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RISK ASSESSMENT FOR WITHDRAWAL FROM SURGICAL TRAINING IN SOUTH AFRICAN ACADEMIC INSTITUTIONS.

By

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“A thesis submitted in fulfilment of the requirements in respect of the master’s degree MMed in the Department of surgery in the Faculty of Health Sciences at the University of the Free State.”

Submission date: 15 September 2020

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DECLARATION OF AUTHORSHIP

I, Ayanda Shabalala, with student number 2016140416 declare that the coursework Master’s Degree **Risk assessment for Withdrawal from surgical Training in South African Academic Institutions** that I herewith submit in a publishable manuscript format for the Master’s Degree qualification MMed at the University of the Free State is my independent work, and that I have not previously submitted it for a qualification at another institution of higher education.

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Date: 15 September 2020

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LIST OF ABBREVIATIONS

CMSA	College of Medicine of South Africa
CSSA	College of Surgeons of South Africa
FCS	Fellowship of College of Surgeons
HPCSA	Health professions council of South Africa
HRH	Human Resources for Health
HSREC	Health Sciences Research Ethics Committee
LOC	Local Organizing Committee
LSL	Learning Style Inventory
MO	Medical officer
NDoH	National Department of Health
NHI	National Health insurance
RACS	Royal Australasian College of Surgeons
SAMJ	South African Medical Journal (SAMJ)
SRS	Surgical Research Society
UFS	University of free state
UOFS	University of Free State
USA	United States of America
SET	Surgical Education Training

ABSTRACT

Introduction: Countries world-wide, including South Africa are facing a huge problem of few graduating surgical professionals and high attrition rates. The loss of a training registrar represents a waste of resources and effort as well as having implications for future workforce planning. Furthermore, South African already has a problem of few surgical professionals; hence the high attrition rate puts a severe strain on an already inadequate health system and this in turn impact, health delivery, health outcomes, and dissatisfaction for both patients and healthcare staff. This suggests that aggressive interventions are urgently needed to address this problem so that trainees can be retained. Hence this study aimed to investigate the risk factors that contribute to surgical trainee's attrition by 1) determining the contemplated attrition rate of general surgical registrars; 2) investigating reasons for considering leaving training before completing; and 3) investigating the overall attitude and satisfaction of South African surgical registrars towards their training program.

Method: The study enrolled 80 general surgery registrars who had attended the 47th Surgical Research Society Meeting and annual registrar symposium that was held at the University of Pretoria in June 2019. Our study comprised a fair representation of registrars from the different medical schools across South Africa. The data was collected using questionnaires which were administered over four days, which was the duration of the meeting. 75 of 80 Registrars (94%) completed the questionnaire. The data were analyzed using SAS software and (FREQ procedure) to determine statistical significance. The level of significance for all test was $P < 0.05$. Differences in outcome between categorical groups was analyzed using Chi-square or Fisher's Exact Test if cell count is < 5 . Analysis of data was done by the University of Free State Biostatistics department.

Results: The study found that 60% of the participants were contemplating withdrawing from surgical training. The study also found that majority of the participants who contemplated withdrawing were in their 2nd year (39%) and 1st year (35%) of study. Suggesting that surgical trainees are most likely to contemplate withdrawal on their 1st and 2nd year of surgical training. Our study also revealed that the most common reasons for potential withdrawal were poor lifestyle and quality of life during surgical training (16%), excessive working hours, workload /intensity/hours (29%), lack of support (12%), high level of stress/anxiety and pressure (15%).

Interestingly, when looking at job satisfaction as the reason for contemplating to withdraw, we found that only 3% of the surgical trainees indicated job dissatisfaction as the reason to contemplate withdrawing.

Conclusion: This study has demonstrated that surgical trainees are most likely to withdraw from the training in their first and second year of training, suggesting that interventions to retain surgical trainees should prioritize first and second-year trainees. Additionally, this study demonstrated that majority of the surgical registrars were satisfied with their jobs, suggesting that the main reasons for withdrawing was not due to job dissatisfaction but mostly the intensity of the workload, the long hours, the lack of support and high stress/pressure. Findings of these study can be used to improve the overall general surgery training programs and lifestyle to prevent future catastrophic events of the shortage of general surgeons.

Keywords: Attrition, Registrar, Surgeon, Burnout, Attitude, Satisfaction, Catastrophe, Crisis, Emotional exhaustion, Withdrawal, Surgical workforce

CHAPTER ONE: INTRODUCTION

Attrition, which is the decrease in the surgical workforce due to factors such as excessive pressure and long working hours, presents a serious healthcare delivery problem in many countries, including South Africa. Currently, there is a paucity of data and literature on the rate of attrition from general surgical training is limited, and there have been no studies in South Africa investigating the incidence of attrition or the reasons contributing to it. It is necessary to research attrition so that interventions can be designed to mitigate the problem urgently, mainly because South Africa already has a problem of the inadequate healthcare workforce, particularly surgical workforce.

This chapter will give a critical review and rationale of the study, problem statement research aims and study objectives.

1.1 Literature review

1.1.1 Nature of the problem

Attrition is defined as the reduction or decrease in the surgical workforce due to voluntary withdrawal, transfer to other programmes or dismissal. The demands of training to become a general surgeon are significant, and they influence the registrars' wellbeing, which then potentially compromises their general surgical education and training, which consequently results in impaired or poor quality of surgical care delivery.^[1, 2] Attrition during surgical training is a critical issue worldwide^[1, 3-5], and the loss of a training registrar represents a waste of resources, effort, time, and has negative implications for future workforce planning.^[1, 4] The issue of surgical trainee attrition is a global problem, several studies have reported trainee attrition rates, (which also includes trainees that have been dismissed for any reason). In the United States of America (USA), attrition has been reported to be around 17-30%.^[6] In Australia and New Zealand, the attrition rate for general surgical trainees during the period of 2010-2014 was reported to be 5.9%, it was further noted that female surgical registrars had a slightly higher rate of withdrawing compared to their male counterparts (5.8% males and 6.2% females). Notably, these figures only report on attrition due to personal reasons or transfer to another specialty^[7], but not the trainees who were dismissed from the training programme.

A meta-analysis conducted by the Royal Australian College of Surgeons (RACS) in 2014 reported an attrition rate of 18% among general surgery trainees.^[8] Furthermore, another study done by the RACS on trainees starting their general surgical education training (SET) Program from 2008

found that 15% of residents who did not complete the program, were either dismissed, failed the exam or voluntary withdrew before they complete the programme. The study found that of the 56% of trainees who withdrew from the programme, the rate of females was 2.5 times higher than that of the men who did. Moreover, a RACS-commissioned external group conducted on individuals that left general surgery before completing their studies; the main reported reasons were: for (i) inflexible the training programmes; (ii) unacceptable learning culture, and (iii) surgery judged as the wrong career choice after training commencement.

A study by Dodson et al., conducted in 2005 found that reasons for attrition ‘lifestyle’ reasons for 65% of the residents.^[9] Furthermore, the study found that females who withdrew from surgical training were double (27% vs. 13%) the size of their male counterparts. Another study conducted in the United States of America (USA) showed women were 2.26 times more likely to withdraw from general surgical training than men, and this was predominantly due to family commitments or health reasons. However, a comprehensive study of 6,303 USA surgical trainees found no gender difference in attrition rates.^[10] The only independent predictor of attrition was post-graduate year level, highest rates being in the first and second years training.^[9, 11, 12]

Keegan et al.^[13] found that registrars who completed their undergraduate medical education in the same university were at a significantly higher risk of attrition compared to their counterparts who underwent medical training overseas. It has not been established whether training in a different university in the same country has any contributory factor to attrition. The reasons may be related to different expectations and perceptions, as well as the fact that international trainees have often chosen to move to Australia (particularly from more disadvantaged nations) and may be more committed to completing training and more willing to accept the challenges that training presents.^[13]

Few studies have considered the factors contributing to a trainee’s decision to leave. A general perception is that attrition is the result of the highly demanding and stressful environment that trainees and their families endure during the postgraduate years. Satisfaction with the training and the job is another contributing factor to attrition as it has been reported that dissatisfied physicians are 2 to 3 times more likely to leave.^[14, 15] Relational and emotional dimensions of surgical practice can contribute to personal internal conflicts.^[16] This suggests that addressing the dimensions that

leads to personal conflicts is important because if not addressed it can lead to some trainees to leave the training.^[7]

Burnout remains one of the major contributor to attrition and has been demonstrated in many studies. Burnout may lead one to feel like they chose the wrong career especially because it influences the trainees' wellbeing, and also has negative implications on health care delivery, and can further lead trainees to withdraw from the training. It is reported that the rate of burnout among surgical registrars across specialities is between 28% to 69%.^[10, 12, 16] Burnout is attributed by many factors which include: work overload and long hours, difficulty in maintaining work-life balance, in exclusion from extracurricular activities due to work commitments.^[10, 16] This is further exacerbated by other factors such as patient hostility, being given too much responsibility, lack of appreciation from seniors, lack of support and effective supervision, disorganization and lack of teamwork or collaboration among colleagues.^[9, 10]

1.2.2 Lifestyle as a trainee

Two meta-analysis studies reported "uncontrollable lifestyle as a reason for attrition."^[17] In addition to lifestyle, the long hours and workload of surgical training can lead to work strain, and the stress it puts on the work-life balance, thus leading to attrition.^[17-23] Khoushal et al.^[17] also reported trainee's personal health, financial problems, lifestyle factors, and poor performance as other factors contributing to attrition and withdrawal. In South Africa, Kahn et al.^[24] observed that tiredness and stress associated with the long working hours placed severe strains on family life.

Sullivan and colleagues reported that some trainees found the duration of training and the personal costs from training to be a surgical registrar were too great for some trainees leading them to withdraw.^[25] In addition to that, the study reported that the trainees who withdrew indicated that they were not happy with their skills and operative experience, and did not feel confident in their ability to not hurt patients. Generally, Lack of proper training and capacity development of surgical trainees can lead them to withdrew due to feeling not well-equipped to become future surgeons.^[19, 25] Lack of support was also another factor that has been reported to contribute to attrition, those who withdrew from the training indicated that they feared asking for help from their fellow trainees as they feared being judged, this was made worse by the lack of respect that the trainees face from the attending physicians.^[25-27]

Ginther and associates found concerns about future employment type, poor work-life balance, and a poor quality of life to be some of the most common reasons leading to attrition among surgical trainees.^[28] Furthermore, Gifford and colleagues also identified long working hours, sleep deprivation and undesirable future lifestyle as other reasons leading to attrition.^[29] Notably, when looking at motivation for trainees to complete their surgical training the most common reasons given were: satisfaction of work, support from family or partners, having invested too much time to quit, support from fellow trainees and the financial freedom.^[14, 25, 28, 29]

1.2.3 Surgical training complexity

A Meta-Synthesis of surgeons' perspectives done by Orri et al.^[16] on the factors influencing trainees practice and wellbeing documented over 1000 interviews with surgeons. The reviews identified these 2 themes: surgeon image and identity. The reviews indicated that trainees enrolled to surgical training with being aware of what is it really that they are getting into and sometimes enroll for the wrong reasons. It is important the perceptions that they have is regarding identity and image are addressed prior to them enrolling or during the initial stage of their training.^[12, 16]

1.2.4 Indicators for attrition among surgical trainees

Based on literature on attrition, it is plausible to suggest that there are indicators that can be used to identify surgical trainees at risk of attrition.^[13]

A National Study done in 2007 across the United States on attrition identified indicators that can be used to predict attrition. The study found that females had a higher rate of attrition compared to their male counterparts, and were 1.4 times more likely to withdraw from training.^[30] Furthermore, the study found that the programme size was an important predictor of attrition as 23% of men withdrew from bigger programmes compared to the 16% from smaller programmes.^[10, 30]

An investigation on the link between attrition and learning style was done by Quillinn et al.^[31] who examined a 14 year database (study period between 1999-2012) of surgical trainees' examination result, operative log data, learning style assessments, and reasons for attrition. The study found that the majority of trainees were action-based learners and were less likely to withdraw from training compared to observational-based trainees who had the most risk of withdrawing.^[31]

1.2 Problem statement

Workforce modelling has predicted that unless there is a substantial increase in the number of graduating surgeons, South Africa will face a surgical workforce crisis. The surgical workforce in

South Africa is currently insufficient in being able to meet the burden of surgical disease in the country. It is estimated that at least 150 surgeons per year need to graduate for adequate access to surgical care to be provided to the entire population. Currently, approximately 70 surgeons are produced per year in 8 South African academic institutions. South African surgical registrar programs are facing multiple pressures, including attracting and retaining registrars.^[15, 24]

The current four or five-year training programme entails commitment and sacrifice on behalf of the trainee, and there is no doubt that the stressors and difficulties encountered during these years will leave some trainees questioning whether they can complete their surgical education. Unless something is done about the current situation, the future of South African surgeons is in danger. We need to listen to the concerns of current surgical registrars and find ways to improve the quality of their training to ensure we have not only adequate numbers for our future surgical workforce but a cohort of surgeons who have enjoyed their training experience and will strive to create a similar one for their trainees in the future. Attrition from surgical training is costly and undesirable for both trainee and the training programme, especially in a resource-limited country like South Africa. Thus, interventions that can help improve surgical training retention needs to be prioritized in order to improve the already insufficient surgical workforce.

