <p>3 I feel my future is hopeless and will only get worse.</p> <p><b>3. Past Failure</b></p> <p>0 I do not feel like a failure.</p> <p>1 I have failed more than I should have.</p> <p>2 As I look back, I see a lot of failures.</p> <p>3 I feel I am a total failure as a person.</p> <p><b>4. Loss of Pleasure</b></p> <p>0 I get as much pleasure as I ever did from the things I enjoy.</p> <p>1 I don't enjoy things as much as I used to.</p> <p>2 I get very little pleasure from the things I used to enjoy.</p> <p>3 I can't get any pleasure from the things I used to enjoy.</p> <p><b>5. Guilty Feelings</b></p> <p>0 I don't feel particularly guilty.</p> <p>1 I feel guilty over many things I have done or should have done.</p> <p>2 I feel quite guilty most of the time.</p> <p>3 I feel guilty all of the time.</p>	<p><b>6. Punishment Feelings</b></p> <p>0 I don't feel I am being punished.</p> <p>1 I feel I may be punished.</p> <p>2 I expect to be punished.</p> <p>3 I feel I am being punished.</p> <p><b>7. Self-Dislike</b></p> <p>0 I feel the same about myself as ever.</p> <p>1 I have lost confidence in myself.</p> <p>2 I am disappointed in myself.</p> <p>3 I dislike myself.</p> <p><b>8. Self-Criticalness</b></p> <p>0 I don't criticize or blame myself more than usual.</p> <p>1 I am more critical of myself than I used to be.</p> <p>2 I criticize myself for all of my faults.</p> <p>3 I blame myself for everything bad that happens.</p> <p><b>9. Suicidal Thoughts or Wishes</b></p> <p>0 I don't have any thoughts of killing myself.</p> <p>1 I have thoughts of killing myself, but I would not carry them out.</p> <p>2 I would like to kill myself.</p> <p>3 I would kill myself if I had the chance.</p> <p><b>10. Crying</b></p> <p>0 I don't cry any more than I used to.</p> <p>1 I cry more than I used to.</p> <p>2 I cry over every little thing.</p> <p>3 I feel like crying, but I can't.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



**11. Agitation**

- 0 I am no more restless or wound up than usual.
- 1 I feel more restless or wound up than usual.
- 2 I am so restless or agitated that it's hard to stay still.
- 3 I am so restless or agitated that I have to keep moving or doing something.

**12. Loss of Interest**

- 0 I have not lost interest in other people or activities.
- 1 I am less interested in other people or things than before.
- 2 I have lost most of my interest in other people or things.
- 3 It's hard to get interested in anything.

**13. Indecisiveness**

- 0 I make decisions about as well as ever.
- 1 I find it more difficult to make decisions than usual.
- 2 I have much greater difficulty in making decisions than I used to.
- 3 I have trouble making any decisions.

**14. Worthlessness**

- 0 I do not feel I am worthless.
- 1 I don't consider myself as worthwhile and useful as I used to.
- 2 I feel more worthless as compared to other people.
- 3 I feel utterly worthless.

**15. Loss of Energy**

- 0 I have as much energy as ever.
- 1 I have less energy than I used to have.
- 2 I don't have enough energy to do very much.
- 3 I don't have enough energy to do anything.

**16. Changes in Sleeping Pattern**

- 0 I have not experienced any change in my sleeping pattern.

---

- 1a I sleep somewhat more than usual.
- 1b I sleep somewhat less than usual.

---

- 2a I sleep a lot more than usual.
- 2b I sleep a lot less than usual.

---

- 3a I sleep most of the day.
- 3b I wake up 1–2 hours early and can't get back to sleep.

**17. Irritability**

- 0 I am no more irritable than usual.
- 1 I am more irritable than usual.
- 2 I am much more irritable than usual.
- 3 I am irritable all the time.

**18. Changes in Appetite**

- 0 I have not experienced any change in my appetite.

---

- 1a My appetite is somewhat less than usual.
- 1b My appetite is somewhat greater than usual.

---

- 2a My appetite is much less than before.
- 2b My appetite is much greater than usual.

