THE PREVALENCE OF BURNOUT AMONG ANAESTHESIOLOGY REGISTRARS IN THE UNIVERSITY OF THE FREE STATE

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DECLARATION OF AUTHORSHIP

I, Durotolu Motunrayo Adeleke with student number 2016445245, declare that the coursework Master's Degree THE PREVALENCE OF BURNOUT AMONG ANAESTHESIOLOGY REGISTRARS IN THE UNIVERSITY OF THE FREE STATE that I herewith submit in a publishable manuscript format for the MMed qualification in Anaesthesiology at the University of the Free State is my independent work, and that I have not previously submitted it for a qualification of another institution of higher education. All sections of the paper that use quotes or describe an argument or concept developed by another author have been duly referenced including all secondary literature used.

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Table of Contents

ABSTRACT

Introduction:

In January 2019 the leading health care organizations in the United States declared burnout as a "public health crisis" with an alarming figure of 78% among the nation's physicians. Burnout is an "individual experience that is specific to the work context" which is associated with poor outcomes in job performance and health. Studies have revealed burnout ranging from 18-84% during postgraduate medical education (residency). The aim of the study was to quantify the prevalence of burnout among anaesthesiology registrars and to identify protective and aggravating factors.

Method

A descriptive, prospective cross-sectional study was done in November 2018 among 23 anaesthesiology registrars using the Maslach Burnout Inventory (MBI), which is the instrument that has been validated globally to assess the dimensions of burnout: emotional exhaustion, depersonalization and a reduced sense of personal accomplishment. A self-developed questionnaire that assessed demographics, factors that contributed to and protected from burnout was also administered.

Results

A prevalence of 17.4% of burnout was found with an equal distribution between males and females. The analysis of the data showed that all the participants who reported burnout were married. Difficulty in maintaining a balance between work, family and a social life was the greatest factor for reconsidering anaesthesia as a career. This was exacerbated by not having fixed working hours. The protective factors identified were: spending time with loved ones, praying, taking a break or spending time in solitude and exercise.

About half (47.8 %) of the participants reported themselves as being prone to errors particularly when sleep deprived.

Conclusion

The registrars in the department of anaesthesiology showed less burnout in comparison with counterparts in anaesthesiology residency training programmes within South Africa and internationally. This reinforces the findings in other studies that physicians in small urban settings show less burnout when compared with national averages. The protective factors identified in Bloemfontein can be further adopted as preventive action to further improve the wellbeing of the registrar vis-à-vis patient outcomes.

KEYWORDS AND GLOSSARY OF TERMS

Anaesthetist: a physician trained in anaesthesia and perioperative medicine

Anaesthesiologist: a physician trained in anaesthesia and perioperative medicine.

Burnout: Burnout is a psychological term that refers to long-term exhaustion and diminished interest in work. It is work specific, occurs in individuals who did not have any pre-existing psychopathology and commonly found in care giving professions.

Depersonalization: is an attempt of an individual to put distance between himself / herself and service recipients by actively ignoring the qualities that make them unique and engaging people. It is characterised by a negative and unaffected attitude towards their patients and colleagues.

Emotional Exhaustion: it is the central component of the burnout syndrome, and for most intent and purposes, the term Burnout is synonymous with the experience of exhaustion. Exhaustion in itself is the state of extreme physical or mental tiredness. It is the action of using something up or the state of being used up.

High Burnout Level: it is defined by a high level of Emotional Exhaustion, high level of Depersonalization and low level of Professional Accomplishment.

Registrar: a doctor in a postgraduate training programme to become a specialist in a field of medicine

Personal (Professional) Accomplishment: An individual's sense of efficiency

Physician: Medical Doctor

Prevalence: Extensiveness

LIST OF ABBREVIATIONS

DoH: Department of Health

DP: Depersonalization

EE: Emotional Exhaustion

EHR: Electronic Health Records

HPCSA: Health Professions Council of South Africa

HSREC: Health Sciences Research Ethics Committee

MBI-HSS: Maslach Burnout Inventory – Human Services Survey

PA: Professional or Personal Accomplishment

SVS: Second Victim Syndrome

UFS: University of the Free State

U.S: United States of America

Chapter 1

Critical and Synthesized Review of Literature

Introduction:

Each year in the United States, over 400 physicians take their lives[1].This is thought to be linked to the spectrum of increasing burnout leading to depression and ending up as suicide when left untreated [1]. In South Africa, seven deaths (all suicide) of anaesthetists was recorded over an 18 month period[2].

Burnout is a work-related syndrome[3,4]. It involves emotional exhaustion, depersonalization and a sense of reduced personal accomplishment [3,4].

The term "burnout" was first described over 40 years ago by the psychoanalyst Freudenberger, who described burnout as a physical and psychiatric breakdown[5,6,7]. The foremost psychologist - Christina Maslach amended the definition in 1981 and proposed three dimensions of burnout - (emotional exhaustion caused by interpersonal interactions, depersonalization and low personal accomplishment at work) [8,9]. The syndrome according to Maslach is found only in caring and social professions (for example: doctors, flight attendants, social workers, teachers and nurses) and that it does not affect people working in a position without direct contact with other people such as welders or factory workers[10]. She introduced the Maslach Burnout Inventory, a tool that has been validated worldwide and is being used till date to measure the syndrome of burnout[11].

The condition Burnout is included in the 10th revision of the International Classification of Diseases (ICD-10): the term 'burnout' was described under code Z.73.0 as a "burnout state of total exhaustion" [12].

In the recent world health assembly of the World Health Organization (WHO), burnout is included in the 11th Revision of the International Classification of Diseases (ICD-11) that will take effect from January 2022 as an occupational phenomenon[13]. It refers specifically to the occupational context and is not applicable to experiences in other areas of life[13]. It is therefore not classified as a medical condition but rather defined elaborately as a syndrome resulting from chronic workplace stress that has not been successfully managed and is characterized by the three dimensions of burnout: feelings of energy depletion or exhaustion; increased mental distance from one's job, or feelings of negativism or cynicism related to one's job; and reduced professional efficacy[13].

The rates of burnout exceed 50% globally in the studies of doctors in residency training programmes and in specialist physicians[3,14,15,16,17,18]. This problem represents a public health crisis[3,19] with negative impacts on individual physicians[3,20], patients[3,21,22,23] and healthcare organizations and systems[3,24].

Studying and practicing anaesthesiology is a stressful endeavour[25].

It is essential to investigate professional burnout among registrars in anaesthesiology training programmes across South Africa.

About 40% of anaesthetists in Belgium experience burnout, especially young trainees under 30 years of age[25]. In the study done at the University of Witwatersrand in South Africa among trainee anaesthetists and specialist anaesthetists (both in the state and private sector); 21% reported high levels of burnout[26].

Contributors to Burnout among Physicians:

a) Individual-Physician Level Factors:

There are independent relationships reported in cross-sectional studies of physicians linking burnout and the bio-data of the doctor in terms of gender, age and relationship status; others are: educational debt, age of children and spousal/partner occupation [27,28,29,30,31].

- Gender: It is worthy of mention that gender is not consistently an independent predictor of burnout. Some studies have found female physicians to have 20–60% increased odds of burnout [27,28,32]. A Norwegian study found higher exhaustion levels amongst women, in whom burnout was notably linked with work–home conflicts. In men however, higher disengagement (depersonalization) levels were found, particularly in those in whom burnout was most strongly predicted by workload [33].
- Age: Younger physicians also appear to be at increased risk of burnout symptoms. Doctors less than 55 years of age are more than double the risk of burnout in comparison with their older colleagues who are older than 55 [34,35].

  It is unclear whether these findings with regards to age and burnout can be fully accounted for by the possible impact of burnout on early physician retirement or the existing policy that enforces retirement at age 65 and the subsequent under-representation of older physicians in burnout prevalence studies.
- Children: Having a child younger than 21 years old has been found to increase the risk of burnout by 54% [34,35].
- Partner Occupation: Having a spouse/partner who works as a non-physician healthcare professional has been shown to increase the risk of burnout by 23% [34,35].
- Individual Characteristics: The personality, interpersonal skills and personal experiences may influence how the physician as an individual copes with stress [36,37,38,39]. The hypothesis of individuals who choose to become physicians appear to be inherently and generally more vulnerable to stress and burnout does not hold true, therefore emphasizing the importance of work-related, organizational and healthcare system factors in the ongoing physician burnout crisis [40,41].

b) Work-Level Factors:

Burnout symptoms vary across medical specialities. Some specialties such as dermatology, preventative and occupational medicine are associated with lower burnout rates whereas emergency medicine, general internal medicine, neurology, anaesthesiology and critical care are associated with up to three-fold increased odds of

burnout in comparison.[28,29,30,33,42]. This suggests that there are unique aspects of the work lives in these specialties that reinforce burnout and contribute to differing burnout risks.

Stressors at work are known to drive physician burnout [40,43,44,45]. Inefficient work processes and environments contribute to the symptoms of burnout [32,46,47]. The use of computer-based physician order entry has been associated with 29% greater rates of physician burnout [32]. Clerical burden also contribute to burnout particularly because it is thought to be a burden that adds no value in physicians' work activities [32,46,47].

Doctors generally agree that electronic health records have improved access to medical records and provide some benefits but nevertheless, they decrease patient interaction, worsen work-life balance, and decrease job satisfaction, resulting in a cumulative harm to physicians[48]. The initiation of the electronic health record was designed to communicate relevant clinical information between members of the healthcare team but it has since derailed because of the shift in focus of medicine to billing, coding, and protection from litigation. The electronic based record systems are independently associated with higher rates of burnout among users[49]. Clinical time is spent more on the computer than with the patients causing conflicts with the physicians' inherent value-system[50,51].EHRs impact physician workflow as time-consuming distractions that create new problems, such as system off lines and electronic-ordering system failures. Downtimes or system off lines are typically scheduled at "slow times" for the hospital in the middle of the night, when emergency departments and emergency theatres are often busy and personnel are few[48,51].

Excessive workloads (e.g. long work hours, frequent overnight call duties and high work intensity), work–home conflicts, loss of support from colleagues and the sense of a loss of control and meaning at work have each been associated with burnout amongst physicians[29,30,32].

Multivariable analyses of data from cross-sectional studies of physicians have reported independent relationships between burnout and work hours[34,35]. There is a 3% increased odds of burnout for each additional hour worked per week[34,35], a 3–9% increased odds for each additional night or week-end on call and a 2% increased odds for each additional hour per week spent at home on work-related tasks[34,35].

When the scenario of a work-home conflict is present, it results in a greater than double risk of burnout[34,35,42]. The importance of meaning in work is further buttressed by the finding that physicians who spend less than 20% of their work effort on the activity they find most personally meaningful are nearly three times more likely to be burnt out than those who spend at least 20% of their work effort on such an activity [30]

c) <u>Organizational / Healthcare System – Level Factors:</u>

From time immemorial, burnout in doctors was seen as a lack of resilience, sign of personal weakness or of being ill-suited to the profession [52]; which was reinforced by individual-contributing factors to the development of burnout (stressful work, doing too much and putting others needs before their own)[53].

The added responsibility of rescuing oneself in terms of acknowledging burnout, engagement in improved communication and self-management skills training or routine exercise was the main focus by leading researchers[54,55,56].

The result of a landmark study by Shanafelt in 2012 on extent of burnout changed the perspective on the role organizations and systems play in contributing to burnout. Shanafelt said, the implication of having one out of every two U.S. Physicians exhibit symptoms of burnout correlates with the fact that the origins of this problem are rooted in the environment and the healthcare delivery system rather than in the personal characteristics of a few vulnerable individuals[42].

The responses to the yearly Medscape (National Burnout, Depression and Suicide) survey has been updated to only list organizational and environmental causes as being responsible for burnout[57].

Other contributing factors to organizational burnout are:

The Climate of the Organization: Negative leadership behaviours, limited inter-professional collaboration, limited opportunities for advancement and social support for physicians also influence burnout[58]. The way leaders engage their colleagues and recognize individuals for their contributions relates to burnout and career satisfaction[58]. Large national studies of physicians suggest that organizations and leaders that provide physicians with increased control over workplace issues are more likely to employ physicians with higher career satisfaction and lower self-reported stress[45,59].

Financial Concerns: the lack of compensation or reimbursement which may be tied to an overwhelming debt that was accrued during medical school and residency training[16,57,60,61]. Debt correlates with burnout[61].

Second Victim Syndrome (SVS) is described as a contributor and consequence of burnout [62,63,64]. SVS explains the psychological trauma healthcare workers suffer from when involved in an "adverse event"[62]. It typically relates to committing a medical error resulting in a poor patient outcome[62,65].