Loss of the registrar adds to the stress, frustration, and career uncertainty of the remaining registrars. It may start the cascade of other registrars leaving. Identifying the surgical trainee at risk of withdrawal is crucial to decrease this global problem of leaving surgical training before time. Program directors must be able to target residents at risk of attrition and in trouble so that intervention is possible.

According to the Lancet Commission on Global surgery, surgical conditions account for approximately 30% of the global burden of disease, and the need for surgical intervention spans 100% of disease sub-categories. The widespread provision of surgical care can significantly decrease death and disability. For example, surgery is responsible for approximately 65% of cancer cure. More considerable attention should be given to surgical services, because of the clear evidence of its cost-effectiveness. Surgery is indivisible, an indispensable part of health care. South Africa has a well-established surgical training system based on the British training model and is highly regarded worldwide.

According to recent statistics, South Africa has a population of approximately 58 million. It is estimated that by 2039/40 the population will be around 69, 988,237. National Department of Health HRH strategy plan 2012/13-2016/17 targets is to double the number of general surgeons in South Africa by 2040. National Health insurance (NHI) amplifies the need for coordinated, comprehensive health workforce planning in South Africa, given the intention to move South Africa toward a more integrated health system and to improve equity, quality of care and access to services. Increased health-seeking behaviour anticipated under NHI implies the need for expanded availability of the surgical workforce, who are currently underrepresented. According to the NDoH's HRH strategy 2012/13 target ratio, the current South African population should have 3.5 surgeons per 100000 total population to meet surgical demands timely and effectively. The current number of surgeons per 100000 total population is 0.53, which is shockingly lower than the targeted ratio. According to the study conducted by Professor D Kahn in 2018, there were a total of 894 registered specialist general surgeons in 2014 (HPCSA records) serving a population of 54 million South Africans resulting to 0.69 surgeons per 100000 total population. The study in 2004 by Professor Kahn also reported about the catastrophe that was facing South African general surgery health workforce.^[32] The study showed that General surgery in South Africa was in crisis with a critical shortage of surgeons and that this shortage was aggravated by the fact that the number of surgical graduates per year had been grossly inadequate.^[32] In 2004 eight medical universities were producing less than 25 general surgeons per year instead of 50 that the predictive model had estimated for. General surgeons qualifying was substantially lower, and not even more than 50% of the 2004 estimates. Fast-tracking to 2020, current projections according to NDoH's HRH strategy 2012/13 and Lancet commission on Global surgery estimated that at least 150 surgeons per year need to graduate for adequate access to surgical care to be provided to the entire population. Currently, approximately 70 surgeons are produced per year by eight South African academic institutions that offer the MMed (Surgery) degree. This is according to the College of Medicine of South Africa (CSMA) data for the year 2017. South African surgical registrar programs are facing multiple pressures, including attracting and retaining registrars. Therefore, losing a surgical trainee is a significant concern that must be dealt with and be prevented at all cost, to avoid disease burden and financial catastrophe in the future.

The literature regarding the rate of attrition from surgical training is limited, and there have been no studies in South Africa concerning either the incidence of attrition of trainee surgeons or the

reasons contributing to it. However, studies conducted in the USA, New Zealand and Australia have shown that attrition among surgical registrars is prevalent, and there are mechanisms that can be used to prevent it. These studies showed that general surgery attrition rates are higher than other medical residencies and have persisted despite major reforms such as elimination of the pyramidal system of residency training. At the same time, a substantial shortage of general surgeons is predicted. Strategies responding to these complex and competing challenges can be informed by understanding general surgery residents' attitudes and experiences regarding their training program. Studies on the effect of the 80-hour workweek on attrition have also yielded mixed findings.

Many general surgery registrars contemplate quitting residency at some time during their training. Once a surgery resident decides that general surgery will not provide the desired lifestyle, the chance of him completing his residency decreases significantly and quitting is inevitable. Residency programs must improve their ability to identify those residents contemplating quitting residencies and intervene. Intervention may be possible with early identification of medical students and registrars at risk for attrition.

1.3 Purpose of the study

1.3.1 Primary outcome

To determine the contemplated attrition rate of general surgical residents in the South African setting. This was established by determining how many participants responded affirmative to the question, “Have you considered leaving surgical training?”

1.3.2 The secondary outcome

To investigate reasons for leaving surgical training and to explore satisfaction and attitudes of South African surgical registrars towards their surgical training program.

1.4 Hypothesis

We hypothesized that research on the surgical workforce in South Africa is limited.

The current number of general surgeons estimated to be in South Africa with a population of 58 million, is insufficient to meet the surgical burden of the country. More surgeons need to be produced to meet the targeted ratio of at least four surgeons per 100000 population. South Africa is classified as an upper-middle-income country and provides reasonable surgical services. Production of general surgeons is solely dependent on eight medical universities in South Africa.

The current four or five-year training programme entails commitment and sacrifice on behalf of the trainee, and there is no doubt that the stressors and difficulties encountered during these years will leave some trainees questioning whether they can complete their surgical education. Current number of surgeons graduating per year is shockingly lower than required.

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CHAPTER 2: PUBLISHABLE MANUSCRIPT

ABSTRACT

Introduction: The high attrition rates among surgical registrars in South Africa put a severe strain on an already inadequate health system, and this, in turn, impact, health delivery, health outcomes. This suggests that aggressive interventions are urgently needed to address this problem. Hence this study aimed to investigate the risk factors that contribute to surgical trainee's attrition rates.

Method: The study enrolled 80 general surgery registrars who had attended the 47th Surgical Research Society Meeting and annual registrar symposium that was held at University of Pretoria in June 2019. The data was collected using questionnaires which were administered in a span of four days, which was the duration of the meeting. To note, 75 of 80 Registrars (94%) completed the questionnaire. The data was analyzed using SAS software and (FREQ procedure) to determine statistically significance.

Results: The study found that 60% of the participants were contemplating withdrawing from surgical training. Furthermore, majority of the surgical registrars considering withdrawing were in their 2nd year (39%) of study, followed by those in their 1st year (35%) of study, followed by those in their 3rd years (14%), 4th year (8%) and then 5th year (5%). Our study also revealed that the most common reasons for potential withdrawal were poor lifestyle and quality of life during surgical training (16%), excessive working hours, workload /intensity/hours (29%), lack of support (12%), high level of stress/anxiety and pressure (15%). Interestingly, when looking at job

satisfaction as the reason for contemplating to withdraw, we found that only 3% of the surgical trainees indicated job satisfaction as the reason to consider withdrawing.

Conclusion: This study findings suggest that interventions to retain surgical trainees should prioritize first and second-year trainees. Findings of these study can be used to improve the overall general surgery training programs and lifestyle to prevent future catastrophic events of the shortage of general surgeons.

Keywords: Attrition, Registrar, Surgeon, Burnout, Attitude, Satisfaction, Catastrophe, Crisis, Emotional exhaustion, Withdrawal, Surgical workforce

2.1 INTRODUCTION

Attrition in surgical trainees presents a significant public health concern worldwide for both the healthcare workforce and patients, and poses severe threats to the quality and delivery of healthcare, particularly in the era of Universal Health Coverage (UHC).^[1-3] When the surgical registrar withdraw from a training programme it has a significant effect on the entire residency, as it adds to the stress, frustration and career uncertainty of the remaining registrars.^[4-6] and may start the cascade of other registrars leaving. Hence, identifying indicators that can be used to predict surgical trainee at risk of withdrawal is crucial to decrease this global problem of attrition.^[7, 8]

Workforce modelling has predicted that unless there is a substantial increase in the number of graduating surgeons, South Africa will face a surgical workforce crisis. This is concerning especially because the surgical workforce in South Africa is currently insufficient in being able to meet the burden of surgical disease in this country.^[9] According to the Lancet Commission on Global surgery, surgical conditions account for approximately 30% of the global burden of disease, and the need for surgical intervention spans 100% of disease sub-categories. Widespread provision of surgical care can greatly decrease death and disability. For example, surgery is responsible for approximately 65% of cancer cure. Greater attention should be given to surgical services, because of the clear evidence of its cost-effectiveness

National Health insurance (NHI) amplifies the need for coordinated, comprehensive health workforce planning in South Africa, given the intention to move South Africa toward a more

integrated health system and to improve equity, quality of care and access to services. Increased health-seeking behaviour anticipated under NHI implies the need for expanded availability of surgical workforce, who are currently inadequate.

According to Professor D Kahn, there were a total of 894 registered specialist general surgeons in 2014 (HPCSA records) serving a population of 54 million South Africans resulting to 0.69 surgeons per 100000 total population. Suggesting that General surgery in South Africa was in crisis with a critical shortage of surgeons.^[10] Currently, approximately 70 surgeons are produced per year in South Africa, this ratio further emphasizes that South African surgical registrar programs are facing multiple pressures, including attracting and retaining registrars; this, in turn, affects the overall health system and patient outcomes. Therefore, losing a surgical trainee is a significant concern that must be dealt with and be prevented at all cost, to prevent disease burden and financial catastrophe in the future.

The literature regarding the rate of attrition from surgical training is limited, and there have been no studies in South Africa concerning either the incidence of attrition of trainee surgeons or the reasons contributing to it. Hence this study aimed to investigate the risk factors that contribute to surgical trainee's attrition by: 1) determining the contemplated attrition rate of general surgical registrars; 2) investigating reasons for considering leaving training before completing; and 3) investigating the overall attitude and satisfaction of South African surgical registrars towards their training program.

2.2 METHODOLOGY

2.2.1 Study Design

This was a descriptive, prospective study of South African general registrars

2.2.2 Inclusion Criteria

General surgery registrars who attended the 47th Surgical Research Society Meeting and annual Registrar Symposium at Pretoria in June 2019 were asked to participate in the study. Eighty general surgery registrars attended the meeting. There was a fair representation of registrars from different medical schools.

2.2.3 Exclusion Criteria

Registrars who did not attend the 47th Surgical Research Society Meeting and annual Registrar Symposium

2.2.4 Sampling convenient / Setting

To determine the contemplated attrition rate of general surgical residents in South African setting, a prospective descriptive study was performed by means of a confidential questionnaire self-distributed (by the principal investigator) to general surgical registrars, who had attended the 47th Surgical Research Society Meeting(SRS) and annual registrar symposium that was held at University of Pretoria in June 2019. Eighty general surgery registrars attended the meeting. There was a fair representation of registrars from the different medical schools. The SRS and Surgery symposium meeting took place over four days and data was collected during these four days.

2.2.5 Data Collection

An invitation to participate in a study was extended to all South African Surgical trainees attending the Registrar symposium and surgical research society (SRS) that was held at Pretoria in June 2019. An information sheet indicating that participation was voluntary, and data collected was confidential. The survey comprised socio-demographic questions and a 44-item questionnaire implementing a 5-point Likert scale response. A modified version of the survey used was developed by Yeo et al.^[11] at the Yale University School of medicine. Completion of the survey constituted implied consent. The protocol was approved by the Health Sciences Research Ethics Committee (HSREC) of the University of Free State.

The survey comprised socio-demographic questions and a 44-item questionnaire implementing a 5-point Likert scale response. Results were summarized by reporting responses on all survey items by all five response categories. Twenty-five illustrative items were selected for more detailed analyses on characteristics of interest. For ease of presentation, the five response categories were collapsed into three categories (strongly agree and agree, neutral, strongly disagree and disagree). We focused on the strongly agree/agree category and strongly disagree and disagree category and reported proportions of participants' responses on selected items. Tests were used to assess the association between registrars that have identified themselves as at risk of withdrawal and registrars not at risk of withdrawal from general surgery training programme, to get the overall attitude and satisfaction of these registrars.