---

- 3a I have no appetite at all.
- 3b I crave food all the time.

**19. Concentration Difficulty**

- 0 I can concentrate as well as ever.
- 1 I can't concentrate as well as usual.
- 2 It's hard to keep my mind on anything for very long.
- 3 I find I can't concentrate on anything.

**20. Tiredness or Fatigue**

- 0 I am no more tired or fatigued than usual.
- 1 I get more tired or fatigued more easily than usual.
- 2 I am too tired or fatigued to do a lot of the things I used to do.
- 3 I am too tired or fatigued to do most of the things I used to do.

**21. Loss of Interest in Sex**

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I am much less interested in sex now.
- 3 I have lost interest in sex completely.

NOTICE: This form is printed with green and black ink. If your copy does not appear this way, it has been photocopied in violation of copyright laws.

Subtotal Page 2

Subtotal Page 1

Total Score

281283-4 654321

## Appendix VI : Information Pack for Interns

Here is some basic information regarding depression and burnout and how you can access help and services should you need to do so.

Some signs that you may be suffering from depression include:

1. Persistent sadness or tearfulness.
2. Lack of interest in engaging in pleasurable activities that you previously would have enjoyed.
3. Loss of appetite leading to loss of weight. Also increased appetite with associated weight gain.
4. Difficulty sleeping particularly early morning awakening. Hypersomnia (sleeping too much could also indicate depression.)
5. Feelings of guilt, worthlessness and no hope for the future.
6. Difficulty concentrating on tasks
7. Feeling tired or exhausted most of the day, nearly everyday.
8. Having suicidal thoughts, or attempts.
9. Having difficulty making decisions, or having no motivation or “drive” to do things.

Some Signs that you may be suffering from burnout include

1. Include physical and emotional exhaustion
  - Chronic fatigue
  - Difficulty sleeping
  - Being Forgetful/ impaired concentration
  - Physical symptoms such as muscle ache, headaches, shortness of breath
  - Loss of appetite
  - Angry outbursts at home or work
  - Anxiety and constant worrying
  - Depression
2. Signs of cynicism and detachment
  - Loss of enjoyment in work and personal life

- Pessimism: feeling constantly negative about the future or work circumstances
  - Isolation- avoiding spending time with friends and family
  - Detachment- isolating yourself from friends and work colleagues resulting in neglecting work difficulties
3. Signs of ineffectiveness and a feelings of lack of accomplishment
- Feelings of pessimism and apathy
  - Increased irritability (feeling that you are unimportant, ineffective or useless)
  - Lack of productivity and poor performance- in spite of keeping long hours your productivity declines and you find yourself achieving less.

**Should you feel that you require further assistance based on the results achieved in your Beck Depression Inventory II or you feel that you wish to have treatment for difficulties arising out of your internship, there are a number of resources listed below that you may choose to access.**

**ICAS** ( Confidential and free counselling service open to all employees of the Western Cape Department of Health) 0800 611 093 (24 hour toll free number) or send a “please call me” to 0711192463

**Occupational Health Clinic (Dr Z. Sunday) at Groote Schuur Hospital**– (021) 404 5409  
This service is available to all medical interns who DO NOT have medical aid.

**Narcotics Anonymous:** 083 900 69 62 Email: ct-emailhelpline@na.org.za

**Alcoholics Anonymous:** 021 418 0908 Email: westerncape@aasouthafrica.org.za

**Adcock Ingram Depression and Anxiety Helpline:** 0800 70 80 90

**Dr Reddy's Help Line:** 0800 21 22 23

**Destiny Helpline for Youth and Students:** 0800 41 42 43

**Lifeline Western Cape (Telephone counselling service):** Landline 021 461 1111 from 09h30 to 22h00 and WhatsApp Call 063 709 2620 from 10h00 to 14h00

**Pharmadynamics Police and Trauma Line:** 0800 205 026

**SADAG (South African Depression and Anxiety Group) Mental Health Line:** 011 234 4837

**Suicide Crisis Line:** 0800 567 567, SMS 31393

Should you wish to access private health care you are welcome to search **www.medpages.co.za** for psychiatrists or psychologists based close to a suburb of your choice.