SVS may also involve any adverse patient outcome, expected or unexpected, with the physician becoming the "second victim"[65]. A study found that up to 60% of surgical residents experienced SVS related to a bad outcome[66,67]. The society is unpardonable of a physician who makes a mistake[68]. This high expectation may further alienate those who make errors leaving them without healthy ways to cope thereby resulting in dysfunctional approaches to recovery[63,64,68]. Poor responses manifesting as isolation, anger, sadness, substance abuse; and callousness toward patients and colleagues place the doctor more at risk of burnout[63,64]. When suffering from SVS, the perception of not being supported or even of being victimized by one's own hospital or organization can worsen the syndrome[68,69]. This sense of being victimized lingers despite research suggesting that medical errors leading to poor patient outcomes emanate from system failures and not just the individual who made the mistake[70]. Burnout is a continuous chain of events[64]. If a physician is burnt out, he or she is more likely to commit an error during patient care, which puts them at risk for SVS. Litigation and stress,

together with SVS is likely to aggravate the symptoms of burnout[64,68,71,72,73]. This vicious cycle and its associated emotional toll lead to negative consequences, which may include depression and leaving medicine by either attrition or suicide[63].

Implications of Burnout:

Cross-sectional studies have associated physician burnout with decreased productivity[74], job dissatisfaction[29] and a more than double self-reported intent to leave one's current practice for reasons other than retirement[75,76]. A longitudinal study of physicians using the Maslach Burnout Inventory showed that each 1-point increase in emotional exhaustion or 1-point decrease in job satisfaction between 2011 and 2013 was associated with a 28% and 67% greater likelihood respectively of a reduction in professional efforts and work hours over the next year based on salary records[77]. When this impact is extrapolated to the national level in the United States alone, the compounding net result on lost productivity annually is estimated to be equal to the loss of the graduating classes of seven medical schools[78]. Other studies further support the relationship between burnout symptoms and physicians leaving their clinical practices[29,80]. In addition to the apparent effects on physicians' lives, these practice changes may reduce patient access to physician care and further strain healthcare systems already struggling to meet the needs of the populations they serve[81].

Physician turnover is not cost efficient for healthcare organizations[82]. The estimated cost to replace one physician is in the range of hundreds of thousands to well over one million U.S. dollars which is dependent on specialty, urban / non-urban areas and the duration of the advertised unfilled vacancy[82,83,84]. A significant number of small studies point to the possibility of increased referrals and the greater use of resources amongst physicians experiencing burnout or high workloads[85,86]. Physician burnout may also increase healthcare expenditures indirectly via higher rates of medical errors[22,87,88], suboptimal patient care[44,89,90], a 17% increased odds of malpractice claims[22,91] and absenteeism[74,92,93].

In the Internal Medicine Resident Well-Being (IMWELL) Study, it was discovered that higher levels of burnout were associated with increased odds of reporting a major medical error in the following 3 months[94].
This is in contradiction to some studies done outside East Africa, Europe, the Middle East and North America that did not consistently find a relationship between burnout and adverse patient outcomes[95,96,97].

Behaviours that Protect from Burnout

Many of the risk factors for burnout among doctors are not dynamic thereby making it difficult to address via intervention strategies[98]. The levels of change that are recommended in order to reduce the risk of burnout are three dimensional[98]. They are: (1) redefining the organisational system and work processes; (2) reinforcing the fit between the organisation and the individual doctor using professional development programmes so that the doctor

is better adapted to the work environment and (3) individual-level steps that reduce stress by choosing healthy behaviour and effective coping strategies[98].

Some of the other strategies considered effective in reducing burnout include:

Non-medical literature

In the survey of 513 physicians reported by the American Medical Association that examined the impact of non-medical reading habits on burnout; it showed that the chances of depersonalization and emotional exhaustion fell as doctors became more consistent readers[99]. When this was compared to physicians who did not read non-medical literature, the relative risk of burnout for consistent readers (those who read at least one book per month) fell by 19 percent across the component of emotional exhaustion[99] and by 44 percent across the component of depersonalization[99].

When the biggest predictors of burnout were accounted for which were the level of training of participating registrars, work hours and gender, reading was found to be replenishing and therefore had an impact[99]. In the registrars who read for relaxation, the odds of burnout decreased by 59 percent[99]. A similar effect was seen in Dr. Marchalik's national survey among palliative care physicians in the United States. The odds of burnout dropped by 39 percent for those who read, even after controlling for age, specific area of clinical discipline and the presence of fatigue[99].

Dr Marchalik went further to survey more than 200 urology registrars, exploring the characteristics specific to their work and techniques they adopted to relax, such as watching movies, meditation, yoga, exercise and reading[99]. He reported in the January 2019 Physician Health of the American Medical Association that meditation, exercise and yoga were not protective against burnout but that recreational reading was protective against burnout[99].

Reading non-medical literature is a novel strategy that protects from burnout[100].

Mindfulness and Self-Compassion

Mindfulness is defined as the act of being aware of the current moment in a way that is non-judgmental and acceptable and not merely being reactive[101,102]. The act of being mindful serves as a buffer against the dangerous effects of stress and promotes the sense of an increased psychological and physical well-being[103,104]. This has been shown to increase resilience in medical students[103,104].

Self-compassion which is explained as caring for one's self during difficult times that is exacerbated by stress has been associated with psychological well-being; [105,106] and the ability to adapt and cope with negative events[107]. Some studies have also associated emotional intelligence with self-compassion in health care workers[108].

In a study conducted among junior registrars in paediatrics, the results indicated that mindfulness and self-compassion were positively associated with less emotional exhaustion and higher levels of resilience[109]. This

outcome implies that both mindfulness and self-compassion is beneficial to the health professionals' personal health and well-being[109].

A study was conducted in the United States among physicians that investigated the effect of an intense educational programme over eight weeks of two and half hours per week with a seven hour retreat which was followed by a monthly two and half hour session that spanned over ten months[103], with the programme focusing on self-awareness, mindfulness and communication[103]. The educational programme showed remarkable improvements in all three dimensions of burnout (emotional exhaustion, depersonalisation and personal accomplishment) [103]. There is therefore some evidence to suggest that active participation in a wellness programme which de-emphasizes a stress-free professional and personal life but one that embraces communication, being mindful, being self-compassionate[103], and being positively challenged at work is associated with short-term and sustained improvements in burnout among physicians across training levels[103]. [110]. The Physicians thrive and achieve success with an increased sense of personal accomplishment[110].

Gaps Identified:

Despite the fact that burnout in physicians has been extensively researched and reported in the literature, particularly with regards to the knowledge of its epidemiology and the interventions to address it, many gaps still remain[111].

There is no burnout study found in literature among registrars that is exclusive to the high acuity field of anaesthesiology in South Africa.

The study performed in the University of the Free State in 2013 included all the medical officers and registrars in the public healthcare facilities in Bloemfontein – the Universitas Academic Hospital, Pelonomi Tertiary Hospital, National District Hospital and the Free State Psychiatric Hospital Complex[112].

The burnout study performed by the University of Stellenbosch also in 2013, was among rural doctors (family physicians across training levels) in the Western Cape[113].

The study performed in the University of Witwatersand in 2015 was among doctors practicing anaesthesia in the public and in the private sectors[26].

Most of the literature on burnout in physicians includes cross-sectional studies. An exhaustive longitudinal study is needed that shows the contributing factors, consequences and solutions to burnout among doctors[3].

Notwithstanding the limitations of the study design, there should be an in-depth consideration of contributing factors such as demographic factors and the impact of these variables in physician burnout[3]. The data on the possible reasons for the differences in burnout across training centres, geographical locations, healthcare systems (paper-based versus electronic health records), disciplines and team structures are limited and therefore needs further investigation[3].

There is a need for multi-centre studies that would test the associations of burnout in a more diverse group[111] of registrars. The study should measure the primary impact of burnout on patients, the satisfaction of patient's relatives and the quality of care[111]. The indirect secondary impact on the registrar, the added cost to health care and the capability of the healthcare system to care for her population should also be evaluated[3].

Furthermore, studies looking at the long term effectiveness of interventions from the first year as a registrar up until practice as a fully certified HPCSA specialist are lacking[3].

It is on this premise that a research question that seeks to address the prevalence of burnout among anaesthesiology registrars in the University of the Free State is being put forward.

The primary aim is to estimate the level of burnout among anaesthesiology registrars in the University of the Free State.

The secondary aim would be to describe the level of burnout, to identify factors leading to the burnout, to identify protective factors that shield against burnout and to identify associations of burnout among junior and senior registrars.

The objective would be to distribute the validated global tool for burnout – the Maslach burnout inventory and a self-developed questionnaire that would cover demographics and factors that predispose or protect from burnout using evidence from existing literature. The two questionnaires would be assigned to registrars in the department of anaesthesiology in the University of the Free State who consent to participate in the study. The data collated would thereafter be analysed.

Recommendations for Further Research:

- There is a need for longitudinal studies that will correlate burnout to the overall wellbeing of the physician and also measure the direct impact this has on outcomes in healthcare[111].
- Mathematical models that quantify the direct and indirect cost of burnout are also needed[111].
- Research that observes the extent to which definite individual and organizational interventions reduce physician burnout in the short and long term and the transformative sequel in terms of patient outcomes are needed[111].
- Multi-centre collaborations that would involve the researchers, health care facilities and financial sponsors with the primary goal of developing and testing interventions in physician burnout and will serve as a yardstick for single-centre studies are needed[111].

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CHAPTER 2 (Publishable Manuscript)

INTRODUCTION

The word "burnout" was coined by Herbert Freudenberger in the 1970s [1,2] to depict the negative result of work imbalance, high stress, job disengagement and job dissatisfaction. It has since then grown to be a phenomenon recognized and extensively researched among professionals in the aviation industry and in the health care sector.[3]

The world's foremost and leading social science researcher on burnout – Dr Christina Maslach defines it as a personal experience that is unique to the context of work [4,5] which manifests as a constellation of three symptoms – emotional exhaustion (EE), depersonalization (DP) and reduced personal / professional accomplishment.[5] It is associated with poor outcomes in job performance and health. This in itself implies that the potential for burnout exists in everyone, however the same interaction between personality traits and specific contextual situations that might lead to burnout in some people might leave others unaffected.[3] Burnout is therefore not an isolated entity – it does not exist in a vacuum, it is believed to be mediated by certain factors in a burnt out individual.[3]

In comparison with the general population; music teachers,[6] dental educators,[7] army intensive care nurses,[8] pilots and doctors are highly prone to burnout.[9] The frequently encountered symptoms of burnout in doctors include: treating patients and colleagues as objects rather than human beings, feeling emotionally depleted, physical exhaustion, poor judgement, cynicism, guilt, feelings of ineffectiveness, and a sense of depersonalisation in relationships with co-workers and/or patients.[10]

In American physicians, the strongest predictor of work-life balance and burnout is the ability to control their schedule and working hours.[11] when looking at their Canadian Physician counterparts, increasing time in non-clinical duties such as exercise is associated with lower burnout rates.[12]

Studies have revealed burnout ranging from 18-84% during residency /postgraduate medical education.[13] The top stressors identified were examinations – particularly in the three months leading up to the finals, followed by work, family and relationships, finances, pressure from colleagues and obligations to do research.[14]

Furthermore, in a 2012 study by Ambrose Rukewe which assessed job satisfaction among anaesthesiologists in a tertiary level hospital in Nigeria, the stressors identified by the respondents were time pressures and long working hours with insufficient sleep (continual wakefulness resulting in impaired concentration and motor skills).[15] A protracted period of twenty-four hours without sleep impairs the ability to perform certain cognitive tasks to the same degree as that from a blood alcohol level of 100 mg/dL[16] Fatigue in registrars has been associated with reduced vigilance which is associated with impaired ability to detect significant changes in clinical variables when monitoring patients in simulated scenarios.[17]

Among the respondents in the study performed in Nigeria, the medical officers were the most discontented (75%) [15] followed by senior registrars (56%).[15] Most participants (54.1%) felt that having a definite work hour schedule was the one change, if implemented, which would enhance their job satisfaction.[15]

The practice of anaesthesiology requires a considerable depth of knowledge, high work demand, experience and often prolonged periods of high levels of alertness which makes it stressful to practitioners in this discipline. It increases the risk of burnout among them.[18,19] This has sadly resulted in the tendency for anaesthesiologists to die at a younger age than doctors in other medical disciplines and to have a higher than average suicide rate.[20,21] This has led to this specialty being less attractive than others as a career choice for young doctors, and there are reports of shortages of anaesthesiologists in the resource-rich countries of North America, Europe, and Australia [22,23,24] which may further worsen the vicious circle of burnout.

The aim of this research was to identify and estimate the level of burnout among registrars in the Department of Anaesthesiology in the University of the Free State, with the goal of suggesting evidence-based interventions for the prevailing causes of burnout in the anaesthesiology residency programme in the Free State and hopefully nationwide.