2.2.6 Data analysis

Statistical analysis was performed using SAS software and (FREQ procedure) to determine statistically significance. The level of significance for all test was $P < 0.05$. Differences in outcome between categorical groups was analyzed using Chi – square or Fisher’s Exact Test if cell count is < 5 . Analysis of data was done by the University of Free State Biostatistics department.

2.2.7 Ethical consideration

An information sheet indicating that participation was voluntary, and data collected was confidential and University affiliation was not required to guarantee anonymity, was provided with each survey. Completion of the survey constituted implied consent. The protocol was approved by the Health Sciences Research Ethics Committee (HSREC) of the University of Free State.

Research was conducted after obtaining ethics approval from Health Sciences Research Ethics Committee (HSREC) of the University of Free State (UFS -HSD2019/0821/2506) and Approval from the chair of LOC Prof Montwedi.

2.3 RESULTS

The study participants were 54.7% males and 45.3% females. Their age arranged from 25 to more than 40 years of age. Majority of the participants were between the ages of 30-34 (64.4%), followed by those who were between 35-40 (20.0%), and then 10.7% who were between 25-29, and few were aged above 40 (5.3%). The majority of respondents were less than 40 years old (90%). With regards to marital status, the majority of the participants were married (50.7%) and 41.3% were single. Table 1 shows the graphical presentation of the study participants’ demographics. About 83% of the participants were beyond their second year of training

The findings showed that surgical trainees who are 30 and upwards were more likely to contemplate withdrawal from the training programme compared to those who are younger. When considering gender, we found that a slightly higher number of female surgical trainees had contemplated withdrawal from the training programme compared to their male counterparts. Our findings indicated that a high number of surgical trainees who indicated that they contemplated withdrawing from the training programme were married/living with their partners. Interestingly, we also found that of the 3 participants who were divorced, 2 of them contemplated withdrawing from the training programme. When considering children, our findings indicated that majority of the surgical trainees with children did not contemplate withdrawing from the surgical programme.

The findings reveal that age, gender, marital status and not having children are huge contributing factors to surgical trainees contemplating withdrawal from the surgical training programme.

Table 1: Shows the demographics of the study participants

Participant Characteristics		Frequency (%)		
		Total	Considered leaving training	
			Yes	No
Age	25–29	8	4 (9)	4 (13)
	30–34	48	30 (67)	18 (60)
	35–40	15	10 (22)	5 (17)
	>40	4	1 (2.2)	3 (10)
Gender	Male	41	20 (44)	21 (70)
	Female	34	25 (56)	9 (30)
Ethnicity	Black	49	20 (44)	29 (59)
	Colored	5	4 (80)	1 (20)
	White	16	10 (63)	6 (38)
	Indians	5	4 (80)	1 (20)
Year of study	1	5	1(20)	4 (80)
	2	8	4 (50)	4 (50)
	3	33	19 (58)	14 (42)
	4	20	13 (65)	7 (25)

	5	9	7 (78)	2 (22)
Marital Status	Single	31	17 (38)	14 (47)
	Married/ living Together	41	26 (57)	15 (50)
	Divorced/separated	3	2 (4)	1 (3)
Children	Yes	41	21 (47)	24 (53)
	No	34	35 (41)	50 (46)

Table 2 shows the rate of withdrawal contemplation among surgical trainees, the reasons for it and the stage in the training programme in which most surgical trainees contemplate withdrawing. The findings show that surgical registrars at risk of leaving had contemplated it mostly during their first and second year of training (74%). Notably, few (26%) of the participants indicated that they had considered leaving general surgical training during 3rd, 4th and 5th year. Moreover, the findings show that female registrars were significantly more likely to consider leaving training compared to males (56% vs 44%). Furthermore, registrars who are married or living with their partners, were also found to be more likely to consider leaving surgical training than those who are single (58% vs 42%). Interestingly, Registrars with children were less likely at risk (47%) than those without children (53%). Registrars that have identified themselves as at risk of withdrawal have considered leaving training programme in the last year (64.4%, $P = < 0.001$).

When looking at reasons we found that the most common reason for potential withdrawal was found to be poor lifestyle and quality of life during surgical training (38%), excessive working hours and workload /intensity (29%). High level of stress and anxiety was also a contributing factor for contemplating withdrawal (15%). Lack of support at work and home (12%). 3% of respondents stated racism as a reason for them to consider leaving surgical training.

Table 2: Tabulates the rate of withdrawal contemplation among surgical trainees, the reasons for it and the stage in the training programme in which most surgical trainees contemplate withdrawing.

CHARACTER	FREQUENCY	PERCENT
Have you considered leaving surgical training?		
Yes	45	60%
No	30	40%
If Yes, please indicate in what level of your training were you		
1st year	23	35%
2nd year	26	39%
3rd year	9	14%
4th year	5	8%
5th year	3	5%
Reasons for contemplating withdrawal		
Poor Lifestyle/ QOL during training	33	16%
Lack of support (work/home)	24	12%
Excessive working hours	35	17%
Job Satisfaction	6	3%
High level stress/anxiety/pressure	30	15%
Domestic or social reason/family commitments	13	6%
Financial or lack of job security	12	6%
Excessive workload/ work intensity	24	12%
To pursue training in another field or specialty	7	3%
Poor lifestyle/ QOL as a consultant	6	3%
Desire to travel	3	1%
Lack of flexible training/ work opportunities	7	3%
Racism/ bullying by colleagues and consultants	6	3%

Overall, about 65% n (49) of registrars were found to be satisfied with their training programme. However, trainees at risk of withdrawal felt less satisfied with their teaching programme than those

not at risk (53% VS 83%, $p = 0.02$). 64.4% of registrars that have identified themselves as at risk of withdrawal had considered leaving training programme in the last year $P = < 0.001$. Registrars at risk of withdrawal also felt not respected by their consultants (22%) and were also not looking forward to coming to work every day (32% vs 60%, $p = 0.05$). However most registrars regardless whether or not at risk of withdrawal were committed to completing surgical training (49% vs 51%, $p = 0.05$), and they really care about their patients, they enjoy operating, and they believe that their operative skills have improved (92%).

Table 3: Shows the attitude and satisfaction towards surgical training

Attitudes	Those that agree or strongly agree n* (%)			
	Total (n=75)	Thought of leaving surgical training		P-value
		Yes (n=45)	No (n=30)	
I am satisfied with my training programme	49 (65)	24 (53)	25 (83)	0.02

As a surgical registrar, my opinions are important	50 (67)	28 (62)	22 (73)	0.60
My training programme has support structures in place which provide me with someone to turn to when I am struggling	22 (29)	13 (29)	9 (30)	0.62
I feel I can turn to my consultants and senior colleagues when I have difficulties in my training	34 (45)	18 (40)	16 (53)	0.14
I look forward to coming to work every day	32 (43)	14 (32)	18 (60)	0.03
I am satisfied with the teaching in my training programme	43 (57)	22 (49)	21 (70)	0.04
I am satisfied with the operative experience in my training programme	51 (68)	28 (62)	23 (77)	0.36
I have considered leaving my training programme in the last year	31 (41)	29 (64)	2 (7)	<0.001
I do not feel respected by my consultants	13 (17)	10 (22)	3 (10)	0.08
I am happy when I am at work	37 (49)	19 (42)	18 (60)	0.29
I am given so much to do that I am afraid I will hurt someone	22 (29)	17 (38)	5 (17)	0.13

I feel that my operating skill is level appropriate	49 (65)	30 (67)	19 (63)	0.72
I worry that I will not feel confident enough to perform procedures by myself before I finish training	22 (29)	14 (31)	8 (27)	0.80
The hours I am working are causing a strain on my personal and family life	61 (81)	39 (87)	22 (73)	0.26
I get along well with my fellow registrars	60 (80)	33 (73)	27 (90)	0.17
My consultants will think worse of me if I ask for help when I do not know how to do a procedure	15 (20)	11 (24)	4 (13)	0.40
I really care about my patients	70 (93)	42 (93)	28 (93)	0.08
The personal cost of surgical training is not worth it to me	10 (13)	8 (18)	2 (7)	0.01
I feel that I fit in well in my training programme	40 (53)	20 (44)	20 (67)	0.09
I enjoy operating	72 (96)	42 (93)	30(100)	0.14
I get a tremendous amount of satisfaction working with patients	65 (87)	36 (80)	29 (97)	0.02

I am committed to completing my general surgical training	66 (85)	37 (82)	29 (97)	0.05
My operative experience so far has helped me develop my skills well	69 (92)	39 (87)	30 (100)	0.03
If I have a problem, I feel I can count on other registrars to help me out	52 (69)	33 (73)	19(63)	0.46
I worry about hurting patients	51 (68)	32 (71)	19 (63)	0.73

2.4 DISCUSSION

This study aimed to determine the contemplated attrition rate, reason for contemplating attrition and determine the overall attitude and satisfaction of general surgical registrars towards their training programme in the South African settings. Furthermore, we sought to understand if there were indicators that can be used to identify surgical trainees before the attrition. To our knowledge, this study is the first of its kind in South Africa.

Our study reports a 60% attrition contemplation rate among general surgical trainees' from eight different medical schools in South Africa. This rate is almost similar to the overall 54% rate of respondents who contemplated leaving surgical training in Keegan et al.^[12] study. Notably, our rate of attrition seems higher than reported in most other studies which is very concerning considering that South Africa already has a shortage of trained surgeons. A study by Schwed et al.^[5] reported an overall attrition rate of 8.8% among surgical trainees. Furthermore, a meta-analysis of 22 studies found that the international attrition rate in general surgery trainees is 18%, with over half of these being voluntary.^[13] An internal RACS evaluation of 2144 trainees embarking on the surgical education training (SET) Program from 2008 to 2014 identified 337 individuals (15%) who did not finish the program, either because of dismissal, failure at hurdle

examinations or choice.^[4] Moreover, our attrition rate is also higher to the one reported by Yeo and his colleague, where they reported an attrition rate of 20.8%.^[14]

The findings show that surgical registrars at risk of leaving had contemplated it mostly during their first and second year of training (74%). Our findings are in agreement with what has been reported by Yeo et al.^[8, 9, 15] Similarly, this has also been reported by Shweikeh et al.^[16] who reported that surgical trainees most often drop out in their first two years of surgical training. Withdrawal of surgical trainees in their second year of studies is also reported in a study by Shweikeh and colleagues who found that majority surgical trainees who withdrew did so in the first and second year of study.^[5] Lastly, these findings are also similar to Yeo and associates, who found an attrition rate of 67.6% at the first year of study among surgical trainees.^[14]

We found that female surgical trainees were more likely to consider withdrawing from surgical training compared to their male counterparts. Our findings are in agreement with findings by Bergen et al who reported that women were 2.26 times more likely to voluntarily withdraw from general surgical training than men, and this was predominantly due to family commitments or health reasons.^[17] Similarly, the study by Dodson et al. reported attrition rates for females as being double that for males.^[18] Our findings are not surprising as it has been reported by others gender plays a role in whether training will be completed or not by female surgical residences.^[13, 17, 19, 20] Peters et al. argued that there are various reasons as to why women drop out from surgical training which most of the time does not include just dropping out to go and have babies.^[21] Notably, it is reported that women are more likely to do withdrew from the time extensive and high workload surgical training in order to maintain a workload balance.^[22]

When considering age, our findings indicated that a high number of surgical trainees who contemplated withdrawing for surgical training were above 30 years of age. Suggesting that age is also a contributing factor contributing to attrition. Our findings are in agreement with the study that reported that physicians under the age of 55 are more likely to suffer burnout which contributes to the risk of attrition.^[23, 24] Concurrently, we also found that surgical trainees who are married and/or living with their partner, and those that have no children have contemplated attrition more compared to their counterparts. It is plausible to suggest that the reason for attrition was to seek a work-life balance, as indicated by other studies.^[25-27] This may also be due to the fact that surgical training involves long working hours which then affect the family time and lifestyle.^[10, 13, 28]

Furthermore, these findings are also in agreement with a 2005 study by Dodson and associates who found that 65% of residents who left their programmes withdrew from training for 'lifestyle' reasons.^[18] This is also in agreement with an American study by Morris et al. and Kelz et al.^[29] where poor lifestyle was given as the most common reason for voluntary resignation from surgical training. Long hours and a high volume of workload affect lifestyle severely since it also lead to burnout, which has been reported as the main reason for withdrawal.^[30-32]

We found that the most common reason for potential withdrawal was found to be poor lifestyle and quality of life during surgical training (38%), excessive working hours and workload /intensity (29%). This is in agreement with other studies that have reported excessive long hours and workload as the contributing factor to attrition.^[13, 27] Excessive working hours and workload can be contributing factors to high level of stress and anxiety which can in turn further exacerbate the contemplation for withdrawal among surgical trainees. We also found other leading factors to be lack of support at work and home. Our findings are similar to those reported by others where lack of support affected their decision to withdraw.^[25, 27, 33] These findings suggest that attrition rate can be reduced if an intervention can include supportive strategies in place in their work place, but also find a way to maintain the work life balance. Furthermore, high workload and excessive hours can result in burnout, which has been reported in several studies to contribute to high attrition rates.