If you have any queries regarding this study, please do not hesitate to contact us.

Dr Kaveshin Naidu (Primary Investigator)

Cell: 072 730 7237

Email: [kaveshinnaidu@gmail.com](mailto:kaveshinnaidu@gmail.com)

Dr Helena Thornton (main supervisor)

Cell: 084 690 2288

Email: [helena.thornton@uct.ac.za](mailto:helena.thornton@uct.ac.za)

Dr John Torline (Co-Supervisor)

Human Research Ethics Committee at University of Cape Town

Old Main Building of Groote Schuur Hospital, Floor E53, Room

46, Observatory 7925

Reception Contact Number: (021) 404 7682

## Appendix VII: UCT Human Research Ethics Approval



**UNIVERSITY OF CAPE TOWN**  
**Faculty of Health Sciences**  
**Human Research Ethics Committee**



Room E53-46 Old Main Building  
Groote Schuur Hospital  
Observatory 7925  
Telephone [021] 406 6626  
Email: [shuretta.thomas@uct.ac.za](mailto:shuretta.thomas@uct.ac.za)

Website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms)

04 December 2017

**HREC REF: 792/2017**

**Dr H Thornton**  
Psychiatry & Mental Health  
Office number 4  
Valkenberg Hospital

Dear Dr Thornton

**PROJECT TITLE: SELF-REPORTED SYMPTOMS OF DEPRESSION AND ASSOCIATED FACTORS IN MEDICAL INTERNS AT A SOUTH AFRICAN TERTIARY HEALTH FACILITY (Masters-candidate-Dr K Naidu)**

Thank you for submitting an excellent response to the Faculty of Health Sciences Human Research Ethics Committee dated 28 November 2017.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

**Approval is granted for one year until the 30 December 2018.**

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms))

**Please quote the HREC REF in all your correspondence.**

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

**The HREC acknowledge that the student, Dr Kaveshin Naidu will also be involved in this study.**

*Yours sincerely*

**PROFESSOR M. BLOCKMAN**  
**CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE**  
Federal Wide Assurance Number: FWA00001637.  
Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines.  
The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

## Appendix VIII

### Groote Schuur Hospital Research Ethics Committee Approval



#### GROOTE SCHUUR HOSPITAL

Enquiries: Dr Bernadette Eick

E-mail : [Bernadette.Eick@westerncape.gov.za](mailto:Bernadette.Eick@westerncape.gov.za)

Dr H. Thornton  
**Psychiatry & Mental Health**

E-mail: [Kaveshinnaidu@gmail.com](mailto:Kaveshinnaidu@gmail.com)

Dear Dr Thornton

**RESEARCH PROJECT: Self-Reported Symptoms of Depression & Associated Factors In Medical Interns At A South African Tertiary Health Facility (Masters Candidate Dr K. Naidu)**

Your recent letter to the hospital refers.

You are granted permission to proceed with your research, which is valid until **30 December 2018**.

Please note the following:

- a) Your research may not interfere with normal patient care.
- b) Hospital staff may not be asked to assist with the research.
- c) No additional costs to the hospital should be incurred i.e. Lab, consumables or stationary.
- d) **No patient folders may be removed from the premises or be inaccessible.**
- e) Please provide the research assistant/field worker with a copy of this letter as verification of approval.
- f) Confidentiality must be maintained at all times.
- g) Should you at any time require photographs of your subjects, please obtain the necessary indemnity forms from our Public Relations Office (E45 OMB or ext. 2187/2188).
- h) Should you require additional research time beyond the stipulated expiry date, please apply for an extension.
- i) Please discuss the study with the HOD before commencing.
- j) Please introduce yourself to the person in charge of an area before commencing.
- k) On completion of your research, please forward any recommendations/findings that can be beneficial to use to take further action that may inform redevelopment of future policy / review guidelines.
- l) **Kindly submit a copy of the publication or report to this office on completion of the research.**

I would like to wish you every success with the project.