AIM OF THE STUDY

Primary Aim: To estimate the level of burnout among anaesthesiology registrars in the University of the Free State

Secondary Aims: (i) To describe the level of burnout

(ii) To identify factors leading to the burnout

(iii) To identify protective factors that shield against burnout

(iii) To identify associations of burn-out among Junior and Senior registrars

METHODOLOGY

1.1 Study Design

A descriptive, prospective cross-sectional study design was used.

1.2 Population and Sample

All of the registrars in the Department of Anaesthesiology

1.3 Inclusion Criteria

All of the registrars in the department of anaesthesiology, University of the Free State.

1.4 Exclusion Criteria

Those registrars who were absent from the Department of Anaesthesia Morbidity and Mortality meetings during the time period the study took place, i.e:

- Registrars on intensive care unit rotation during the study period
- Registrars on leave

Measurements

The questionnaires were distributed by hand to every registrar attending the Department of Anaesthesia Morbidity and Mortality weekly meeting, over four consecutive Fridays in the month of November 2018. The registrars were instructed only to complete the form once. When completed, the registrars placed their questionnaires into a sealed box that was placed on a desk close to the exit door. Only the researcher had access to this box in order to maintain confidentiality of the completed questionnaires. The researcher was present to provide clarifications on any questions at each of these meetings.

Study Material / Tool

The Maslach Burnout Inventory-Human Services Survey (MBI-HSS) (Appendix B) was used to assess the level of burnout in this study. Permission was sought from the authors to use the copyrighted questionnaire and reproduce it.

The MBI-HSS was developed in 1981 by Maslach and Jackson and revised in 1996. Dr Christina Maslach is a social scientist and leading researcher on burnout. The questionnaire is well validated for use across the globe including the Republic of South Africa in conducting surveys among various disciplines in the health care sector. It was successfully used in 2015 in a similar research that assessed burnout among doctors practising anaesthesia in the University of Witwatersrand and in the private sector in Johannesburg. It is the gold standard of measurement of burnout among health care professionals. It assesses the three aspects of burnout using 22 questions: Emotional Exhaustion/EE (9 items), Depersonalization/DP (5 items) and Lack of Personal (Professional) Accomplishment/PE (8 items). The registrar respondents gave their answers using the Likert scale.

With regards to Emotional Exhaustion, a total score of 17 or less indicates low-level burnout, between 18 and 29 equates to moderate burnout, and 30 or more a high-level of burnout.

With regards to Depersonalization, a total of 5 or less indicates low-level burnout, between 6 and 11 implies moderate burnout, and 12 and greater equates to- high-level burnout.

A total score of 33 or less under Personal Accomplishment indicates a high-level of burnout. A total score between 34 and 39 means moderate burnout whereas a score greater than 40 implies a low-level burnout.

In essence, a high score under emotional exhaustion and depersonalization and a low score in personal accomplishment indicates burnout.

b) A self-developed questionnaire (Appendix A) was also used to assess other factors identified by literature that are not covered by the Maslach Burnout Inventory-Human Services.

Both questionnaires were administered in English, based on the fact that the language of instruction and examination in the University MMed and the examinations conducted by the College of Medicine of South Africa is English.

The researcher was aware that the survey only measured the burnout rate at a single point in time and that variations in the level of burnout may occur in individuals over time. To limit these errors, the researcher ensured that the tool of measurement was valid and reliable. A pilot study conducted using the first two registrars that arrived for the morbidity and mortality meeting who also gave consent for the study. The decision on the number of participants for the pilot study was reached in consultation with the bio-statistician. The result of the pilot study was excluded from the study data.

ANALYSIS OF DATA

Descriptive statistics, namely frequencies and percentages for categorical data with medians and percentiles for continuous data, were calculated per group (burnout or not). The groups were compared by means of Fisher's exact test for categorical data and Kruskal-Wallis test for numerical data. The prevalence of burnout was calculated and described by means of 95% confidence interval for the prevalence. The Department of Biostatistics of the University of the Free State performed the analysis.

ETHICAL CONSIDERATIONS

The study protocol was submitted to the Health Sciences Research Ethics Committee of the Faculty of Health Sciences (HSREC), University of the Free State. A change of study period application was applied for and approved by HSREC. Study Approval Number: UFS-HSD2018/0445/3107

Approval was sought and approved by the Free State Department of Health (Health Research Committee). Study Approval Number: FS_201805_014.

Ethical considerations in terms of each participating individual as well as departmental consent for the survey was sought.

The contact details of the University Counsellors offering student support services was included in the questionnaire should issues that warrant counselling arise from the respondent.

The data file is being stored by the researcher in the Department of Anaesthesia in the University of the Free State for 15 years.

Permission for the research was obtained from the then acting Head of Department of Anaesthesiology (Prof. Gillian Lamacraft)

RESULTS

Part A

Demographics:

At the time of the study, the Department of Anaesthesiology of the University of the Free State had 28 registrars, of which 23 (12 senior registrars and 11 junior registrars) participated in the study. Of these, 52.2% were females and 47.8% males. The median age of the participants was 32 years. Eleven (60.9%) of the 23 participants had undertaken their undergraduate studies at the University of the Free State. Only two of the respondents did not have prior anaesthesia experience before taking up the training position in anaesthesiology. Most of the participants (82.6%) were married with less than half having medical doctors as spouses. Ten (47.7%) out of 21 respondents had children under 5 years.

Table I: **Spouse Occupation**

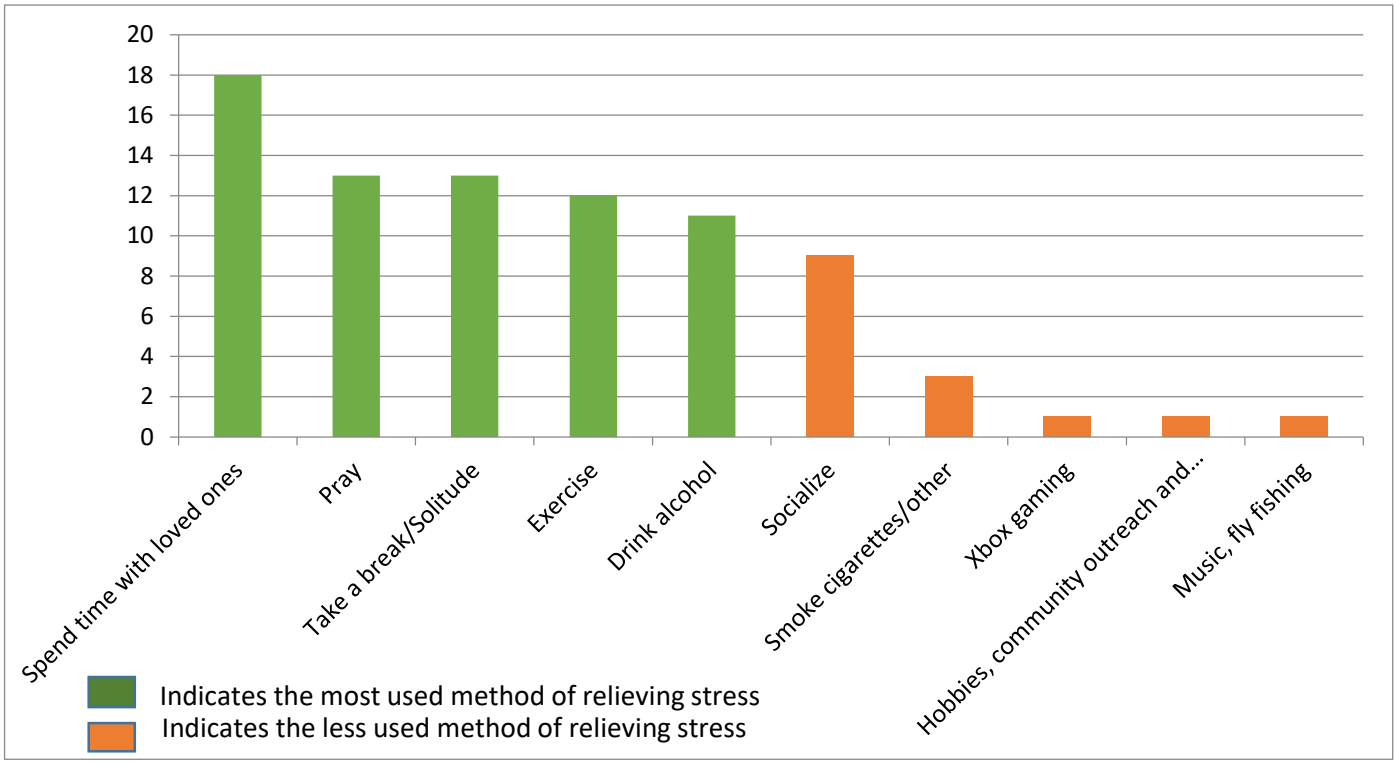
Occupation (n = 20)	**Percentage**
Medical doctor (n = 9)	45.0
Other (n = 11)	55.0

Table II: **Participants with Children under 5 years of Age**

Number of children under 5y	**Number of participants (n=21)**	**Percentage of participants**
0 (no children or none under 5)	11	52.4 %
1 child under 5	9	42.9 %
2 children under 5	1	4.8 %

In response to the question: "What do you do to relieve stress?" All the respondents answered this question. Spending time with loved ones, praying, taking a break/being in solitude, exercise and drinking alcohol ranked as the most frequent means of reducing stress in this study.

Figure1: **Methods to Reduce Stress** (n=23)



In response to the question, "on a scale of 1-5, which stressors are severe enough to make you re-think anaesthesiology as a career?" (1= least severe, 5= most severe). Problems in maintaining work/family/social life balance and a non-specific time of working day were foremost on the list of stressors. (See Table 3)

Table III: **Stressor Severity Scale**

Stressor	Stress level (1 - least severe; 5 - most severe)				
	1: Least severe	2: Mildly severe	3: Moderately severe	4: Severe	5: Most severe
Problems maintaining Work/Family/Social life balance (n=23)	8.7 %	8.7 %	30.4 %	21.7 %	30.4 %
Non-specific time of working day (n= 21)	14.3 %	23.8 %	9.5 %	33.3 %	19.1 %
Finances (n=21)	47.6 %	14.3 %	23.8 %	4.8 %	9.5 %
Conflict with surgeons (n=21)	33.3 %	33.3 %	23.8 %	4.8 %	4.8 %
Conflict with anaesthesiology colleagues (n=21)	66.7 %	19.1 %	9.5 %	4.8 %	0 %

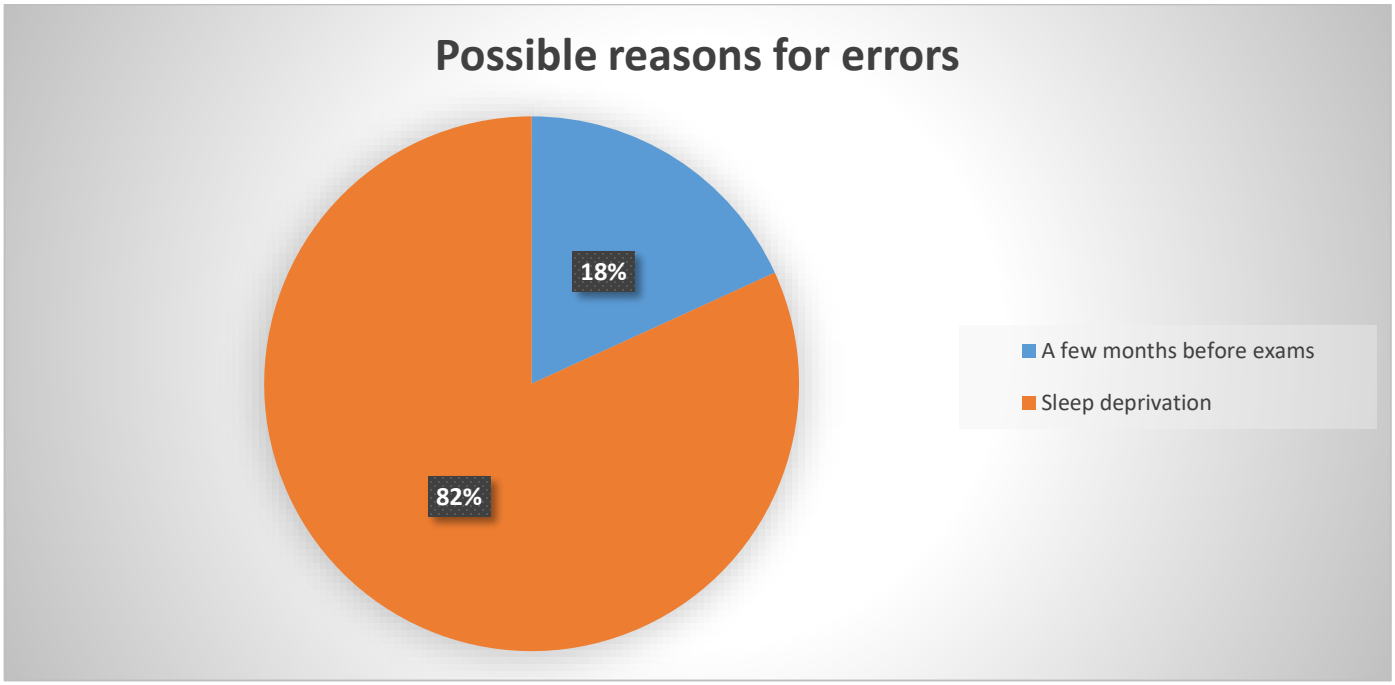
In response to the question, “do you consider yourself prone to errors”? Fewer participants considered themselves prone to error as indicated in Table 4. The leading cause of error was stated as sleep deprivation and less so the closeness to sitting for an examination (Figure 2)

Table IV**. Practitioners Self-Assessment as being Prone to Error**

	Percentage of participants who consider themselves prone to errors:
Prone to errors	47.8 %
Not prone to errors	52.2 %

Of the 47.8% respondents who considered themselves prone to error, sleep deprivation was the major attributable cause. The preparation and the countdown to a major examination described as ‘a few months before exams” ranked lower.