Regarding attitude and satisfaction towards the training program, in our study we have found that about 65% of registrars were satisfied with their training programme. This is contradictory to the studies which reported that attrition is also due to trainees feeling dissatisfied with their training programme.^[26, 31, 33-36] Our findings are also contrary to the findings of the study conducted by Patel et al.^[37] on general surgical training in South Africa. The study showed that only 31.4%, 41.9% and 37.1% of surgical registrars' trainees were satisfied with the exposure to minimally invasive surgery, the extent of formal academic teaching, and supervision levels during theatre procedures.

64.4% of registrars that have identified themselves as at risk of withdrawal has considered leaving training programme in the last year. Registrars at risk of withdrawal also feel not respected by their consultants (22%) and are also not looking forward to coming to work every day (32% vs 60%, $p = 0.05$). However most registrars regardless whether or not are at risk of withdrawal are committed

to completing surgical training (49% vs 51%, $p = 0.05$), and they really care about their patients, they enjoy operating, and they believe that their operative skills has improved.

The study limitations are that we only included surgical trainees that attended the 47th SRS and registrar symposium meeting, hence the ones who did not attend were left out. The study also did not include hospital managers and the people responsible for running the surgical registrars training programmes. The study also did not ask for the reasons of why the participants enrolled in the programme in the first place, understanding the various reason for enrolment can help shed light into the risk of attrition.

2.5 Recommendations

The findings indicate that thoughts of leaving training occur before decisions are made to actually leave these programs; therefore these findings should be viewed as an opportunity to address factors that lead to higher attrition rates in general surgery residency and to develop interventions that can prevent this tremendous loss. Furthermore, the department of health can use these programs to also develop remediation programmes that can help reduce attrition rates. Future studies can include the surgeons who are conducting the trainees and hospitals supervisors, to understand their perspective in order to come up with an effective intervention programme. It will also be beneficial to investigate or include registrars who have left training to get the exact reasons behind their decision to leave this noble art.

2.6 Conclusion

The study concludes that attrition is a very serious public health problem that needs immediate attention and effective intervention strategy. Prioritizing this matter is of particular importance as it can affect the rollout on universal health coverage due to skilled surgical staff. In closing, it is crucial that residency programs improve their ability to identify those general surgical trainees contemplating withdrawing and intervene. This may play a role in retaining general surgical trainees in the long run and improve health delivery and health outcomes.

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APPENDECES

A. Letter of Approval from HOD and Departmental Research Health Committee.



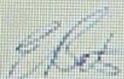
MASTER OF MEDICINE

This is to certify that the Departmental Research Meeting approved of the following MMed research protocol:

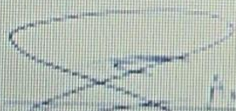
DATE OF MEETING	22/03/2019
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SUPERVISOR	DR ARKO COBBAN
CO-SUPERVISOR	

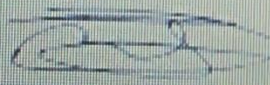
TITLE OF THE RESEARCH PROJECT
Risk assessment for withdrawal from Surgical Training in South African Academic Institutions.


RESEARCH CHAMPION

06/05/2019
DATE

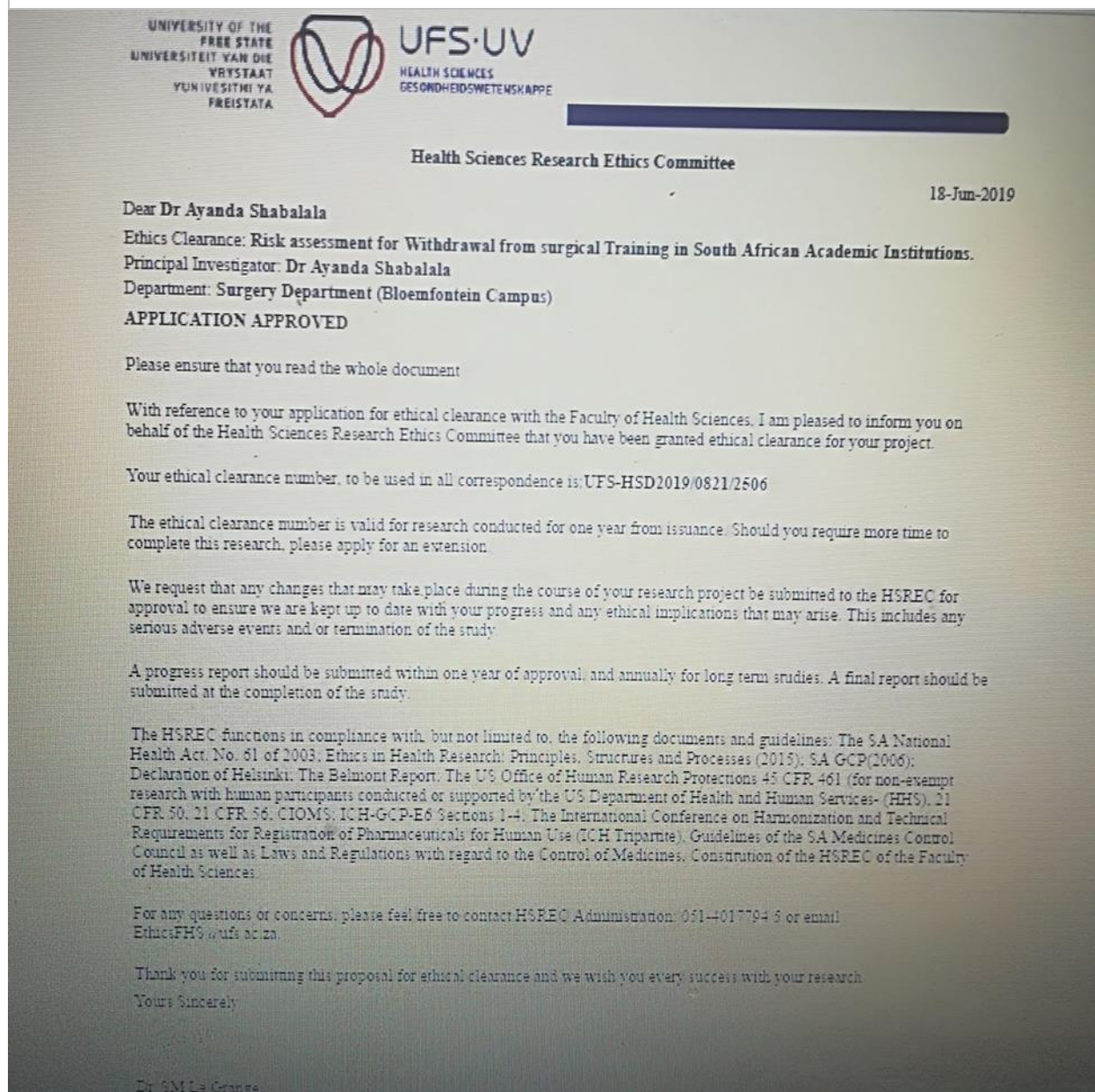

SUPERVISOR(S)

07/05/2019
DR NE PEARCE
DATE

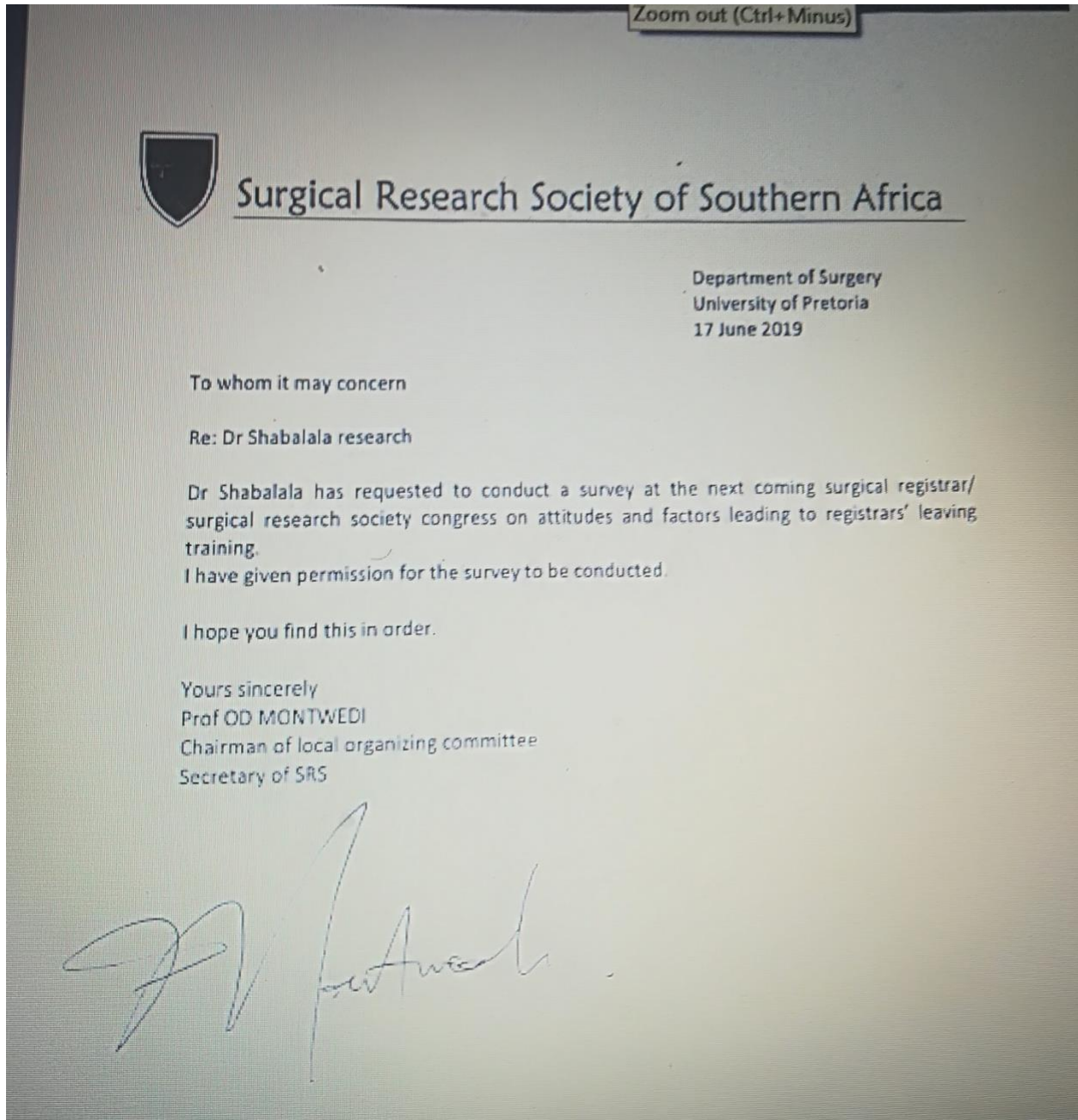

HEAD OF THE DEPARTMENT

06-05-2019
DATE

B. Letter of Approval from HSREC



C. Letter of approval to distribute questionnaires at SRS meeting



D. Participant's information form and consent form



INFORMATION DOCUMENT

Good day.

I, Dr Ayanda Shabalala is doing research on Assessing risk from leaving surgical training before completing training and reasons contributing to this decision, as well as attitude of surgical registrars towards their training programme.

Study title:

Risk assessment for Withdrawal from surgical Training in South African Academic Institutions. Ethical clearance number: UFS-HSD2019/0821/2506

I am doing this research to examine both the satisfaction and attitudes of South African surgical registrars towards their training programme and to assess the number and characteristics of registrars at risk of leaving or withdrawing from their training.

THIS IS AN INVITATION TO PARTICIPATE IN THE STUDY.

What is involved in participation: Participation involves completion of an anonymous questionnaire that is administered to you. Questionnaire is in English since this is a language medium of instruction in South African medical institutions. Questionnaire should be completed to the best of your ability and as truthfully as possible. Assistance with completion of the questionnaire will be readily available if needed.

Please note that the participation implies consent or that you are voluntarily agreeing to participate in the research study.