Yours sincerely

**Signed by Dr Jacobs**

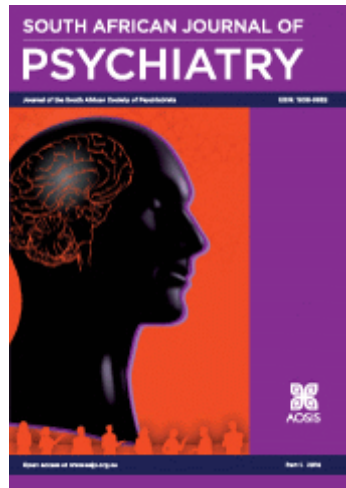
**DR BELINDA JACOBS**  
**(Acting) CHIEF OPERATIONAL OFFICER**  
**Date:** 15 December 2017

C.C. Mr L. Naidoo  
Dr T. Numanoglu  
Professor J. Joska (Professor D. Stein)

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Private Bag X,  
Observatory, 7935  
[www.capegateway.gov.za](http://www.capegateway.gov.za)

## Appendix IX : Submission Guidelines for the South African Journal of Psychiatry



### Submission Guidelines

The author guidelines include information about the types of articles received for publication and preparing a manuscript for submission. Other relevant information about the journal's policies and the reviewing process can be found under the about section. The **compulsory cover letter** form part of a submission and is on the first page of the manuscript. It should always be presented in English. [See full structure of cover letter below.](#) After the cover letter the manuscript body starts.

#### Original Research Article

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An original article provides an overview of innovative research in a particular field within or related to the focus and scope of the journal, presented according to a clear and well-structured format. Systematic reviews should follow the same basic structure as other original research articles. The aim and objectives should focus on a clinical question that will be addressed in the review. The methods section should describe in detail the search strategy, criteria used to select or reject articles, attempts made to obtain all important and relevant studies and deal with publication bias (including grey and unpublished literature), how the quality of included studies was appraised, the methodology used to extract and/or analyse data. Results should describe the homogeneity of the different findings, clearly present the overall results and any meta-analysis.

Word limit	3000-4000 words (excluding the structured abstract and references)
Structured abstract	250 words to include a Background, Aim, Setting, Methods, Results and Conclusion
References	60 or less
Tables/Figures	no more than 7 Tables/Figures
Ethical statement	should be included in the manuscript
Compulsory supplementary file	ethical clearance letter/certificate

#### Cover Letter

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The format of the compulsory cover letter forms part of your submission. It is located on the first page of your manuscript and should always be presented in English. You should provide the following elements:

- Full title: Specific, descriptive, concise, and comprehensible to readers outside the field, max 95 characters (including spaces).

- Tweet for the journal Twitter profile: This will be used on the journal Twitter profile to promote your published article. Max 101 characters (including spaces). If you have a Twitter profile, please provide us your Twitter @ name. We will tag you to the Tweet
- Full author details: The title(s), full name(s), position(s), affiliation(s) and contact details (postal address, email, telephone, highest academic degree, Open Researcher and Contributor Identification (ORCID) and cell phone number) of each author.
- Corresponding author: Identify to whom all correspondence should be addressed.
- Authors' contributions: Briefly summarise the nature of the contribution made by each of the authors listed.
- Disclaimer: A statement that the views expressed in the submitted article are his or her own and not an official position of the institution or funder.
- Source(s) of support: These include grants, equipment, drugs, and/or other support that facilitated conduct of the work described in the article or the writing of the article itself.
- Summary: Lastly, a list containing the number of words, pages, tables, figures and/or other supplementary material should accompany the submission.

Anyone that has made a significant contribution to the research and the paper must be listed as an author in your cover letter. Contributions that fall short of meeting the criteria as stipulated in our policy should rather be mentioned in the 'Acknowledgements' section of the manuscript.

Read our [authorship](#) guidelines and [author contribution](#) statement policies.

### Original Research Article full structure

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**Title:** The article's full title should contain a maximum of 95 characters (including spaces).

**Abstract:** The abstract, written in English, should be no longer than 250 words and must be written in the past tense. The abstract should give a succinct account of the objectives, methods, results and significance of the matter. The structured abstract for an Original Research article should consist of six paragraphs labelled Background, Aim, Setting, Methods, Results and Conclusion.