Figure 2: Cause of Errors in Participants Who Considered Themselves Prone to Errors



Part B

All the participants responded to the distributed MBI-HSS questionnaire as indicated in Table V.

Table V: **MASLACH BURNOUT INVENTORY-Human Services Survey (MBI-HSS)**

Emotional Exhaustion was assessed using Questions:4,5,7,9,10,11,12,15,17,18,19,21,22

Depersonalization was assessed using Questions:1,2,3,4,6,7,8,9,12,13,14,16,17,18,19,20,21

Personal/Professional Accomplishment using Questions:1,2,3,5,6,8,10,11,13,14,15,16,20,21

MBI survey statements (n=23)	**Never (0)**	**A few times a year or less**	**Once a month or less**	**A few times a month**	**Once a week**	**A few times a week**	**Every day**
1. I feel emotionally drained from my work.	4.4 % (n = 1)	8.7 % (n=2)	17.4 % (n=4)	30.4 % (n=7)	8.7 % (n=2)	30.4 % (n=7)	0 % (n=0)
2. I feel used up at the end of the workday.	4.4 % (n = 1)	4.4 % (n= 1)	13.0 % (n = 3)	13.0% (n=3)	17.4 % (n=4)	39.1 % (n= 9)	8.7 % (n=2)
3. I feel fatigued when I get up in the morning and have to face another day on the job.	0 % (n = 0)	4.4 % (n=1)	13.0 % (n=3)	30.4 % (n= 7)	13.0 % (n=3)	26.1 % (n = 6)	13.0 % (n=3)
4. I can easily understand how my recipients (patients) feel about things.	0 % (n = 0)	8.7 % (n=2)	21.7 % (n = 5)	21.7 % (n = 5)	21.7 % (n = 5)	4.4 % (n = 1)	21.7 % (n = 5)
5. I feel I treat some recipients as if they were impersonal objects.	21.7 % (n = 5)	21.7 % (n = 5)	17.4 % (n=4)	13.0% (n=3)	13.0% (n=3)	8.7 % (n=2)	4.4 % (n = 1)
6. Working with people all day is really a strain for me.	17.4 % (n=4)	17.4 % (n=4)	8.7 % (n=2)	39.1 % (n= 9)	13.0% (n=3)	4.4 % (n = 1)	0 % (n = 0)
7. I deal very effectively with the problems of my recipients	4.4 % (n = 1)	4.4 % (n = 1)	13.0 % (n=3)	13.0 % (n = 3)	8.7 % (n=2)	30.4 % (n= 7)	39.1 % (n= 9)
8. I feel burned out from my work.	8.7 %	4.4 %	17.4 %	26.1 %	13.0 %	26.1 %	4.4 %

	(n=2)	(n = 1)	(n=4)	(n = 6)	(n=3)	(n = 6)	(n = 1)
9. I feel I'm positively influencing other people's lives through my work.	0 % (n = 0)	0 % (n = 0)	8.7 % (n=2)	17.4 % (n=4)	17.4 % (n=4)	26.1 % (n = 6)	30.4 % (n= 7)
10. I've become more callous toward people since I took this job.	13.0 % (n=3)	21.7 % (n = 5)	26.1 % (n = 6)	17.4 % (n=4)	17.4 % (n=4)	0 % (n = 0)	4.4 % (n = 1)
11. I worry that this job is hardening me emotionally.	8.7 % (n=2)	17.4 % (n=4)	13.0 % (n=3)	34.8 % (n = 8)	8.7 % (n=2)	8.7 % (n=2)	8.7 % (n=2)
12. I feel very energetic.	4.4 % (n = 1)	17.4 % (n=4)	17.4 % (n=4)	17.4 % (n=4)	17.4 % (n=4)	21.7 % (n = 5)	4.4 % (n = 1)
13. I feel frustrated by my job.	4.4 % (n = 1)	17.4 % (n=4)	8.7 % (n=2)	30.4 % (n= 7)	26.1 % (n = 6)	8.7 % (n=2)	4.4 % (n = 1)
14. I feel I'm working too hard on my job.	4.4 % (n = 1)	8.7 % (n=2)	17.4 % (n=4)	13.0 % (n=3)	30.4 % (n= 7)	26.1 % (n = 6)	0 % (n = 0)
15. I don't really care what happens to some recipients.	52.2 % (n = 12)	13.0 % (n=3)	8.7 % (n=2)	17.4 % (n=4)	0 % (n = 0)	8.7 % (n=2)	0 % (n = 0)
16. Working with people directly puts too much stress on me.	30.4 % (n= 7)	13.0 % (n=3)	26.1 % (n = 6)	21.7 % (n = 5)	8.7 % (n=2)	0 % (n = 0)	0 % (n = 0)
17. I can easily create a relaxed atmosphere with my recipients.	0 % (n = 0)	0 % (n = 0)	13.0 % (n=3)	8.7 % (n=2)	17.4 % (n=4)	43.5 % (n = 10)	17.4 % (n=4)
18. I feel exhilarated after working closely with my recipients.	0 % (n = 0)	8.7 % (n=2)	17.4 % (n=4)	17.4 % (n=4)	26.1 % (n = 6)	30.4 % (n= 7)	0 % (n = 0)

19. I have accomplished many worthwhile things in this job.	0 % (n = 0)	4.4 % (n = 1)	4.4 % (n = 1)	17.4 % (n=4)	30.4 % (n= 7)	39.1 % (n= 9)	4.4 % (n = 1)
20. I feel like I'm at the end of my rope.	17.4 % (n=4)	21.7 % (n = 5)	26.1 % (n = 6)	4.4 % (n = 1)	17.4 % (n=4)	4.4 % (n = 1)	8.7 % (n=2)
21. In my work, I deal with emotional problems very calmly.	0 % (n = 0)	4.4 % (n = 1)	13.0 % (n=3)	13.0 % (n=3)	13.0 % (n=3)	47.8 % (n = 11)	8.7 % (n=2)
22. I feel recipients blame me for some of their problems	39.1 % (n = 9)	17.4 % (n=4)	17.4 % (n=4)	13.0 % (n=3)	8.7 % (n=2)	4.4 % (n = 1)	0 % (n = 0)

Table VI: **Emotional Exhaustion (EE)**:

Level of Emotional Exhaustion	Percentage of participants N = 23
Low	13.0 % (n=3)
Moderate	30.4 % (n=7)
High	56.5% (n=13)

The highest scoring component of burnout was Emotional Exhaustion, with 13/23 respondents alluding to high emotional exhaustion and 20/23 reporting moderate to high levels of EE.

Table VII: **Depersonalization (DP)**:

Level of Depersonalization	Percentage of participants N = 23
Low	26.1 % (n=6)
Moderate	47.8 % (n=11)
High	26.1 % (n=6)

Depersonalization is also referred to as cynicism in which case the doctor treats the patient as an object. Six registrars reported having high level of depersonalization and 17 reported moderate to high levels of burnout.

Table VIII: **Professional Accomplishment (PA)**:

Level of Low Sense of Professional Accomplishment	Percentage of participants N = 23
Low	43.5 % (n=10)
Moderate	30.4 % (n=7)
High	26.1% (n=6)

Professional Accomplishment (PA) also referred to as personal accomplishment is a dimension of burnout that is explained by a low sense of professional achievement. Six respondents had a low sense of professional accomplishment and 13 reported moderate to high levels of PA.

Table IX: **Level of Burnout using all three elements**

High Burnout	Percentage of participants	Number of participants (n = 23)
Yes	17.4 %	4
No	82.6 %	19

Four of the 23 registrars (17.4%) met the criteria for a high level of burnout in all three components: high score for Emotional Exhaustion and Depersonalization and a low sense of Professional Accomplishment.

Part C

Associations:

Burnout versus Gender: There was no gender disparity with regards to burn out (No statistical significance, Fisher's Exact Test: P = 1.0)

Burnout versus Relationship Status and Occupation of Spouse: All the participants who experienced a high level of burnout were married and half (50%) had spouses who were medical doctors.

Burnout versus Number of Children: Being a parent was not found to contribute to or protect from burnout. (Kuskral Wallis Test: p=1.0 (no significance with number of children)

Burnout versus Place of Graduation: Undergraduate medical studies at the University of Free State, Bloemfontein did not predispose neither did it protect from burnout in this study.

Burnout versus Training Level: No statistical significance with regards to burnout and level of training in terms of being a junior or senior registrar was found; p=0.0932 Fisher's Exact Test.

Burnout versus MMed research project? An incomplete M Med research project was a possible contributing factor to burnout since all the participants who exhibited a high level of burnout had incomplete MMed projects.

Burnout versus Methods Used to Relieve Stress: Registrars who adopted strategies such as spending time with loved ones, socializing, the physical activity of exercising and the spiritual activity of praying were less likely to experience burn out in this study.

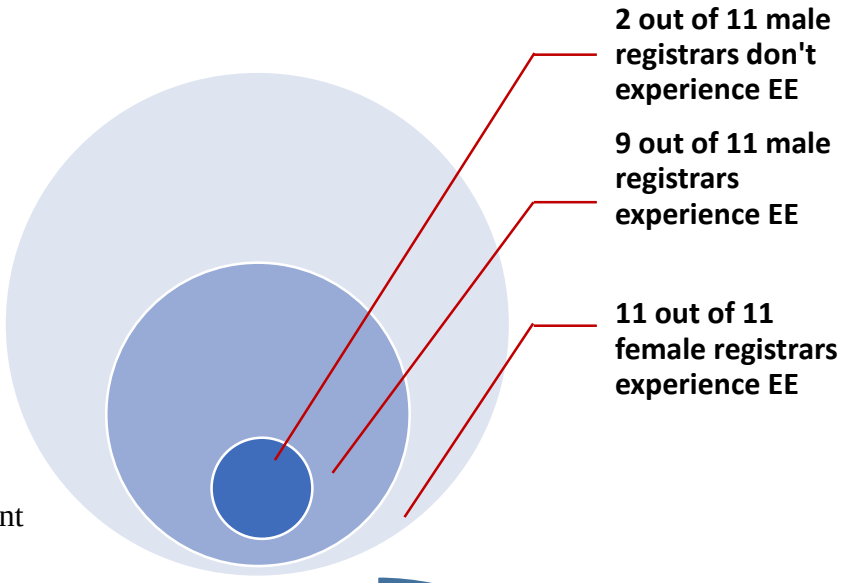
All the three participants who smoked cigarettes did not show any form of burnout in the study.

Burnout versus Factors Severe Enough to Reconsider Anaesthesiology as a Career

Striking a balance between work, family and social life with an unpredictable length of a work day ranked as the highest factors associated with burnout with the concomitant possible implication of reconsidering Anaesthesiology as a career path. The possible impact of finances and conflict with fellow anaesthesiology and surgery registrars ranked the lowest.