Risks: This questionnaire is anonymous and at no point requires you to provide any identifying information on any of the pages. Your data will always be treated confidentially. There are no risks regarding or associated with participating in this study.

Benefits: The information provided to the researcher through this questionnaire will allow him to make recommendation regarding identifying surgical registrars at risk of withdrawing from their training. Results of this study will be of great value in terms of workforce planning, development and surgical education reformation. This study will help identify reasons why surgical registrars are leaving their training before completing their studies.

The focus is to change this “dogma” that surgical registrars are amongst the unhappiest registrars. Information obtained from this study will help researcher make recommendations about ways of improving registrar education programme and improving the overall quality of life of the surgical registrar. This is, after all, the primary goal of this research., to improve the quality of life of a

future surgeon, by finding ways to decrease stressors and difficulties encountered during the 4 or 5-year surgical training. By identifying registrars at risk of withdrawing and reasons for leaving, we will be able to start considering how the modifiable risk factors for attrition can be addressed.

Information provided will be utilised to come up with coping strategies to be used by surgical trainees. Research will help to come up with strategies that will improve factors associated with the complexity of surgical life. We will be able to come up with programmes and intervention to prevent voluntary withdrawal, and to produce a happy well-trained surgeon who trained under favourable conditions and who has a balanced happy life (**improving work-life balance**). Surgical registrar time should no longer be the cause of unhappy families. Attrition should be defeated.

Participation is voluntary, and refusal to participate will result in no punitive action or loss. You may discontinue participation at any time and request that your incomplete/complete questionnaire be excluded from the study.

There is no cost payable by you to participate in this study.

Participants will receive no remuneration.

Confidentiality: The questionnaire does not require you to provide any identifying information and anonymity is guaranteed. Once the questionnaire is complete the researcher will place it in the box. After the data is captured and analysed, the questionnaire will be kept in a safe manner/ place for a period of at least 5 years.

Data will be analysed by the biostatistics department of the University of Free state and individual questionnaire may be inspected by the Health Sciences Research Ethics Committee (HSREC) of the University of Free State.

The report and results of this study will be presented at our Faculty Forum, as well as the next SRS-meeting, and will hopefully be published in locally and / or internationally peer reviewed journals as part of MMed in General Surgery and may be requested from the researcher after the report is complete.

Thank you for your participation in this study.

Contact details of researcher

Dr Ayanda Shabalala

General Surgery registrar

University of Free state

0829208826

Shaba2000@webmail.co.za

Contact details of the **Health Sciences Research Committee (HSREC), UFS**

051 4017794/5

E. Forms for collecting data = Questionnaire

1. Participant demographics

AGE	25 – 29	
	30-34	
	35-40	
	>40	
SEX		
ETHNICITY/RACE		
YEAR OF SURGICAL TRAINING.	1	
	2	
	3	
	4	
	5	
MARITAL STATUS	Single	
	Married	
	Divorced	
	Living together	
DO YOU HAVE CHILDREN	YES / NO	
	If YES , how many? <====> Do u plan on having more YES / NO Do you plan to have one during your training? =====> YES / NO	

2. Attitude and satisfaction: Select the single appropriate answer per question applicable to you. **MARK WITH AN X / TICK THE BOX.**

QUESTION	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Overall, I am very satisfied with my program					
As a surgical registrar, my opinions are important					
The program has support structures in place which provide me with someone to turn to when I am struggling					
To be a good surgeon you must give up sensitivity					
I feel I can turn to members of the faculty when I have difficulties with the program					
I feel I can turn to members of the faculty when I am struggling with how to treat a patient					
I look forward to coming to work everyday					
I am satisfied with the academic teaching in my program					
I am satisfied with the operative experience in my program					
I have considered leaving my program in the last year					
I do not feel respected by my consultants					
I am happy when I am at work					
Surgical training is too long					
I often feel that” I am in over my head”					
I am uncomfortable with some of the ethical decisions I see some consultants make					

I am given so much to do that I am afraid I will hurt someone					
QUESTION	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I feel that my operating skill is level appropriate					
I worry that I will not feel confident enough to perform procedures by myself before I finish training					
I am not happy with the personality that I must have to become a good surgeon					
The hours I am working are causing a strain on my family life					
The stress of my work is causing a strain on my family life					
My consultants will think worse of me if I ask for help when I do not know how to do a procedure					
My consultant will think worse of me if I ask for help when I do not know how to manage a patient					
I really care about my patients					
I worry about performing badly in front of my consultants					
I worry about performing poorly in front of my senior registrars and fellows					
The personal cost of surgical training is not worth it to me					
I get along well with my fellow registrars					
I get a tremendous amount of satisfaction working with patients					
I feel that I fit in well at my training program					

I am committed to completing my surgical training					
I enjoy operating					
QUESTION	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I worry about hurting patients					
My operative experience so far has helped me develop my skills well					
If I have a problem, I feel I can count on other registrars to help me out					
I worry that the field of my surgical specialty is going to become obsolete (outdated) (old fashioned).					
I worry that other medical professionals will take over some of the procedures that I do					
The modern surgeon must be specialty trained in order to become successful					
I will need to complete additional specialty training after I complete my surgical training in order to be competitive in the job market					
If I complete specialty training, I will have a better income					
If I complete specialty training, I will have a better lifestyle					
Surgeons do not make as much money now as they used to					
I worry about the high cost of malpractice insurance					
One of the factors that influenced my decision to be a surgeon was the expectation of good financial compensation					

3. Have you ever considered leaving surgical training?

YES	NO
------------	-----------

If **YES**, please indicate in what **LEVEL** of your training were you?

1	
2	
3	
4	
5	

If **YES**, please indicate by marking the **PRIMARY** factor/s contributed or is contributing to your reasons.
→ MORE THAN 1 OPTION CAN BE SELECTED

REASON	
Poor lifestyle / QoL during training	
Lack of support (home /work)	
Excessive working hours	
Job dissatisfaction.	
High level stress/anxiety/pressure	
Domestic or social reason/family commitments	
Financial or lack of job security	
Excessive workload/ work intensity	
To pursue training in another field or specialty	
Poor lifestyle / QOL as a consultant	
Desire to travel	

Lack of flexible training/ work opportunities	
ANY OTHER REASONS/ COMMENTS	

F. Copy of research protocol approved by HSREC



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



Principal researcher:

Dr Ayanda Shabalala
Department of General Surgery
Faculty of health sciences
University of Free State

Supervisor:

Dr Emmanuel Arko-Cobbah
Department of General Surgery
Faculty of health sciences
University of Free State
Consultant and subspecialist in general surgery and Trauma

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Introduction

Background:

The demands of becoming and being a surgeon are significant; they impact the individual's sense of wellness, potentially leading to imperfect learning within surgical education and training, as well as the impaired quality of surgical health care. Attrition during surgical training is a critical issue, as the loss of a training registrar represents a waste of resources and effort as well as having implications for future workforce planning¹.

Literature review regarding attrition and reasons contributing to it.

The literature regarding the rate of attrition from surgical training is limited, and there have been no studies in South Africa concerning either the incidence of attrition or the reasons contributing to it. **Attrition** is defined as a decrease in the surgical workforce due to all causes, including voluntary withdrawal, transfer to other programmes or dismissal². In the US, several studies have reported trainee attrition rates (including all trainees who have left or been dismissed for any reason), with consistent figures of 17–30%³. In Australia and New Zealand, the withdrawal rate for general surgical trainees during the 5 years from 2010–2014 was found to be 5.9% (with 5.8% for male trainees, and 6.2% for female trainees) due to personal reasons or transfer to another specialty⁴. These figures did not include trainees who were dismissed from training.

A meta-analysis of 22 studies found that the international attrition rate in general surgery trainees is 18%, with over half of these being voluntary⁵. Within the Australian and New Zealand context, the Royal Australasian College of Surgeons (RACS) has assessed attrition rates. An internal RACS evaluation of 2144 trainees embarking on the surgical education training (SET) Program from 2008 to 2014 identified 337 individuals (15%) who did not finish the program, either because of dismissal, failure at hurdle examinations or choice. 45 recommenced with the same or another specialty. Of the remaining 292, some 56% chose to leave (resigned), with women 2.5 times more likely to resign⁶.

To investigate the reason behind such major career decisions, RACS commissioned an external group with medical education expertise to design and conduct a survey and interview study of the group. Eighty respondents out of the 162 who chose to leave (resigned) responded. This was a significant response (one-half) from doctors who were no longer involved with the SET program. Their reasons were cumulative and varied. For most, there was a significant amount of time between considering and ultimately leaving training. Three major themes were identified: (i) inflexibility in the training programmes; (ii) an unacceptable culture in which to learn; and (iii) having commenced surgical training, surgery was judged the wrong career choice¹.

A 2005 study by Dodson et al considered reasons for attrition and found that 65% of residents who left their programmes withdrew from training for 'life-style' reasons⁷. It has been reported previously that gender may play a role in attrition. In the US, Bergen et al reported that women were 2.26 times more likely to voluntarily withdraw from general surgical training than men, and this was predominantly due to family commitments or health reasons¹. Similarly, the study by Dodson et al reported attrition rates for females as being double that for males (27% vs 13%).

However, a comprehensive study of 6,303 US trainees by Yeo et al found no gender difference in attrition rates. This same study found that the only independent predictor of attrition was postgraduate year level, with the highest rates in the first and second years of specialty training^{6,7,10}.

The study conducted by Christopher Young and partners in 2013 found that locally educated registrars (those completing their medical education in same university that they did their MBCHB) were at a significantly higher risk of attrition than their counterparts who underwent medical training overseas. Locally trained general surgical registrars are at a higher risk of withdrawal during their training programme for several reasons. The reasons for this trend are not entirely clear, but may be related to different expectations and perceptions, as well as the fact that international trainees have often chosen to move to Australia (**particularly from more disadvantaged nations**) and therefore may be more committed to completing training and more willing to accept the challenges that training presents. They have usually made a significant financial sacrifice to go through the Royal Australasian College of Surgeons International Medical Graduate pathway, and this, coupled with the associated sequelae, is likely a significant driving force against consideration of withdrawal^{7,10}.

Few studies have considered the factors contributing to a trainee's decision to leave. It is perceived that attrition is the result of the highly demanding and stressful climate that trainees and their families endure in the postgraduate years. It has been demonstrated that dissatisfied physicians are 2 to 3 times more likely to leave medicine than those that are satisfied^{5,7}.

In 2014, the Royal Australasian College of Surgeons identified, through internal analysis, a considerable attrition rate within its Surgical Education and Training programmes. Within the attrition cohort, choosing to leave accounted for the majority. Women were significantly over-represented. It was considered important to study these 'leavers' if possible. A systematic review of qualitative studies assessing what it means to be a surgeon revealed a gap between the idealization that surgeons are highly skilled professionals and the reality of a typical working day^{5,8,9,10}.

Orri et al. identified that the emotional and relational dimensions of surgical practice can contribute to an individual's internal tensions. Ignoring these dimensions of surgery, or not adequately preparing trainees to deal with them, may result in individual's questioning whether surgery is a career for them and, for some, to make the decision to leave surgery⁹.

Burnout is by far the major contributor for attrition as demonstrated in many studies: Burnout is defined as emotional exhaustion, depersonalization and a decreased sense of personal accomplishment that can distort career decisions, impact well-being, negatively affect patient care and may contribute to a decision to leave surgical training. The incidence of burnout in surgical trainees across specialties ranged from 28% to 69%, and over half of those classified with burnout considered dropping out of training^{8,9,10}.

Factors found to be associated with burnout in surgical trainees included high workload and working hours, difficulty in balancing professional and private life and not taking part in extracurricular activities^{9,8}.

Other important factors included patient aggression, lack of gratitude from seniors, being assigned a level of responsibility perceived to be too high, working in units where senior surgeons did not support trainees or their patient care, working in units where regular staff meetings were not scheduled, perceiving patient expectations to be unrealistic and poor peer collaboration^{7,8}.

Lifestyle as a trainee: In 2017, Khoushhal et al. meta-analyzed 10 studies that reported reasons for attrition. This included a total of 10 371 general surgery trainees from the United States, and the most common cause of voluntary attrition was found to be an uncontrollable lifestyle¹¹. Another study of 2033 general surgery trainee, not included in Khoushhal et al.'s meta-analysis, also reported lifestyle factors, including the strain of work, excessive hours and the stress it puts on family life, as the most significant reasons for withdrawal¹².

Health and personal considerations: Health and personal considerations identified by Khoushhal et al. included trainee's own health, family or spousal factors, financial burden, poor performance and imminent dismissal¹¹.