- Background: Summarise the social value (importance, relevance) and scientific value (knowledge gap) that your study addresses.
- Aim: State the overall aim of the study.
- Setting: State the setting for the study.
- Methods: Clearly express the basic design of the study, and name or briefly describe the methods used without going into excessive detail.
- Results: State the main findings.
- Conclusion: State your conclusion and any key implications or recommendations.

Do not cite references and do not use abbreviations excessively in the abstract.

**Introduction:** The introduction must contain your argument for the social and scientific value of the study, as well as the aim and objectives:

- Social value: The first part of the introduction should make a clear and logical argument for the importance or relevance of the study. Your argument should be supported by use of evidence from the literature.
- Scientific value: The second part of the introduction should make a clear and logical argument for the originality of the study. This should include a summary of what is already known about the research question or specific topic, and should clarify the knowledge gap that this study will address. Your argument should be supported by use of evidence from the literature.
- Conceptual framework: In some research articles it will also be important to describe the underlying theoretical basis for the research and how these theories are linked together in a conceptual framework. The theoretical evidence used to construct the conceptual framework should be referenced from the literature.

- Aim and objectives: The introduction should conclude with a clear summary of the aim and objectives of this study.

**Research methods and design:** This must address the following:

- Study design: An outline of the type of study design.
- Setting: A description of the setting for the study; for example, the type of community from which the participants came or the nature of the health system and services in which the study is conducted.
- Study population and sampling strategy: Describe the study population and any inclusion or exclusion criteria. Describe the intended sample size and your sample size calculation or justification. Describe the sampling strategy used. Describe in practical terms how this was implemented.
- Intervention (if appropriate): If there were intervention and comparison groups, describe the intervention in detail and what happened to the comparison groups.
- Data collection: Define the data collection tools that were used and their validity. Describe in practical terms how data were collected and any key issues involved, e.g. language barriers.
- Data analysis: Describe how data were captured, checked and cleaned. Describe the analysis process, for example, the statistical tests used or steps followed in qualitative data analysis.
- Ethical considerations: Approval must have been obtained for all studies from the author's institution or other relevant ethics committee and the institution's name and permit numbers should be stated here.

**Results:** Present the results of your study in a logical sequence that addresses the aim and objectives of your study. Use tables and figures as required to present your findings. Use quotations as required to establish your interpretation of qualitative data. All units should conform to the [SI convention](#) and be abbreviated accordingly. Metric units and their international symbols are used throughout, as is the decimal point (not the decimal comma).

**Discussion:** The discussion section should address the following four elements:

- Key findings: Summarise the key findings without reiterating details of the results.
- Discussion of key findings: Explain how the key findings relate to previous research or to existing knowledge, practice or policy.
- Strengths and limitations: Describe the strengths and limitations of your methods and what the reader should take into account when interpreting your results.
- Implications or recommendations: State the implications of your study or recommendations for future research (questions that remain unanswered), policy or practice. Make sure that the recommendations flow directly from your findings.

**Conclusion:** Provide a brief conclusion that summarises the results and their meaning or significance in relation to each objective of the study.

**Acknowledgements:** Those who contributed to the work but do not meet our authorship criteria should be listed in the Acknowledgments with a description of the contribution. Authors are responsible for ensuring that anyone named in the Acknowledgments agrees to be named.

Also provide the following, each under their own heading:

- Competing interests: This section should list specific competing interests associated with any of the authors. If authors declare that no competing interests exist, the article will include a statement to this effect: *The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.* Read our [policy on competing interests](#).
- Author contributions: All authors must meet the criteria for authorship as outlined in the [authorship](#) policy and [author contribution](#) statement policies.
- Funding: Provide information on funding if relevant
- Disclaimer: A statement that the views expressed in the submitted article are his or her own and not an official position of the institution or funder.

**References:** Authors should provide direct references to original research sources whenever possible. References should not be used by authors, editors, or peer reviewers to promote self-interests. Refer to the journal referencing style downloadable on our *Formatting Requirements* page.