GENDER BREAKDOWN OF THE THREE COMPONENTS OF BURNOUT

Figure 3

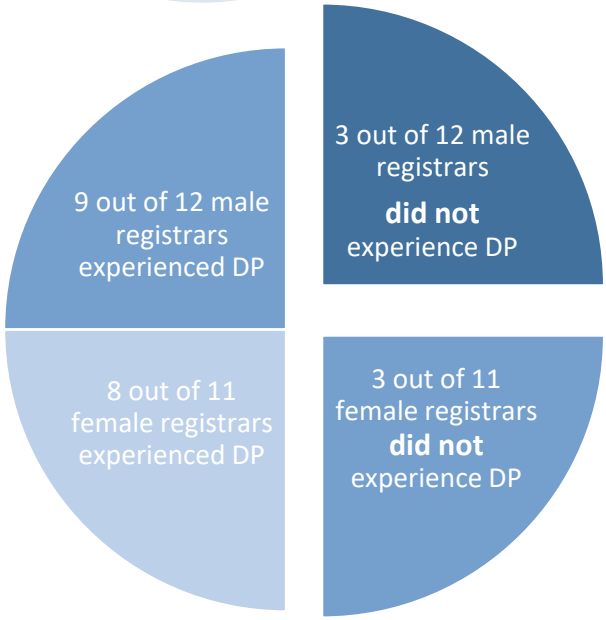


Emotional Exhaustion EE

There was a tendency for females to have more moderate to high levels of emotional exhaustion but this was not statistical significant

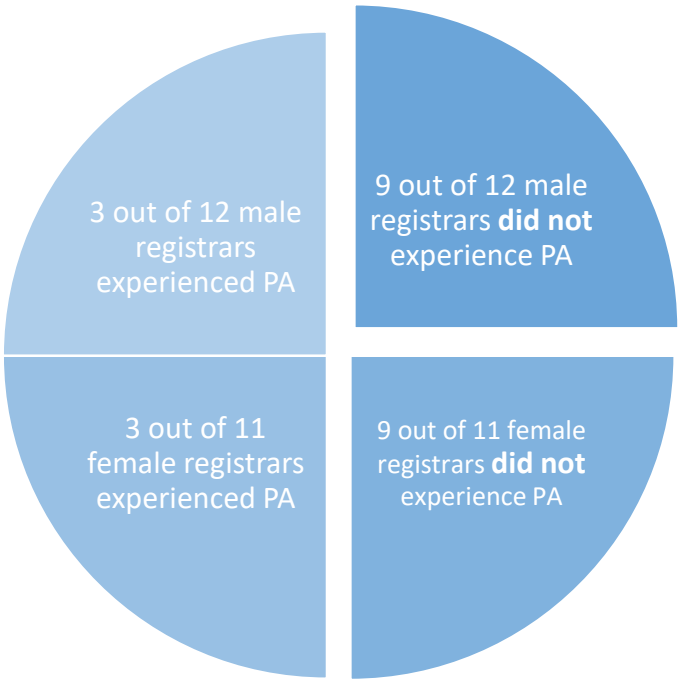
Depersonalisation DP

There was no significant difference between male and female registrars who experienced moderate to high levels of depersonalization.



Professional Accomplishment PA

There was no gender disparity in the 'low' sense of professional accomplishments among the registrars. The low level recorded implies a reduced sense of Personal accomplishment, reduced capability, reduced productivity or low sense of professional efficacy.



DISCUSSION

In a report released on the 10th of April 2019 by the South African Society of Anaesthetists (SASA) that investigated research performed on burnout at Stellenbosch University by Professor Johan Coetzee; severe burnout was identified in the state sector among 18% of physicians practising anaesthesiology. This included community service doctors, medical officers, family medicine registrars and family medicine specialists. This finding is much higher than the international average of 6.2% .[25] This figure essentially places anaesthetists practicing in South African Public Hospitals at a level of burnout three times [25] higher than their counterparts overseas. The findings in Coetzee's report is in tandem with the outcome of this study, which showed a 17.4% incidence of severe burnout among anaesthesiology registrars in the University of the Free State.

Furthermore, in the study conducted in 2015 assessing burnout among anaesthetists in the academic institution of the University of the Witwatersrand by Nicolaas Van der Walt et.al, the level of burnout found was 21% among the doctors[26] which is higher than the 17.4% found in this study.

The report of the research conducted by the New York University of Medicine showed that physicians who work in small, independent primary care practices in urban settings had much lower levels of burnout compared to national averages.[27]

Several other international studies have also found a high prevalence of burnout among doctors in residency training with rates higher than those of age-similar individuals pursuing other non-medical related careers.[28,29,30,31] Burnout is reported as ranging between 18-84% during residency.[13] This crisis continues to worsen [32] and the repeated tragedies of physician suicide is a sad pointer to the persistence of the devastating situation[33] particularly in the high acuity field of anaesthesiology, as evidenced by the 2019 Medscape national physician burnout, depression and suicide report.[33]

DEMOGRAPHIC PROFILES AND ASSOCIATIONS OF THOSE AT HIGHER RISK OF BURNOUT

Cross-sectional studies of physicians have found independent relationships between burnout and physician gender, age, relationship status, age of children, and spousal/partner occupation.[34,35] Gender is not consistently an independent predictor of burnout, after adjusting for age and other factors, however some studies have found female physicians to have 30–60 percent increased risk of burnout.[36,37,38]

This index study showed no difference between male and female registrars in terms of high level of burnout but it importantly showed that all the female participants in the study had a moderate to high level of the Emotional Exhaustion component of burnout (Figure 4). A number of factors have been attributed to these observations; Dr Carol Bernstein, the psychiatrist at the New York University Langone Medical centre stated that women are more likely to admit to psychological problems and seek help, and therefore may be more likely to acknowledge burnout than their male colleagues.[33]

Previous studies have shown that younger physicians have an increased risk of burnout. Doctors who are less than 55 years old are said to have a two-fold risk of burnout compared with those older than 55.[28,39]A child younger than 21 years old increases the odds of burnout by 54 percent in the physician-parent and a spouse/partner who works as a non-physician increases the odds of burnout by 23 percent.[28,39]

The median age of the registrars in the department of anaesthesiology of the University of the Free State is 32 years with only 45% of the married population having spouses that are medical practitioners. All the registrars that exhibited high levels of burnout were married. The occupation of the spouse and having children less than five years of age were not associated with burnout.

One of the job requirements for the registrars appointed at the time of the study, to the Department of Anaesthesiology of the University of the Free State, was a Diploma in Anaesthesia from the Colleges of Medicine of South Africa. Hence, a large percentage of the participants had a diploma in anaesthesia; thus no correlation could be made between burnout and prior experience in anaesthesia.

BURNOUT AND CORRELATIONS SPECIFIC TO ANAETHESIOLOGY REGISTRARS IN BLOEMFONTEIN

This study found that work/family/social balance and a non-specific time to the ending of a work day were the greatest factors contributing to burnout.

A large number of studies support the finding of this study, that work-home conflicts fuel burnout,[40] with an increased odds of burnout in the range of 200 to 250 %.[28,39] Multivariate analyses of data from cross-sectional studies of physicians have reported independent relationships between burnout and work hours (3% increased odds for each additional hour per week).[28,39]

With regards to night or weekend call, there is a documented 3–9 % increased odds of burnout for each additional night or weekend on call.[28,39].

Women generally acknowledge more work-life imbalance than their male contemporaries.[33] However, in this study, there was no significant gender difference with regards to the concerns of work/life balance.

Cross sectional studies have consistently found that the physician's specialty is an independent predictor of burnout and that the unique characteristics in the specialties such as emergency medicine, critical care and anaesthesiology that are prone to burnout is the work-life balance.[36,40]

In this study, the stressors of work-life balance and that of a non-specific end to a work day were described as severe enough to make the respondents reconsider anaesthesiology as a career. The others were finances and conflict with surgeons. Burnout is independently associated with job dissatisfaction and a more than 200% increased odds of intent to leave.[41,42] The dissatisfaction and intent to leave often materializes into action.[41,42] With each one-point increase in Emotional Exhaustion there is a corresponding 28% likelihood of a decrease in

professional effort (in terms of reducing work hours) and ultimately exiting clinical practice.[43,44] The compounding effect of this is a further strain on the already fragile health care system.

THE IMPACT OF BURNOUT

The immediate impact of these stressors noted in this study is the tendency towards making errors. Of the respondents, 47.8% reported being prone to error, and attributed this to when being sleep deprived (81.8%) as well as in the few months leading to examinations (18.2%). The association of sleep deprivation and error is well known[16]. The preparation for an examination entails a reduction in sleep and the anxiety associated with the countdown to the examination also makes the initiation of sleep difficult and the quality of sleep poor; the compounding effect of this may be a difficulty in focusing on tasks at work and impaired judgement which may result in drug errors. [46,47,48]

a). In Terms of Patient Safety

Burnout not only negatively affects the physician's professional behaviour[45] but also patient safety.[46,47,48] The relationship between burnout and medical error has been described as bidirectional.[28,39] In a longitudinal study of internal medicine residents, higher levels of burnout were associated with increased odds of reporting an error in the subsequent three months.[28,39] It is also an independent predictor of being involved in a medical malpractice suit after controlling for other personal and professional factors.[49] Some studies have shown that as the mean emotional exhaustion levels of critical care physicians rose, so did the standardized patient mortality ratio,[50] while the perceived quality of interpersonal teamwork deteriorated.[51]

b). In Terms of Health Care Costs

Burnout increases healthcare costs indirectly through absenteeism,[52] lower productivity,[52] high rates of medical errors[46,47] and malpractice claims.[49] Several small studies in the past have also noted that burnt-out physicians are likely to incur more expenditure by ordering more investigations and making more referrals than their counterparts who are not burnt out.[52,54]

c). In Terms of the Individual: The Anaesthesiology Registrar

The deleterious impact of a dysfunctional registrar by reason of burnout can manifest as suicide even after graduating as a specialist.

Cross-sectional studies of physicians have found burnout to be independently associated with a 25 % increased risk of alcohol abuse/dependence and 200 % increased risk of suicidal ideation among physicians.[55,56] This study however did not show a correlation between burnout and increased alcohol use. In a longitudinal study of medical students, it was discovered that burnout predicted the development of suicidal thoughts in the following year which was found to be independent of symptoms of depression.[57]

ADAPTIVE MECHANISMS

Male and female physicians lean towards different coping strategies in an attempt to prevent burnout. Anaesthesiology registrars are no different. Exercise, talking with family members / friends, isolating self from others and sleep were adaptive mechanisms identified in the 2019 Medscape National Physician Burnout, Depression & Suicide Report.[33]

The syndrome of burnout often presents as dis-engagement.[4,5] The emotions become blunted, and the demeanour is that of detachment, helplessness or hopelessness.[4,5]

It is the components of emotional exhaustion and cynicism (depersonalization) that serve as the primary indicators which reinforce each other to produce the sense of inefficacy (low sense of personal accomplishment).[4,5,6]

In order to prevent or reverse the elements of burnout in this study, an energetic state of involvement with personally fulfilling activities is utilized by the participants. These include spending time with loved ones, praying, taking a break in solitude and exercise, all of which tally with the most frequently adopted forms of engagement in the Medscape report.

The use of alcohol (47.8%) and smoking of cigarette (13%) were activities less utilized as adaptive mechanisms in this study which is comparable to the outcomes of the Medscape National Burnout, Depression and Suicide Report of 2019.

In the study on burnout conducted among cardiac anaesthesiologists in Italy towards the end of 2017, the preference to remain in cardiac anaesthesiology, and parenthood, were the only two investigated factors in the study that protected against all components of burnout.[59] As expected, the participants in the study who exhibited high levels of burnout were more inclined to opt out of the cardiac subspecialty if an opportunity presented itself.[59]

SHORTCOMINGS OF THE STUDY

- The study only measured the self – reported outcome of burnout with regards to the tendency to making errors.
- The major limitation of this study was the lack of a control group. The anaesthesiology medical officers (M.O's) in a health care facility within the Free State could have served as the control group and it would have further validated the findings of this study.

RECOMMENDATIONS

A longitudinal study design and a measured health care outcome to understand the impact of burnout on doctors in the anaesthesiology training programmes across South Africa is needed. It will bring into perspective the needed

insight in terms of the direct consequences of burnout on the registrar's wellbeing, the need to assess if burnout as a registrar equates to burnout as a specialist or giving up on anaesthesia altogether and the indirect consequences on service delivery with regards to expenditure and the safety and quality of health care. Mathematical models that quantify and estimate with precision the cost of burnout are also needed so as to convincingly influence policies that speak to organizational frameworks of health care systems in residency training institutions across South Africa.

Interventions geared towards decreasing burnout should be bi-dimensional: The individual registrar and the environment (organizational healthcare framework) in which the registrar works.

At an organizational level efforts must be made to ameliorate work load intensity and its attendant production pressure, while ensuring that service delivery needs are met.

The current anaesthesiology registrar-directed wellness programme implemented in Bloemfontein, which embraces mindfulness and reinforces cognitive behavioural skills that help to enhance competence, improve communication skills and coping strategies should be encouraged and incorporated into the mainstream training programme.