Sullivan et al. found that trainees who withdrew from training considered training to be too long, expressed dissatisfaction with the personality required to become a good surgeon and felt the personal cost of surgery was too great. In addition, those who left training were less satisfied with their operative experience, felt their skills were not level appropriate, reported feeling 'in over their head' and that their work volume left them fearful they would hurt someone. Overall, the trainees who withdrew were dissatisfied with the training programmes and felt they were not the correct fit for surgery¹³.

Inability to ask for support: Sullivan et al. report that those who left training were less likely to ask their peers for help for fear of negative judgement; they perceived a lack of respect from attending physicians, were less likely to interact with attending physicians (consultant surgeons) socially, did not report having camaraderie with their peers and felt they could not rely on other trainees for support when needed¹³.

Ginther et al. found that the most significant factors associated with thoughts of leaving was poor work-life balance (71%), concerns about future unemployment or underemployment (46%) and poor quality of life (44%)¹⁴. Furthermore, Gifford et al. identified sleep deprivation (50%), undesirable future lifestyle (47%) and excessive work hours (41.4%) as the reasons trainees considered leaving training¹⁵.

In addition, both the Ginther et al. and Gifford et al. studies investigated factors that prevented surgical trainees from leaving, effectively supporting the completion of the surgical programmes. In both studies, the most significant factor that prevented trainees leaving was support from family or partners (14% of responders and 65% of responders)^{14,15}. Other reported reasons for not leaving included enjoyment of work (42%), having invested too much time to quit (34%), support from other trainees (64%) and the perception of being better rested (59%)^{13,14,15}. It is important to note that, despite considering leaving throughout their training period, many trainees will go on to become successful surgeons¹⁴.

Factors associated with the complexity of surgical life

Orri et al.'s meta-synthesis of surgeons' perspectives about factors affecting their practice and well-being included 51 studies that documented over 1000 surgeon interviews. This review identified the following themes of a career in surgery that trainees may not be aware of prior to commencing surgical training¹⁰.

Surgeon image and identity: The importance of upholding a certain image and identity was reported by the surgeons interviewed as not being addressed in their education. Surgeons reported feeling the vulnerability of their professional identity given that it was so strongly linked to their surgical outcomes^{9,10}.

Can trainees considering leaving be identified?

Given what is known about the reasons for leaving or considering leaving, as well as the insight from the work by Orri et al., is it possible to predict the characteristics of surgical trainees who are most at risk of attrition¹⁰?

A prospective National Study on the Expectations and Attitudes of Residents in Surgery was initiated in 2007 across the United States and was designed to identify characteristics that may predict which trainees are most at risk of non-completion. All postgraduate year one trainees took part in a 68-item survey that focused on questions regarding demographics, choice of residency programmes, expectations for surgical training and personality. Of the 1048 general surgery interns who began training in 2007, over 80% participated. Linkage data were available for 836 of these interns, and 672 went on to complete residency. The survey identified that the female gender was the independent risk factor most strongly associated with attrition, with women being 1.4 times more likely to leave training. For men, the most important predictor of attrition was training programmes size, with 23% of men withdrawing from larger programmes compared with 16% from smaller programmes¹⁶.

Quillin et al. investigated whether there is a link between learning style and attrition. They examined a 14-year database of surgical trainee learning style assessments, along with operative log data, examination results and reasons for leaving surgical training before completion. Individual learning styles were assessed using the Kolb Learning Style Inventory (LSI), which is a validated, self-assessment tool. Individuals were categorized by learning style, and a total of 441 LSIs were completed by 126 trainees during the study period (1999–2012). The authors characterized the learning styles of general surgery trainees, finding that the majority were action-based learners. Those at most risk of attrition were trainees who the inventory suggested learned by observation. In addition, these individuals had a less robust operative experience as they were rated less 'hands on'¹⁷.

Workforce modelling has predicted that unless there is a substantial increase in the number of graduating surgeons, South Africa will face a surgical workforce crisis. Surgical workforce in South Africa is currently insufficient in being able to meet the burden of surgical disease in the country. It is estimated that at least 150 surgeons per year need to graduate for adequate access to surgical care to be provided to the entire population. Currently approximately 70 surgeons are produced per year in 8 South African academic institutions. South African surgical registrar programs are facing multiple pressures, including attracting and retaining registrars¹⁸.

Attrition in surgical trainees presents a significant concern for all those involved in surgical education and training as well as workforce planning. The current 4 or 5-year training programme entails commitment and sacrifice on behalf of the trainee, and there is no doubt that the stressors and difficulties encountered during these years will leave some trainees questioning whether they can complete their surgical education. Unless something is done about the current situation, the future of South African surgeons is in danger. We need to listen to the concerns of current surgical registrars and find ways to improve the quality of their training to ensure we have not only adequate numbers for our future surgical workforce, but a cohort of surgeons who have enjoyed their training experience and will strive to create a similar one for their own trainees in the future. Withdrawal from surgical training is costly and undesirable for both individuals and programmes. Surgical trainees use various strategies to help them to cope with the demands of their intensive training and choosing to leave is the strategy used by some. It is important that surgical colleges and programmes develop a culture whereby trainee work–life balance and well-being are promoted. Interventions that foster this, as identified from the literature, include the provision of stress identification and management strategies to all surgical trainees through their curriculum.

Aim:

To examine both the satisfaction and attitudes of South African surgical registrars towards their training programme and to assess the number and characteristics of registrars at risk of leaving or withdrawing from their training.

Research question

1. Who are surgical registrars at risk of withdrawing from training? Or profile of surgical registrars at risk of withdrawing from their surgical training.
2. Why do surgical registrars leave their training?
3. What is the attitude of South African registrars towards their training?

Methodology:

Study Design

A descriptive, prospective study design will be used.

Population and Sample

General surgical registrars

Inclusion Criteria

Only general surgical registrars attending the upcoming Registrar Symposium and Surgical Research Society (SRS)-meeting in Pretoria will be targeted. During these meetings there are usually a fair representation of registrars from different medical schools.

Exclusion Criteria

None except those:

- Registrars who opt-out of the study
- Registrars who do not complete the survey
- Registrars who do not consent

SAMPLING CONVENIENT

This study will be conducted at the Registrar Symposium and the SRS-meeting. These meetings are organized by the same people, namely the Local Organizing Committee (LOC). These meetings are major meetings that most surgical registrars attend. Permission to distribute questionnaire during these upcoming Registrar symposium and SRS - meetings will be obtained from the Chair of the Local organizing committee Prof Daniel Montwedi of the university of Pretoria. SASSiT representatives has agreed to help me distribute the questionnaires during these meetings, **after obtaining ethics approval from Health Sciences Research Ethics Committee (HSREC) of the University of Free State and Approval from the chair of LOC Prof Montwedi.** Most of South African medical universities are well represented in these meetings and many surgical registrars will be present and will be invited to participate in the study. Registrar symposium is an annual event and it will be done over 2days. Surgical Research Society meeting will also run for 2 days.

TOOL/ MATERIAL

An invitation to participate in a study will be extended to all South African Surgical trainees attending the upcoming Registrar symposium and Surgical research society (SRS) that will be held in Pretoria in June 2019, after obtaining ethical clearance.

The survey comprised **socio-demographic questions** and a **44-item questionnaire** implementing a 5-point Likert scale response.

Modified version of survey developed by Yeo et al at the Yale University School of medicine.

Validity of the Tool to be used

Professor Christopher J Young,
Senior Consultant Colorectal Surgeon

Royal Prince Alfred Hospital and the University of Sydney, Australia.

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 has been used in many studies with great success. This will be the first study of this kind to be conducted in South Africa.

Primary outcome

This will be established by determining how many participants will respond affirmative to the question, “Have you considered leaving surgical training?”

The secondary outcomes

Will be to investigate reasons for leaving surgical training and to explore satisfaction and attitudes towards surgical training.

1. Firstly, respondents who will identify themselves as being at risk of withdrawal will be asked whether 12 factors influenced their decision to leave surgical training.

⇒ These 12 factors will be presented as a list of common concerns formulated by the authors based on previous experience with surgical trainees who had left or thought about leaving surgical training.

2. Secondly, all respondents will be asked to rate 44 statements regarding attitudes towards surgical training on a five-point Likert scale (strongly agree–strongly disagree). Analysis will be performed to determine statistically significant differences between at risk and not at-risk groups.

Time projection

	May 2019	June 2019 to February 2020	March 2020	June 2020
Ethics approval	❖			
Data collection		❖		
Data analysis			❖	
Writing research paper				❖

Statistical analysis:

Descriptive statistics and content analysis will be used to analyse data. Analysis for answers will be performed using content analysis and quantitative data that will be entered Microsoft excel to generate descriptive statistics.

Biostatistical approval was obtained from the Department of Biostatistics of the University of the Free-State, and they will be doing the analysis.

Approval letters required before conducting the study:

Consent for the conduction of the research will be obtained from:

1. The local Ethics Committee → Health Sciences Research Ethics Committee (HSREC) of the University of Free State.
2. Dept of Surgery → Letter Signed by the HoD, Study supervisor and the research champion.
3. Free State department of health.
4. The chair of Local organising committee (LOC) for the upcoming Registrar symposium and SRS – meeting.

Ethical aspects

- ✓ Participant's consent

After providing an explanation for the purpose and the nature of the study, an informed consent will be obtained from the participant, who accept to participate in the study. The researcher will assure the participant that participation in the study is voluntary and the anonymity and confidentiality of their responses is assured Participant's right will always be respected. Consent from participants will be implicated by filling in the anonymous questionnaire. Completion of questionnaire constitutes informed consent. Questionnaire is anonymous and at no point requires the participant to provide any identifying information on any of the pages. Once the questionnaire is complete the researcher will place it in a box that will be created by the researcher and kept in a very safe manner.

Data capturing sheet:

The data collected will be inserted into pre-designed data capturing sheet. The data capturing sheet will be compiled and filled in by the researcher. The data will be analysed by Biostatistics Department of the University of the Free state, and individual questionnaires may be inspected by the Health Sciences Research Ethics Committee (HSREC) of the University of Free State. all research data will be kept safe for at least 5 years.

Amendments of Protocol

This protocol will be strictly adhered to. The researcher will inform the ethics committee, in writing if any amendment to the research is planned.

Presentation and publication of findings

Findings will be presented at our Faculty Forum, as well as the next SRS-meeting, and will hopefully be published as part of MMed in General Surgery.

Financial

Budget of the proposed project is outlined below, and cost will be carried by the principle researcher.

Stationary	R400
Printing and binding	R1000
Internet data	R600
Transport	R500
TOTAL	R2500

Pilot study

The pilot study will be performed on 5 plastic surgery registrars of the University of Free state, before the upcoming Registrar symposium and SRS meeting in Pretoria to check and ensure clarity, applicability and feasibility of the tools and to identify the difficulties that may be faced during their application. Data collected from the pilot study will not be included in the final study. This will be done after obtaining ethics approval to conduct the study.

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G. Full Author Guidelines for the South African Medical Journal (SAMJ)

Author Guidelines

The *SAMJ* has launched a new submission and tracking system. Authors will be required to register a profile on the Editorial Manager platform in order to submit a manuscript.

To submit a manuscript, please proceed to the *SAMJ* Editorial Manager website:

www.editorialmanager.com/samj

To access and submit an article already in production, please see the guidelines [here](#).

Author Guidelines

Please view the [Author Tutorial](#) for guidance on how to submit on Editorial Manager.

Please take the time to familiarise yourself with the policies and processes below. If you still have any questions, please do not hesitate to ask our editorial staff (tel.: +27 (0)21 532 1281, email: submissions@hmpg.co.za).

[SAMJ policies](#)

- [Types of articles considered by the SAMJ](#)
- [Article Processing Charges](#)
- [Authorship](#)
- [Conflict of interest](#)
- [Research ethics committee approval](#)
- [Clinical trials](#)
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SAMJ Policies

Type of articles considered by the SAMJ

The *SAMJ* will no longer limit the articles accepted to those that have 'general medical content', but is intending to capture the spectrum of medical and health sciences, grouped by relevance to the country's burdens of disease. This content will include research in the social sciences and economics that is relevant to the medical issues around our burden of disease. Please see '[A new vision for the SAMJ – and a call for papers](#)' for a full discussion of the new directions for the *SAMJ*.

We accept the following types of articles:

[Research](#)

[Reviews](#)

[Clinical trials](#)

[Editorials](#)

[In Practice](#) (Previously Forum incl. Case Reports)

[Correspondence](#)

[Obituaries](#)

[Book reviews](#)

[Ad hoc supplements](#) e.g. guidelines, conference/congress abstracts, Festschrifts*

The following articles are by invitation only:

Guest editorial

Continuing Medical Education (CME)

*Contact claudian@hmpg.co.za for information on submitting ad hoc/commissioned supplements, including guidelines, conference/congress abstracts, Festschrifts, etc.