A recent meta-analysis showed that organization-directed interventions had a higher treatment effect compared with physician-directed interventions, which produced a significant but smaller benefit[60].

CONCLUSION

Anaesthesiology registrars continue to face situations that threaten their wellness during the course of their training to become specialists.[15] Nearly one out of every five anaesthesiology registrars in the University of the Free State (17.4%) has a high level of burnout.

It is imperative to realign systems at an organizational level to support registrars in a way that would reduce the factors contributing to burnout so that the levels can be reduced to zero and no registrar would be burnt-out.

The levels of burnout in the studies undertaken at the Universities of Stellenbosch and Witwatersrand were higher – 18% and 21% respectively. The identifiable factors that may have contributed to the lower levels of burnout in the University of the Free State need to be strengthened so as to enable the creation of environments that boost lower burnout rates in other training programmes across the nation.

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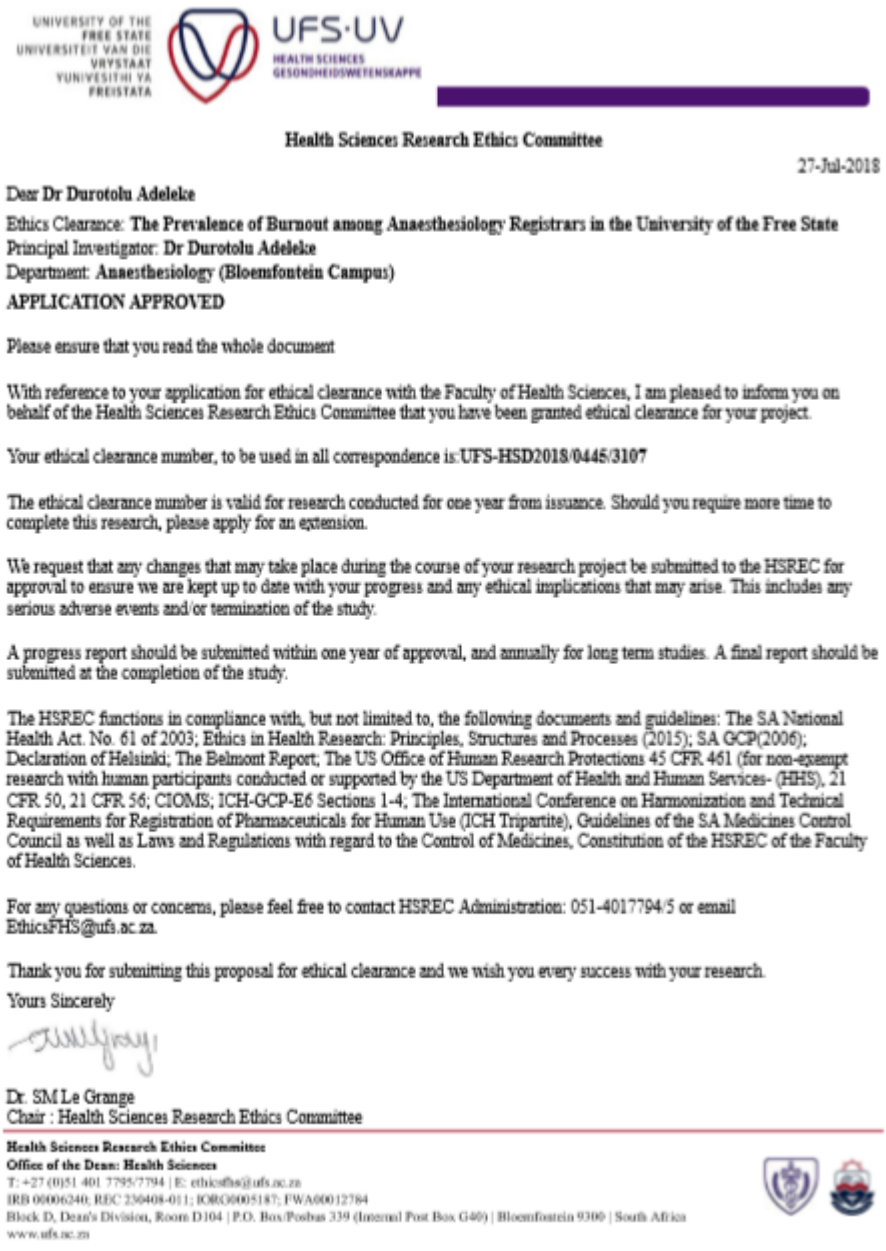
Appendices

Appendix A (Letter of Approval from Research Ethics Committee)



UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS·UV
HEALTH SCIENCES
GESONDHEIDSWETENSKAPPE

Health Sciences Research Ethics Committee

27-Jul-2018

Dear **Dr Durotolu Adeleke**

Ethics Clearance: **The Prevalence of Burnout among Anaesthesiology Registrars in the University of the Free State**
Principal Investigator: **Dr Durotolu Adeleke**
Department: **Anaesthesiology (Bloemfontein Campus)**
APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is:**UFS-HSD2018/0445/3107**

The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee
Office of the Dean: Health Sciences
T: +27 (0)51 401 7795/7794 | E: ethicsfhs@ufs.ac.za
IRB 00006240; REC 230408-011; IORG0005187; FWA00012784
Block D, Dean's Division, Room D104 | P.O. Box/Posbus 339 (Internal Post Box G40) | Bloemfontein 9300 | South Africa
www.ufs.ac.za

CONSENT TO PARTICIPATE IN RESEARCH

Kindly review below and sign consent if in agreement:

You have been asked to participate in a research study.

You have been informed about the study by Dr D.M Adeleke (Registrar, Department of Anaesthesiology, UFS).

You have been informed of the availability of the University Counsellors who offer student support should you require counselling if emotional injury occurs as a result of the study.

You may contact Ms Carmien Schmitz of the University Student Support Services on 051/401 2853 if you are injured as a result of the research.

You may contact the Secretariat of the Health Sciences Research Ethics Committee, UFS at telephone number (051) 4017794/5 if you have questions about your rights as a research subject.

Your participation in this research is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to terminate participation.

If you agree to participate, you will be given a signed copy of this document as well as the participant information sheet, which is a written summary of the research.

The research study, including the above information has been verbally described to me. I understand what my involvement in the study means and I voluntarily agree to participate.

_____ _____

Signature of Participant

Date

_____

_____

Signature of Witness

(Where applicable)

Date

INFORMATION DOCUMENT

Kindly read information below before answering the questionnaire:

The Prevalence of Burnout among Anaesthesiology Registrars in the University of the Free State

Good day.

I, Dr D.M Adeleke is doing research on the prevalence of burnout among anaesthesiology registrars in the University of the Free State.

The research is just the process to learn the answer to a question. In this study I want to estimate and describe the level of burnout among anaesthesiology registrars in the University of the Free State and identify factors and associations leading to burnout.

Invitation to participate: I do like to kindly request that you participate in this research study

What is involved in the study – a descriptive cross-sectional study design will be used. It would involve the administering of two sets of questionnaires once-off to all the 30 registrars in the department of anaesthesiology, University of the Free State and of which the first set of questions will assess the level of burn-out while the second set of questions will assess the factors and protective steps taken by the participant to prevent burnout.

Time for filling each of the questionnaire is estimated as ten minutes. Total time for both sets of questionnaires is twenty minutes.

Risks Involved: An identification by the participant of a high level of burnout while filling the questionnaire with the attendant distress. The University Counsellors offering support services to students would be available to offer counselling and support. Contact details: 051 / 401 2853

Benefits of being in the study: Response of the participants would offer evidence-based estimate of burnout in the department of anaesthesiology which will be used to further strengthen the existing wellness programme in the department.

You will be given pertinent information on the study while involved in the study and the results of the study would be shared with you.

Participation is voluntary and at no financial cost. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled to; you may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled.

Confidentiality: Efforts will be made to keep personal information confidential. Absolute confidentiality cannot be guaranteed. Personal information may be disclosed if required by law to the Health Sciences Ethics Research Committee.

If the results are published, this may lead to individual/cohort identification.

Contact details of researcher – Dr DM Adeleke (Cell: 082 291 6074. Email Address: dtee.mbchb@gmail.com) for further information/reporting of study-related adverse events.

Contact details of HSREC Secretariat and Chairperson – Mrs MGE Marais. Block D Room 104, Francois Retief Building. UFS. Email: ethicsfhs@ufs.ac.za

Appendix C (Permission from Department of Health)

health
Department of Health
FREE STATE PROVINCE

11 July 2018

Dr D Adeleke
Dept. of Anaesthesiology
UFS

Dear Dr D Adeleke

Subject: The Prevalence of Burnout among Anaesthesiology Registrars in the University of the Free State.

- Please ensure that you read the whole document, Permission is hereby granted for the above – mentioned research on the following conditions:
- Participation in the study must be voluntary.
- A written consent by each participant must be obtained.
- Serious Adverse events to be reported to the Free State department of health and/ or termination of the study
- Ascertain that your data collection exercise neither interferes with the day to day running of Universitas Hospital nor the performance of duties by the respondents or health care workers.
- Confidentiality of information will be ensured and please do not obtain information regarding the identity of the participants.
- **Research results and a complete report should be made available to the Free State Department of Health on completion of the study (a hard copy plus a soft copy).**
- Progress report must be presented not later than one year after approval of the project to the Ethics Committee of The University of the Free State and to Free State Department of Health.
- Any amendments, extension or other modifications to the protocol or investigators must be submitted to the Ethics Committee of The University of the Free State and to Free State Department of Health.
- **Conditions stated in your Ethical Approval letter should be adhered to and a final copy of the Ethics Clearance Certificate should be submitted to [illegible] or [illegible] before you commence with the study**
- No financial liability will be placed on the Free State Department of Health
- Please discuss your study with the institution manager/CEOs on commencement for logistical arrangements
- Department of Health to be fully indemnified from any harm that participants and staff experiences in the study
- Researchers will be required to enter in to a formal agreement with the Free State department of health regulating and formalizing the research relationship (document will follow)
- You are encouraged to present your study findings/results at the Free State Provincial health research day
- Future research will only be granted permission if correct procedures are followed see http://nhrd.hst.org.za

Trust you find the above in order.
Kind Regards

Dr D Motau
HEAD: HEALTH
Date: 19/07/18

Appendix D (Permission from Head of Department of Anaesthesiology)

APPENDIX C – PERMISSION FROM THE HEAD OF DEPARTMENT OF ANAESTHESIA

Department of Anaesthesia

University of the Free State

09 January 2018

Prof G. Lamacraft

Head of Department Anaesthesia

University of the Free State

Bloemfontein

Dear Prof,

Re: Permission for Research Study

I, Durotolu Motunrayo Adeleke, registrar in the department of anaesthesia as part of the requirements for my training for the MMed in Anaesthesiology would like to seek your permission in conducting a cross-sectional study that assesses the prevalence of burnout among anaesthesiology registrars in the University of the Free State.

I hereby request permission to administer the questionnaire and analyse the data received from registrars in the department who are willing and give consent to participate.

Thank you Prof in anticipation of your kind consideration.

Kind regards,

20 March 2018

2018/03/20

Formatted: English (United States)

Appendix E (Institutional Approval)

HSREC 17

UFS·UV

HEALTH SCIENCES RESEARCH ETHICS COMMITTEE

APPROVAL FROM UFS AUTHORITIES
FOR PARTICIPATION OF STUDENTS/STAFF IN RESEARCH PROJECTS

Title, Initials, Surname:	Dr D.M ADELEKE	**Staff/Student number**	2016445245
Department/Institution:	ANAESTHESIOLOGY		
Phone:	0822916074	**E-mail address:**	dtee.mbchb@gmail.com
Supervisor(s):	Prof G Lamacraft	**Phone:**	051/4053576 ; 0823768379

Protocol Title:	THE PREVALENCE OF BURNOUT AMONG ANAESTHESIOLOGY REGISTRARS IN THE UNIVERSITY OF THE FREE STATE

Who will be involved in the study? (tick ✓)	☐ UFS Personnel	☑ Students

INSTRUCTIONS:

I. Please attach the following to this form when requesting approval from the signatories:
   a. The study protocol; and
   b. The Health Sciences Research Ethics Committee (HSREC) application form.

II. Kindly note that it is the responsibility of the researcher(s) to ensure that all relevant signatures are obtained before this signed form is returned to HSREC Administration (D104) Francois Retief Building, Faculty of Health Sciences, UFS. The protocol may, however, be submitted for HSREC approval while signatures are being obtained.