Publication Fees

All articles published in the *South African Medical Journal* are open access and freely available online upon publication. This is made possible by applying a business model to offset the costs of peer review management, copyediting, design and production, by charging a publication fee of R5 565 (ex vat) for each research article published. The charge applies only to **Research** articles submitted after 1 March 2017. The publication fee is standard and does not vary based on length, colour, figures, or other elements.

When submitting a Research article to the *SAMJ*, the submitting author must agree to pay the publication fee should the article be accepted for publication. The publication fee is payable when your manuscript is editorially accepted and before production commences for publication. The submitting author will be notified that payment is due and given details on the available methods of payment. Prompt payment is advised; the article will not enter into production until payment is received.

Queries can be directed to claudian@hmpg.co.za.

Please refer to the section on 'Sponsored Supplements' regarding the publication of supplements, where a charge is applicable. Queries can be directed to dianes@hmpg.co.za or claudian@hmpg.co.za

Authorship

Named authors must consent to publication. Authorship should be based on: (i) substantial contribution to conceptualisation, design, analysis and interpretation of data; (ii) drafting or critical revision of important scientific content; or (iii) approval of the version to be published. These conditions must all be met (uniform requirements for manuscripts submitted to biomedical journals; refer to www.icmje.org)

If authors' names are added or deleted after submission of an article, or the order of the names is changed, all authors must agree to this in writing.

Please note that co-authors will be requested to verify their contribution upon submission. Non-verification may lead to delays in the processing of submissions.

Author contributions should be listed/described in the manuscript.

Conflicts of interest

Conflicts of interest can derive from any kind of relationship or association that may influence authors' or reviewers' opinions about the subject matter of a paper. The existence of a conflict – whether actual, perceived or potential – does not preclude publication of an article. However, we aim to ensure that, in such cases, readers have all the information they need to enable them to make an informed assessment about a publication's message and conclusions. We require that both authors and reviewers declare all sources of support for their research, any personal or financial relationships (including honoraria, speaking fees, gifts received, etc) with relevant individuals or organisations connected to the topic of the paper, and any association with a product or subject that may constitute a real, perceived or potential conflict of interest. If you are unsure whether a specific relationship constitutes a conflict, please contact the editorial team for advice. If a conflict remains undisclosed and is later brought to the attention of the editorial team, it will be considered a serious issue prompting an investigation with the possibility of retraction.

Research ethics committee approval

Authors must provide evidence of Research Ethics Committee approval of the research where relevant. Ensure the correct, full ethics committee name and reference number is included in the manuscript.

If the study was carried out using data from provincial healthcare facilities, or required active data collection through facility visits or staff interviews, approval should be sought from the relevant provincial authorities. For South African authors, please refer to the guidelines for submission to the [National Health Research Database](#). Research involving human subjects must be conducted according to the principles outlined in the Declaration of Helsinki. Please refer to the National Department of Health's guideline on [Ethics in Health research: principles, processes and structures](#) to ensure that the appropriate requirements for conducting research have been met, and that the HPCSA's [General Ethical Guidelines for Health Researchers](#) have been adhered to.

Clinical trials

As per the recommendations published by the International Committee of Medical Journal Editors (ICMJE), clinical trial research is any research that assigns individuals to an intervention, with or without a concurrent comparison/control group to study the cause-and-effect relationship between the intervention and health outcomes. All clinical trials should be registered with the appropriate national clinical trial registry (or any international primary register, if relevant), and the trial registration number should be cited at the end of the abstract. All clinical trial reports must also contain a data sharing statement as per the recommendations of the ICMJE. Statements are to indicate:

- whether individual deidentified participant data will be shared;
- what data in particular will be shared; whether additional, related documents will be available;
- when the data will become available and for how long; by what access criteria data will be shared.

Please see the ICJME announcement for further details and illustrative examples of data sharing statements: [ICMJE Data Sharing Statements for Clinical Trials](#)

Since 1st December 2005, all clinical trials conducted in South Africa have been required to be registered in the South African National Clinical Trials Register. The SAMJ therefore requires that clinical trials be registered in the relevant public trials registry at or before the time of first patient enrollment as a condition for publication. The trial registry name and registration number must be included in the manuscript.

Please refer to the general guidelines for all papers at the top of this article for additional requirements with respect to ethics approval, funding, author contributions, etc. The format of original research articles should be followed for reporting of clinical trial results.

Patient Consent

Information that would enable identification of individual patients should not be published in written descriptions, photographs, and pedigrees unless the information is essential for scientific purposes and the patient (or parent or guardian) has given informed written consent for publication and distribution. We further recommend that the published article is disseminated not only to the involved researchers but also to the patients/participants from whom the data was drawn. Refer to [Protection of Research Participants](#). The signed consent form should be submitted with the manuscript to enable verification by the editorial team.

Other individuals

Any individual who is identifiable in an image must provide [written agreement](#) that the image may be used in that context in the *SAMJ*.

Copyright notice

Copyright remains in the Author's name. The work is licensed under a [Creative Commons Attribution - Noncommercial Works License](#). Authors are required to complete and sign an [Author Agreement form](#) that outlines Author and Publisher rights and terms of publication. The [Author Agreement form](#) should be uploaded along with other submissions files and any submission will be considered incomplete without it.

Material submitted for publication in the *SAMJ* is accepted provided it has not been published or submitted for publication elsewhere. Please inform the editorial team if the main findings of your paper have been presented at a conference and published in abstract form, to avoid copyright infringement. All research already published as 'Conference proceedings' needs to be substantially re-written, with a new title, a new abstract and new and important results to back up any study before it will be considered for a new publication. The *SAMJ* does not hold itself responsible for statements made by the authors.

Previously published images

If an image/figure has been previously published, permission to reproduce or alter it must be obtained by the authors from the original publisher and the figure legend must give full credit to the original source. This credit should be accompanied by a letter indicating that permission to reproduce the image has been granted to the author/s. This letter should be uploaded as a supplementary file during submission.

Privacy statement

The *SAMJ* is committed to protecting the privacy of its website and submission system users. The names, personal particulars and email addresses entered in the website or submission system will not be made available to third parties without the user's permission or due process. By registering to use the website or submission system, users consent to receive communication from the *SAMJ* or its publisher SAMA on matters relating to the journal or associated publications. Queries with regard to privacy may be directed to publishing@hmpg.co.za.

Ethnic/race classification

Use of racial or ethnicity classifications in research is fraught with problems. If you choose to use a research design that involves classification of participants based on race or ethnicity, or discuss issues with reference to such classifications, please ensure that you include a detailed rationale for doing so, ensure that the categories you describe are carefully defined, and that socioeconomic, cultural and lifestyle variables that may underlie perceived racial disparities are appropriately controlled for. Please also clearly specify whether race or ethnicity is classified as reported by the patient (self-identifying) or as perceived by the investigators. Please note that it is not appropriate to use self-reported or investigator-assigned racial or ethnic categories for genetic studies.

Continuing Professional Development (CPD)

SAMJ is an HPCSA-accredited service provider of CPD materials. Principal authors can earn up to 15 CPD continuing education units (CEUs) for publishing an article; co-authors are eligible to earn up to 5 CEUs; and reviewers of articles can earn 3 CEUs. Each month, *SAMJ* also publishes a CPD-accredited questionnaire relating to the academic content of the journal. Successful completion of the questionnaire with a pass rate of 70% will earn the reader 3 CEUs. Administration of our CPD programme is managed by Medical Practice Consulting. To complete questionnaires and obtain certificates, please visit [MRP Consulting](#)

Manuscript preparation

Preparing an article for anonymous review

To ensure a fair and unbiased review process, all submissions are to include an anonymised version of the manuscript. The exceptions to this are Correspondence, Book reviews and Obituary submissions.

Submitting a manuscript that needs additional blinding can slow down your review process, so please be sure to follow these simple guidelines as much as possible:

- An anonymous version should not contain any author, affiliation or particular institutional details that will enable identification.
- Please remove title page, acknowledgements, contact details, funding grants to a named person, and any running headers of author names.
- Mask self-citations by referring to your own work in third person.

General article format/layout

Accepted manuscripts that are not in the correct format specified in these guidelines will be returned to the author(s) for correction, which will delay publication.

General:

- Manuscripts must be written in UK English.
- The manuscript must be in Microsoft Word format. Text must be single-spaced, in 12-point Times New Roman font, and contain no unnecessary formatting (such as text in boxes).
- Please make your article concise, even if it is below the word limit.
- Qualifications, **full** affiliation (department, school/faculty, institution, city, country) and contact details of ALL authors must be provided in the manuscript and in the online submission process.
- Abbreviations should be spelt out when first used and thereafter used consistently, e.g. 'intravenous (IV)' or 'Department of Health (DoH)'.
- Include sections on Acknowledgements, Conflict of Interest, Author Contributions and Funding sources. If none is applicable, please state 'none'.
- Scientific measurements must be expressed in SI units except: blood pressure (mmHg) and haemoglobin (g/dL).
- Litres is denoted with an uppercase L e.g. 'mL' for millilitres).
- Units should be preceded by a space (except for % and °C), e.g. '40 kg' and '20 cm' but '50%' and '19°C'.
- Please be sure to insert proper symbols e.g. μ not u for micro, α not a for alpha, β not B for beta, etc.
- Numbers should be written as grouped per thousand-units, i.e. 4 000, 22 160.
- Quotes should be placed in single quotation marks: i.e. The respondent stated: '...'
- Round brackets (parentheses) should be used, as opposed to square brackets, which are reserved for denoting concentrations or insertions in direct quotes.
- If you wish material to be in a box, simply indicate this in the text. You may use the table format –this is the *only* exception. Please DO NOT use fill, format lines and so on.

SAMJ is a generalist medical journal, therefore for articles covering genetics, it is the responsibility of authors to apply the following:

- Please ensure that all genes are in italics, and proteins/enzymes/hormones are not.
- Ensure that all genes are presented in the correct case e.g. TP53 not Tp53.

****NB:** Copyeditors cannot be expected to pick up and correct errors wrt the above, although they will raise queries where concerned.

- Define all genes, proteins and related shorthand terms at first mention, e.g. '188del11' can be glossed as 'an 11 bp deletion at nucleotide 188.'
- Use the latest approved gene or protein symbol as appropriate:

- Human Gene Mapping Workshop (HGMW): genetic notations and symbols
- HUGO Gene Nomenclature Committee: approved gene symbols and nomenclature
- OMIM: Online Mendelian Inheritance in Man (MIM) nomenclature and instructions
- Bennet et al. Standardized human pedigree nomenclature: Update and assessment of the recommendations of the National Society of Genetic Counselors. *J Genet Counsel* 2008;17:424-433: standard human pedigree nomenclature.

Preparation notes by article type

- [Research](#)
- [Editorials](#)
- [CME](#)
- [In Practice and Case reports](#)
- [Reviews](#)
- [Clinical trials](#)
- [Correspondence](#)
- [Obituaries](#)
- [Book reviews](#)
- [Guidelines](#)

Research

Guideline word limit: 4 000 words

Research articles describe the background, methods, results and conclusions of an original research study. The article should contain the following sections: introduction, methods, results, discussion and conclusion, and should include a structured abstract (see below). The introduction should be concise – no more than three paragraphs – on the background to the research question, and must include references to other relevant published studies that clearly lay out the rationale for conducting the study. Some common reasons for conducting a study are: to fill a gap in the literature, a logical extension of previous work, or to answer an important clinical question. If other papers related to the same study have been published previously, please make sure to refer to them specifically. Describe the study methods in as much detail as possible so that others would be able to replicate the study should they need to. Results should describe the study sample as well as the findings from the study itself, but all interpretation of findings must be kept in the discussion section, which should consider primary outcomes first before any secondary or tertiary findings or post-hoc analyses. The conclusion should briefly summarise the main message of the paper and provide recommendations for further study.

Select figures and tables for your paper carefully and sparingly. Use only those figures that provided added value to the paper, over and above what is written in the text.

Do not replicate data in tables and in text .