III. Please choose either section A **OR** B below.

IV. Section C is **mandatory** for all research on campus.

HSREC 17

A. FOR RESEARCH ON UFS STUDENTS AND/OR STAFF FROM A SPECIFIC FACULTY, **BOTH** THE FOLLOWING SIGNATURES MUST BE OBTAINED:		
I. HEAD OF SCHOOL (IF APPLICABLE):	☑ Approved	☐ Not Approved
Signature:	Date: Prof. N. Mofolo Head: School of Clinical Medicine 19 APR 2018 Faculty of Health Sciences University of the Free State	
Comments:		

II. DEAN OF FACULTY:	☒ Approved	☐ Not Approved
Signature:	Date: 17/4/18	
Comments:		

OR

B. FOR RESEARCH ON INTERFACULTY UFS STUDENTS AND/OR STAFF AND/OR STUDENTS IN UFS RESIDENCES, THE FOLLOWING SIGNATURE MUST BE OBTAINED:		
I. DEAN: STUDENT AFFAIRS	☑ Approved	☐ Not Approved
Signature:	Date: 23 — 04 — 2018	
Comments:		

AND

C. ALL RESEARCH ON STUDENTS AND/OR STAFF TO BE APPROVED BY:		
I. VICE-RECTOR: RESEARCH	☑ Approved	☐ Not Approved
Signature:	Date: 24/04/2018 Die Universiteit van die Vrystaat The University of the Free State 2018-04-24 Prof. R.C. Witthuhn VISE-REKTOR: NAVORSING VICE RECTOR: RESEARCH	
Comments:		

Appendix F (Letter of Support from UFS Student Counselling and Development)

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS·UV
STUDENT COUNSELLING & DEVELOPMENT (SCD)
STUDENTE VOORLIGTING & ONTWIKKELING (SVO)

2nd July 2018

Dear Durotolu Motunrayo Adeleke

Research Project: 'The Prevalence of Burnout among Anaesthesiology Registrars at the University of Free State'

Student Counselling & Development agrees to accept the referral of any registered UFS student participating in the above mentioned study.

Please feel free to contact me, should you have any further queries.

Yours truly

Mangchoe

Dr Melissa Barnaschone
Director: Student Counselling & Development

Appendix G (Research Protocol Approved by HSREC)

THE PREVALENCE OF BURNOUT AMONG ANAESTHESIOLOGY REGISTRARS IN THE UNIVERSITY OF FREE STATE

D.M ADELEKE

October 2018

INDEX

DECLARATION:

I, Durotolu Motunrayo Adeleke, declare that the work for the following thesis with the title:

THE PREVALENCE OF BURNOUT AMONG ANAESTHESIOLOGY REGISTRARS IN THE UNIVERSITY OF FREE STATE

Was solely undertaken by myself and that no help was provided from other sources except those allowed. All sections of the paper that use quotes or describe an argument or concept developed by another author have been duly referenced including all secondary literature used. This in essence is to show that this material has been adopted to support my thesis.

Title:

THE PREVALENCE OF BURNOUT AMONG ANAESTHESIOLOGY REGISTRARS IN THE UNIVERSITY OF FREE STATE

Researchers:

Dr D.M Adeleke

MBChB (Ife, Nigeria), MPhil (HIV Mgt) Stellenbosch, DIP (HIV) SA, DA (SA).

Registrar in Anaesthesia

Department of Anaesthesia

University of the Free State

Student Number: 2016445245

Cell number: 082 291 6074

#Universitas 6625 #Pelonomi 6163

E-mail: dtee.mbchb@gmail.com

Prof Gillian Lamacraft

Chief Specialist: Anaesthesiology & Acting HOD

Department of Anaesthesiology

Faculty of Health Sciences

University of the Free State

Cell number: 082 376 8379

#Universitas 6502 #Pelonomi 6502

Work: 051 4053307

E-mail: LamacraftG@ufs.ac.za

INTRODUCTION

The word "burnout" was coined by Herbert Freudenberger in the 1970s [1,2] to depict the negative result of work imbalance, high stress, job disengagement and job dissatisfaction. It has since then grown to be a phenomenon recognized and extensively researched in professionals in the aviation industry and in the health care sector [3].

The world's foremost and leading social science researcher on burnout – Dr Christina Maslach defines it as an "individual experience that is specific to the work context" [4,5] which manifests as a constellation of three symptoms – emotional exhaustion (EE), depersonalization (DP) and reduced personal accomplishment [5]. It is associated with poor outcomes in job performance and health. This in itself implies that the potential for burnout exists in everyone, however the same interaction between personality traits and specific contextual situations that might lead to burnout in some people might leave others unaffected [3]. Burnout is therefore not an isolated entity – it does not exist in a vacuum, it is believed to be mediated by certain factors in a burnt out individual [3].

Over and beyond the general population; music teachers[6], dental educators[7], army intensive care nurses[8], pilots and doctors are highly prone to burnout [9]. The frequently encountered symptoms of burnout in doctors are treating patients and colleagues as objects rather than human beings, feeling emotionally depleted, physical exhaustion, poor judgement, cynicism, guilt, feelings of ineffectiveness, and a sense of depersonalisation in relationships with co-workers and/or patients [10].

In American physicians, the strongest predictor of work-life balance and burnout is the ability to control their schedule and working hours [11]. In their Canadian Physician counterparts, increasing time in non-clinical duties such as exercise is associated with lower burnout rates[12].

Studies have revealed burnout ranging from 18-84% during postgraduate medical education (residency) [13]. The top stressors identified were exams – particularly in the three months to the finals, followed by work, family and relationships, finances, pressure from colleagues and obligations to do research [14].

Furthermore, in a study undertaken by Ambrose Rukewe which was published in 2012 in the Saudi Journal of Anaesthesia to assess job satisfaction among anaesthesiologists in a tertiary level hospital in Nigeria, the stressors identified by the respondents were time pressures, long working hours with complaints of insufficient sleep (continual wakefulness results in impaired concentration and motor skills) [15]. A protracted period of twenty-four hours without sleep impairs the ability to perform certain cognitive tasks to the same degree as that from a blood alcohol

level of 100 mg/dL[16] Fatigue in registrars has been associated with reduced vigilance and in a study was associated with impaired ability to detect significant changes in clinical variables when monitoring patients in simulated scenarios [17]).

Among the respondents in the study done in Nigeria, the medical officers were the most discontented (9 out of 12 ≈75%), followed by senior registrars (5 out of 9 ≈ 56%). A high percentage of participants (54.1%) declared that the one change if implemented that would enhance their job satisfaction was having a definite closing time.

The practice of anaesthesiology requires a considerable depth of knowledge, high work demand, experience and often prolonged periods of high levels of alertness, which makes it stressful to practitioners of this discipline and increases the risk of burnout among them [18,19]. This has sadly resulted in the tendency for anaesthesiologists to die at a younger age than doctors in other medical disciplines and to have a higher than average suicide rate [20,21]. This has also led to this specialty being less attractive than others as a career choice for young doctors and there are reports of shortages of anaesthesiologists in resource-rich countries of North America, Europe, and Australia [22,23,24] which further worsens the vicious circle of burnout.

The value of this research is to identify and estimate the level of burnout among registrars in the department of anaesthesiology in the University of the Free State with the intent of suggesting evidence-based interventions for the prevailing causes in the anaesthesiology residency programme in the Free State and hopefully nationwide.

AIMS AND OBJECTIVES

Primary Objective: To estimate the level of burnout among anaesthesiology registrars in the University of the Free State

Secondary Objective: (i) To describe the level of burnout

(ii) To identify factors leading to the burnout

(iii) To identify protective factors that shield against burnout

(iii) To identify associations of burn-out among Junior and Senior registrars.

METHODOLOGY

1.1 Study Design

A descriptive, prospective cross-sectional study design will be used.

1.2 Population and Sample

All the 30 registrars in the department of anaesthesiology.

1.3 Inclusion Criteria

All the registrars in the department of anaesthesiology, University of the Free State.

1.3.1 Exclusion Criteria

None except those:

(a) Registrars who opt-out of the study
(b) Registrars who do not complete the survey
(c) Registrars who do not consent

1.2Measurements

1.2 The questionnaires would be distributed by hand over four consecutive Fridays in the month of July 2018 during each Morbidity and Mortality meeting held in the department so that every registrar gets an opportunity. The questionnaires would be completed and dropped off in a box that would be placed on a desk close to the exit door. I would be physically present to provide clarifications on any questions.

1.3 Study Material / Tool

The Maslach Burnout Inventory-Human Services Survey (MBI-HSS) (Appendix B) will be used to assess the level of burnout in this study. Permission would be sought from the authors to use the copyrighted questionnaire.

The MBI-HSS was developed in 1981 by Maslach and Jackson and revised in 1996. Dr Christina Maslach is a social scientist and leading researcher on burnout. The questionnaire is well validated for use across the globe including the Republic of South Africa in conducting surveys among various disciplines in the health care sector. It was successfully used in 2015 a similar research that assessed burnout among doctors practising anaesthesia in the University of Witwatersrand and in the private sector in Johannesburg. It is the gold standard of burnout measurement among health care professionals. It assesses the three aspects of burnout using 22 questions: Emotional Exhaustion/EE (9 items), Depersonalization/DP (5 items) and Lack of

Personal Accomplishment/PE (8 items). The registrar – respondents would give their answer using the Likert scale.

With regards to Emotional Exhaustion, a total score of 17 or less: low-level burnout. Total between 18 and 29: Moderate burnout. Total over 30: High-level burnout.

With Depersonalization, total of 5 or less: Low-level burnout. Total of between 6 and 11: Moderate burnout. Total of 12 and greater: High-level burnout.

A total score of 33 or less under personal achievement indicates a high-level of burnout. A total score between 34 and 39 means moderate burnout whereas a score greater than 40 implies a low-level burnout.

In essence, a high score under emotional exhaustion and depersonalization and a low score in personal achievement may still indicate burnout.

b) A self-developed questionnaire (Appendix C) would also be used to assess other factors identified by literature that are not covered by the Maslach Burnout Inventory-Human Services.

Both questionnaires would be administered in English based on the fact that the language of instruction and examination in the University MMed and the examinations conducted by the College of Medicine of South Africa is in English.

I am aware that the survey will only measure the burnout rate at a single point in time and that variations in the level of burnout may occur in individuals over time. I will try and limit these errors by ensuring that my tool of measurement is valid and reliable. A pilot study will also be conducted using the first two registrars that arrive for the morbidity and mortality meeting and also give consent for the study.

ANALYSIS OF DATA

Descriptive statistics namely frequencies and percentages for categorical data with means and standard deviations or medians and percentiles for continuous data will be calculated per group (burnout or not). The groups will be compared by means of 95% confidence intervals. The prevalence of burnout will be calculated and described by means of 95% confidence interval for the prevalence. The analysis would be done by the Department of Biostatistics.

IMPLEMENTATION OF FINDINGS

The data and information collected will be used for:

a) Submission for an M.Med in Anaesthesia as part of requirements for the postgraduate degree.
b) Possible article publication in a journal

c) Help to offer evidence-based recommendations that will influence polices that will address burnout and mitigate against it among Anaesthesiology residents in the University of Free State and hopefully in Anaesthesiology residency programmes nationwide.

TIME SCHEDULE

Protocol to Ethics Committee: April 2018

Administration of Questionnaire & Data Collection: Friday November 9 2018 – Friday December 7 2018

Analysis: January 2019

Article writing: February 2019

Submission: March 2019

BUDGET

- The budget for stationary is R 1, 000 and will be covered by the researcher.
- The license to use the Maslach Burnout Inventory – Human Services Survey for Medical Personnel will be bought. The purchase of the license would cost USD 2, 50 ≈ R32.50.
- The manual/scoring guidelines and group report of the validated questionnaire will also be purchased from The Mind Garden at a cost of USD 200 (conversion of USD to Rands variable≈R2, 600)
- Total amount estimated at R 3, 632.50

Following ethics approval and acceptance of the protocol, an application for grant from the postgraduate committee may be submitted to the Postgraduate Administration Office to access funds offered for research done for the NAMB7900 module code. This if approved in full or partially would be used to offset or augment the bill accrued in purchasing the Maslach Burnout Inventory-Human Services Survey for Medical Personnel.

Should the application for grant be unsuccessful, the principal researcher (Dr D.M Adeleke) will be fully responsible for the expense of the research.

ETHICAL CONSIDERATIONS

The study protocol will be submitted to the Health Sciences Research Ethics Committee of the Faculty of Health Sciences, University of the Free State.

A progress report will be submitted as needed.

A report on conclusion of the research will be submitted to the Health Sciences Research Ethics Committee.

As this is a descriptive study involving anaesthesia-trainee registrars, ethical considerations in terms of individual and departmental consent for survey will be sought.

Contact details of the University Counsellors offering student support services will be included in the questionnaire should issues that warrant counselling arise from the respondent.

The data file will be stored by the researcher in the Department of Anaesthesia in the University of the Free State for 15 years.

Permission for the research will be obtained from Prof. Gillian Lamacraft, Department of Anaesthesia and the Department of Health Research Committee (kindly refer to the appendices concerned).

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Appendix H (Data Collection Tool) –

Self-Developed Demographic Questionnaire

Research to assess the prevalence of burnout among Anaesthesiology Registrars in the University of the Free State

Instructions: Please circle/ complete the most appropriate response

1. What is your gender?
   a. Male
   b. Female

2. Date of birth (dd/mm/yyyy) ____ /_____/_____ Age: _____ years

3. Marital status?
   a. Married
   b. Not married but in a stable relationship
   c. Divorced /Separated
   d. Not in a relationship
   e. Widowed

4. Occupation of spouse/partner?
   a. Medical Doctor
   b. Other, Please specify: _____

5. How many children do you have? _____

   5.1. How many are under five years old? _____

6. Where did you have your Undergraduate study?
   a. University of the Free State (UFS)
   b. Others (South Africa): Wits, UCT, UP, UKZN, SU, Walter Sisulu University
   c. Non-South African Universities, Please Specify: _____

7. Training level
   a. Registrar (JAKAS)
   b. Senior Registrar (SAKAS/ FAKAS)

If answer to Registrar (JAKAS) is **yes**:

7.1. How many years of core anaesthesia experience did you have prior to taking up this registrar post in Anaesthesia? _____

7.2. Did you have the Diploma in Anaesthesia before taking up this registrar post?
   a. Yes
   b. No

7.3. Have you passed in full all the primary examinations?
   a. Yes
   b. No

7.4. Did you fail any of the primary examinations?
   a. Yes
   b. No

7.5. How many more months to the examinations are you?
   a. Primary examinations: _____

If the answer to Senior Registrar (SAKAS/ FAKAS) is **yes**:

7.6. How many months from the final examinations are you? _____

7.7. Have you attempted the finals before unsuccessfully?
   a. Yes
   b. No

7.8. Have you passed the final FCA Part Two Exams?
   a. Yes
   b. No

7.9. Have you completed your M. Med research programme?
   a. Yes
   b. No

8. What do you do as routine to relieve stress? **Please circle** where applicable **(You can select more than one answer)**

   a. Exercise
   b. Socialize

c. Drink alcohol
d. Smoke cigarette/ others
e. Pray
f. Spending time with loved ones
g. Take a break and be in solitude
h. Other, please specify:_____

9. On a scale of 1-5, which stressors are severe enough to make you re-think anaesthesiology as a career? (1= least severe, 5= most severe)

	a. Non-specific work-day finish time
	b. Work/ family/ social life balance
	c. Finances
	d. Conflict with anaesthesiology colleagues
	e. Conflict with surgeons

9.1. Please state any other stressors and rate them on a scale of 1-5 :

_____

_____

_____

_____

_____

_____

_____

10. Do you consider yourself prone to errors?
    a. Yes
    b. No

10.1. **If yes**, when are you most prone to errors? **(Kindly circle one response)**

a. In the few months just before examinations
b. Non-work related emotional issues
c. Sleep deprivation
d. Other, please specify:_____
_____

Appendix H (Data Collection Tool) –

Copyrighted MBI-HSS (Maslach Burnout Inventory – Human Services Survey)

CHRISTINA MASLACH • SUSAN E. JACKSON

MBI–Human Services Survey

The purpose of this survey is to discover how various persons in the human services or helping professionals view their job and the people with whom they work closely.

Because persons in a wide variety of occupations will answer this survey, it uses the term *recipients* to refer to the people for whom you provide your service, care, treatment, or instruction. When answering this survey please think of these people as recipients of the service you provide, even though you may use another term in your work.

On the following page are 22 statements of job-related feelings. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, write the number "0" (zero) in the space before the statement. If you have had this feeling, indicate *how often* you feel it by writing the number (from 1 to 6) that best describes how frequently you feel that way. An example is shown below.

Example

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

How Often 0–6	Statements:
1. _____	I feel depressed at work.

If you never feel depressed at work, you would write the number "0" (zero) under the heading "How Often." If you rarely feel depressed at work (a few times a year or less), you would write the number "1." If your feelings of depression are fairly frequent (a few times a week but not daily), you would write the number "5."

1055 Joaquin Road, 2nd Floor
Mountain View, CA 94043
800-624-1765 www.cpp.com

3463

MBI–Human Services Survey

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times times a week	Every day

How Often 0–6	Statements:
1. _____	I feel emotionally drained from my work.
2. _____	I feel used up at the end of the workday.
3. _____	I feel fatigued when I get up in the morning and have to face another day on the job.
4. _____	I can easily understand how my recipients feel about things.
5. _____	I feel I treat some recipients as if they were impersonal objects.
6. _____	Working with people all day is really a strain for me.
7. _____	I deal very effectively with the problems of my recipients.
8. _____	I feel burned out from my work.
9. _____	I feel I'm positively influencing other people's lives through my work.
10. _____	I've become more callous toward people since I took this job.
11. _____	I worry that this job is hardening me emotionally.
12. _____	I feel very energetic.
13. _____	I feel frustrated by my job.
14. _____	I feel I'm working too hard on my job.
15. _____	I don't really care what happens to some recipients.
16. _____	Working with people directly puts too much stress on me.
17. _____	I can easily create a relaxed atmosphere with my recipients.
18. _____	I feel exhilarated after working closely with my recipients.
19. _____	I have accomplished many worthwhile things in this job.
20. _____	I feel like I'm at the end of my rope.
21. _____	In my work, I deal with emotional problems very calmly.
22. _____	I feel recipients blame me for some of their problems.

(Administrative use only) EE: _____ cat. _____ cat. DP: _____ cat. _____ cat. PA: _____ cat. _____

Appendix I: Instructions to Author / Full Author Guidelines for the South African Journal of Anaesthesia and Analgesia (SAJAA)

Title page

All articles must have a title page with the following information and in this particular order: Title of the article; surname, initials, qualifications and affiliation of each author; The name, postal address, e-mail address and telephonic contact details of the corresponding author and at least 5 keywords.

Abstract

All articles should include an abstract. The structured abstract for an Original Research article should be between 200 and 230 words and should consist of four paragraphs labeled Background, Methods, Results, and Conclusions. It should briefly describe the problem or issue being addressed in the study, how the study was performed, the major results, and what the authors conclude from these results. The abstracts for other types of articles should be no longer than 230 words and need not follow the structured abstract format.

Keywords

All articles should include keywords. Up to five words or short phrases should be used. Use terms from the Medical Subject Headings (MeSH) of Index Medicus when available and appropriate. Key words are used to index the article and may be published with the abstract.

Acknowledgements

In a separate section, acknowledge any financial support received or possible conflict of interest. This section may also be used to acknowledge substantial contributions to the research or preparation of the manuscript made by persons other than the authors.

References

Cite references in numerical order in the text, in superscript format (Format> Font> Click superscript). Please do not use brackets or do not use the foot note function of MS Word.

In the References section, references must be typed in single-spaced and numbered in numerical order, not alphabetically.

The style for references should follow the format set forth in the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (http://www.icmje.org) prepared by the International Committee of Medical Journal Editors. Abbreviations for journal titles should follow Index *Medicus* format. Authors are responsible for the accuracy of all references. Personal communications and unpublished data should not be referenced. If essential, such material should be incorporated in the appropriate place in the text.

List all authors when there are six or fewer; when there are seven or more, list the first three, then ";et al."; When citing URLs to web documents, place in the reference list, and use the following format: Authors of document (if available). Title of document (if available). URL. (Accessed [date]).

The following are sample references:

1. Jun BC, Song SW, Park CS, Lee DH, Cho KJ, Cho JH. The analysis of maxillary sinus aeration according to aging process: volume assessment by 3-dimensional reconstruction by high-resolutional CT scanning. Otolaryngol Head Neck Surg. 2005 Mar;132(3):429-34.
2. Polgreen PM, Diekema DJ, Vandeberg J, et al. Risk factors for groin wound infection after femoral artery catheterization: a case-control study. Infect Control Hosp Epidemiol [Internet]. 2006 Jan [cited 2007 Jan 5];27(1):34-7. Available from: http://www.journals.uchicago.edu/ICHE/journal/issues/v27n1/2004069/2004069.web.pdf.

More sample references can be found at: http://www.nlm.nih.gov/bsd/uniform_requirements.html"

Tables

Tables should be self-explanatory, clearly organised, and supplemental to the text of the manuscript. Each table should include a clear descriptive title on top and be numbered in Roman numerals (I, II, etc) in order of its appearance as called out in text. Tables must be inserted in the correct position in the text. Authors should place explanatory matter in footnotes, not in the heading. Explain in footnotes all non-standard abbreviations.

For footnotes use the following symbols, in sequence:*,†,‡,§,||,**,††,‡‡

Figures

All figures must be inserted in the appropriate position of the electronic document. Symbols, lettering, and numbering (in Arabic numerals e.g. 1, 2, etc. in order of appearance in the text) should be placed below the figure, clear and large enough to remain legible after the figure has been reduced. Figures must have clear descriptive titles.

Photographs and images

If photographs of patients are used, either the subject should not be identifiable or use of the picture should be authorised by an enclosed written permission from the subject. The position of photographs and images should be clearly indicated in the text. Electronic images should be saved as either jpeg or gif files. All photographs should be scanned at a high resolution (300dpi, print optimised). Please number the images appropriately.

Permission

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Review and action

Manuscripts are initially examined by the editorial staff and are usually sent to independent reviewers who are not informed of the identity of the author(s). When publication in its original form is not recommended, the reviewers' comments (without the identity of the reviewer being disclosed) may be passed to the first author and may include suggested revisions. Manuscripts not approved for publication will not be returned.

Ethical considerations

Papers based on original research must adhere to the Declaration of Helsinki on "Ethical Principles for Medical Research Involving Human Subjects" and must specify from which recognised ethics committee approval for the research was obtained.

Conflict of interest

Authors must declare all financial contributions to their work or other forms of conflict of interest, which may prevent them from executing and publishing unbiased research. [Conflict of interest exists when an author (or the author's institution), has financial or personal relationships with other persons or organisations that inappropriately influence (bias) his or her opinions or actions.]* *Modified from: Davidoff F, et al. Sponsorship, Authorship, and Accountability. (Editorial) JAMA 2001: 286(10) The following declaration may be used if appropriate: "I declare that I have no financial or personal relationship(s) which may have inappropriately influenced me in writing this paper."

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All submissions must be made online at www.sajaa.co.za and correspondence regarding manuscripts should be addressed to:

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Tips on Preparing your manuscript

1. Please consult the "Uniform requirements for manuscripts submitted to biomedical journals" at www.icmje.org
2. Please consult the guide on Vancouver referencing methods at: http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=citmed.TOC&depth=2

3. The submission must be in UK English, typed in Microsoft Word with no double spaces after the full stops, 1.5 paragraph spacing, font size 12 and font type: Times New Roman.
4. All author details (Full names, Qualifications, Affiliation and ORCID) must be provided.
5. The full contact details of corresponding author (Tel, email address, postal address) must be on the manuscript.
6. There must be an abstract and keywords.
7. References must strictly be in Vancouver format. (Reference numbers must be strictly numerical and be typed in superscript, not be in brackets and must be placed AFTER the full stop or comma.)
8. It must be clear where every figure and table should be placed in the text. If possible, tables and figures must be placed in the text where appropriate. If too large or impractical, they may be featured at the end of the manuscript or uploaded as separate supplementary files.
9. All photographs must be at 300dpi and clearly marked according to the figure numbers in the text. (Figure 1, Table II, etc.)
10. All numbers below ten, without percentages or units, must be written in words.
11. Figure numbers: Arabic, table numbers: Roman

Appendix I: A Summary Report Compiled in the Turnitin Plagiarism Search Engine

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by Durotolu Motunrayo Adeleke

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Submission ID: 1156206729

File name: Final_MMed_Research_Manuscript_31072019_Adeleke_DM_TIN.docx (153.24K)

Word count: 9264

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MMED-Anaesthesiology.

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PRIMARY SOURCES

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2	Shailesh Kumar. "Burnout and Doctors: Prevalence, Prevention and Intervention", Healthcare, 2016 Publication	
3	journals.lww.com Internet Source	
4	www.univadis.co.uk Internet Source	
5	Submitted to University of Nigeria Student Paper	
6	Filippo Sanfilippo, Alberto Noto, Gaetano J. Palumbo, Mariachiara Ippolito et al. "Burnout in Cardiac Anesthesiologists: Results From a National Survey in Italy", Journal of Cardiothoracic and Vascular Anesthesia, 2018 Publication	

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