Structured abstract

- This should be 250-400 words, with the following recommended headings:
 - **Background:** why the study is being done and how it relates to other published work.
 - **Objectives:** what the study intends to find out
 - **Methods:** must include study design, number of participants, description of the intervention, primary and secondary outcomes, any specific analyses that were done on the data.
 - **Results:** first sentence must be brief population and sample description; outline the results according to the methods described. Primary outcomes must be described first, even if they are not the most significant findings of the study.
 - **Conclusion:** must be supported by the data, include recommendations for further study/actions.
- Please ensure that the structured abstract is complete, accurate and clear and has been approved by all authors.
- Do not include any references in the abstracts.

[Here](#) is an example of a good abstract.

Main article

All articles are to include the following main sections: Introduction/Background, Methods, Results, Discussion, Conclusions.

The following are additional heading or section options that may appear within these:

- Objectives (within Introduction/Background): a clear statement of the main aim of the study and the major hypothesis tested or research question posed
- Design (within Methods): including factors such as prospective, randomisation, blinding, placebo control, case control, crossover, criterion standards for diagnostic tests, etc.
- Setting (within Methods): level of care, e.g. primary, secondary, number of participating centres.
- Participants (instead of patients or subjects; within Methods): numbers entering and completing the study, sex, age and any other biological, behavioural, social or cultural factors (e.g. smoking status, socioeconomic group, educational attainment, co-existing disease indicators, etc) that may have an impact on the study results. Clearly define how participants were enrolled, and describe selection and exclusion criteria.
- Interventions (within Methods): what, how, when and for how long. Typically for randomised controlled trials, crossover trials, and before and after studies.
- Main outcome measures (within Methods): those as planned in the protocol, and those ultimately measured. Explain differences, if any.

Results

- Start with description of the population and sample. Include key characteristics of comparison groups.
- Main results with (for quantitative studies) 95% confidence intervals and, where appropriate, the exact level of statistical significance and the number need to treat/harm. Whenever possible, state absolute rather than relative risks.
- Do not replicate data in tables and in text.
- If presenting mean and standard deviations, specify this clearly. Our house style is to present this as follows:
- E.g.: The mean (SD) birth weight was 2 500 (1 210) g. Do not use the \pm symbol for mean (SD).
- Leave interpretation to the Discussion section. The Results section should just report the findings as per the Methods section.

Discussion

Please ensure that the discussion is concise and follows this overall structure – sub-headings are not needed:

- Statement of principal findings
- Strengths and weaknesses of the study
- Contribution to the body of knowledge
- Strengths and weaknesses in relation to other studies
- The meaning of the study – e.g. what this study means to clinicians and policymakers
- Unanswered questions and recommendations for future research

Conclusions

This may be the only section readers look at, therefore write it carefully. Include primary conclusions and their implications, suggesting areas for further research if appropriate. Do not go beyond the data in the article.

Editorials

Guideline word limit: 1 000 words

These opinion or comment articles are usually commissioned but we are happy to consider and peer review unsolicited editorials. Editorials should be accessible and interesting to readers without specialist knowledge of the subject under discussion and should have an element of topicality (why is a comment on this issue relevant now?) There should be a clear message to the piece, supported by evidence.

Please make clear the type of evidence that supports each key statement, e.g.:

- expert opinion
- personal clinical experience
- observational studies
- trials
- systematic reviews.

CME (by invite only)

CME is intended to provide readers with practical, up-to-date information on medical and related matters. It is aimed at those who are not specialists in the field.

From January 2016, all CME articles will be printed in full in the *SAMJ*. Please try to adhere strictly to the guidelines on word count as we have a page limit for the print issue of the *SAMJ*. We reserve the right to place some tables and reference lists online if this is necessary for space.

In practice, this means that each CME topic usually covers two issues of the print issue of the *SAMJ*.

The guest editor, in consultation with the editor, is responsible for convening a team of authors, deciding on the subjects to be covered and for reviewing the manuscripts submitted. The suggestion is for 4 - 5 articles, although there is some room for flexibility contingent on discussions with the editor.

For queries about these guidelines please feel free to contact the CME editor, Dr Bridget Farham, by email (ugqirha@iafrica.com) or telephone (+27 (0)82 452 2860)

Review process

The guest editor reviews the articles and returns them to the CME editor for review and final approval.

Guest editorials

Guideline word limit: 1 000 words

- Include the guest editor's personal details (qualifications, positions, affiliation, e-mail address, and a short personal profile (50words)).

- If possible, include a photograph of the author(s) at high enough resolution for print. It is preferable to provide two guest editorials, one for each issue, so that the content of the articles in each issue is covered.

Articles

Guideline word limit: 2 000 - 3 000 words

- Each article requires an abstract of ±200 words.
- The editor reserves the right to shorten articles but will send a substantially shortened article back for author approval.

Personal details

Please supply: Your qualifications, position and affiliations and MP number (used for CPD points); Address, telephone number and fax number, and your e-mail address; and a short personal profile (50words)and a few words about your current fields of interest.

In Practice

Guideline word limit: 2 000 - 3 000words

This section includes articles that would previously have been accepted into the Forum section, and case reports.

In practice articles are those that draw attention to specific issues of clinical, economic or political interest regarding medicine and healthcare in southern Africa. They are assigned to a topic:

Case report

Clinical practice

Clinical alert

Issues in medicine

Issues in public health

Healthcare delivery

Medicine and the environment

Medicine and the law

Cochrane corner

An In Practice article should follow the following format – sub-headings are not necessary, but may be used for clarity:

- Author affiliations and qualifications: to be the same as for Research. Provide all authors' names and initials, qualifications and full affiliations, and corresponding author.
- Short abstract: does not need to be structured, but should capture the essential features of the article
- Introduction: the reason for the article and the issue being addressed
- Recent research, discussion, local policy around the issue – include your own research where appropriate
- All statements should be referenced and, if opinion only, this should be stated

- Discussion: how this article adds to the discussion around a particular topic
- If a clinical practice or policy point is at issue, this needs to be emphasised, using a box with highlights if appropriate.

Essentially In practice is an opportunity for a more discursive approach to topics of clinical, economic or political importance in southern African health systems. It is not an opportunity to put forward unsubstantiated opinions!

Case reports

The *SAMJ* has recently started to accept case reports. The cases must come from Africa, preferably southern Africa unless the condition is common to all African countries, and must be either a completely new description of a clinical condition or result (use Google!) or a case that highlights important practice or management issues.

Please use the following format for case reports:

- Title of case: do not include the words 'a case report' in the title
- Summary/abstract: up to 150 words summarising the case presentation and outcome
- Background: why is this case important and why did you write it up?
- Case presentation: presenting features, medical, social, family history as appropriate
- Case management: should be according to best practice, and if not, please explain why
- Investigations, if relevant: save space by simply saying 'normal' if, for example, renal function was completely normal, rather than listing normal results, highlight the abnormal – or indeed the normal if this is clinically significant
- Differential diagnosis, if relevant
- Treatment, if relevant
- Outcome and follow-up
- Discussion – a VERY BRIEF review of similar published cases
- Teaching points: 3 - 5 bullet points
- References: as per the *SAMJ* house style
- Tables and figures: keep to a minimum. Use clinical images where relevant – we need hi-res versions for print, and identifiable persons must have a consent form
- Patient consent: please include a statement about patient consent to a written case report. This should be uploaded as a supplementary file.

Clinical trials

Guideline word limit: 4000 words

As per the recommendations published by the International Committee of Medical Journal Editors (ICMJE), clinical trial research is any research that assigns individuals to an intervention, with or without a concurrent comparison/control group to study the cause-and-effect relationship between the intervention and health outcomes. All clinical trials should be registered with the appropriate national clinical trial registry (or any international primary register, if relevant), and the trial registration number should be cited at the end of the abstract. Since 1st December 2005, all clinical trials conducted in South Africa have been required to be registered in the [South African National Clinical Trials Register](#). The *SAMJ* therefore requires that clinical trials be registered in the relevant public trials registry at or before the time of first patient enrollment as a condition for publication. The trial registry name and registration number must be included in the manuscript.

Please refer to the general guidelines for all papers at the top of this article for additional requirements with respect to ethics approval, funding, author contributions, etc. The format of original research articles should be followed for reporting of clinical trial results.

Review articles

Guideline word limit: 4 000 words

These are welcome, but should be either commissioned or discussed with the Editor before submission. A review article should provide a clear, up-to-date account of the topic and be aimed at non-specialist hospital doctors and general practitioners.

Please ensure that your article includes:

- Abstract: unstructured, of about 100-150 words, explaining the review and why it is important
- Methods: Outline the sources and selection methods, including search strategy and keywords used for identifying references from online bibliographic databases. Discuss the quality of evidence.
- When writing: clarify the evidence you used for key statements and the strength of the evidence. Do not present statements or opinions without such evidence, or if you have to, say that there is little or no evidence and that this is opinion. Avoid specialist jargon and abbreviations, and provide advice specific to southern Africa.
- Personal details: Please supply your qualifications, position and affiliations and MP number (used for CPD points); address, telephone number and fax number, and your e-mail address; and a short personal profile (50 words) and a few words about your current fields of interest.

Correspondence (Letters to the Editor)

Guideline word limit: 500 words

Letters to the editor should relate either to a paper or article published by the SAMJ or to a topical issue of particular relevance to the journal's readership

- May include only one illustration or table
- Must include a correspondence address.

Book reviews

Guideline word limit: 400 words

Should be about 400 words and must be accompanied by the publication details of the book. Provide a hi-res image of the cover if possible (with permission from the copyright holder).

Obituaries

Guideline word limit: 400 words

Should be offered within the first year of the practitioner's death, and may be accompanied by a photograph.

Guidelines

Guidelines should always be discussed with the Editor prior to submission.

Because of the intensive review process required to ensure Guidelines are independent, evidence-based and free from commercial bias, they are usually published as a supplement to the *SAMJ*, the costs of which must be covered by sponsorship, advertising or payment by the guideline authors/association. We will provide a quote based on the expected length of the guideline and whether it is to appear online only, or in print, which must be accepted by the body putting the guidelines together before submitting the work to the SAMJ.

The Editor reserves the right to determine the scheduling of supplements. Understandably, a delay in publication must be anticipated dependent upon editorial workflow.

All guidelines should include a clear, transparent statement about all sources of funding and an explicit, clear statement of conflicts of interest of any of the participants in the guidelines about industry funding for lectures, research, conference participation etc.

All guidelines should be structured according to [Agree II](#).

Please access this website before putting the guidelines together, download the Agree 11 instrument and use this to put the guidelines together.

All submitted guidelines will be sent to the local Agree II appraisal committee for review and must be endorsed by an appropriate body prior to consideration and all conflicts of interest expressed.

A structured abstract not exceeding 400 words (recommended sub-headings: *Background, Recommendations, Conclusion*) is required. Sections and sub-sections must be numbered consecutively (e.g. 1. Introduction; 1.1 Definitions; 2.etc.) and summarised in a Table of Contents.

Illustrations/photos/scans

- If illustrations submitted have been published elsewhere, the author(s) should provide consent to republication obtained from the copyright holder.
- Figures must be numbered in Arabic numerals and referred to in the text e.g. '(Fig. 1)'.
• Each figure must have a caption/legend: Fig. 1. Description (any abbreviations in full).
- All images must be of high enough resolution/quality for print.
- All illustrations (graphs, diagrams, charts, etc.) must be in PDF or jpeg form.
- Ensure all graph axes are labelled appropriately, with a heading/description and units (as necessary) indicated. Do not include decimal places if not necessary e.g. 0; 1.0; 2.0; 3.0; 4.0 etc.
- Scans/photos showing a specific feature e.g. *Intermediate magnification micrograph of a low malignant potential (LMP) mucinous ovarian tumour. (H&E stain)*. –include an arrow to show the tumour.
- Each image must be attached individually as a 'supplementary file' upon submission (not solely embedded in the accompanying manuscript) and named Fig. 1, Fig. 2, etc.

Tables

- Tables should be constructed carefully and simply for intelligible data representation. Unnecessarily complicated tables are strongly discouraged.

- Large tables will generally not be accepted for publication in their entirety. Please consider shortening and using the text to highlight specific important sections, or offer a large table as an addendum to the publication, but available in full on request from the author
- Embed/include each table in the manuscript Word file - do not provide separately as supplementary files.
- Number each table in Arabic numerals (Table 1, Table 2, etc.) and refer to consecutively in the text.
- Tables must be cell-based (i.e. not constructed with text boxes or tabs) and editable.
- Ensure each table has a concise title and column headings, and include units where necessary.
- Footnotes must be indicated with consecutive use of the following symbols: * † ‡ § ¶ || then ** †† ‡‡ etc.

Do not: Use [Enter] within a row to make 'new rows':

Rather:

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Combine into one column, *n* (%):

Do not: have overlapping categories, e.g.:

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Use <> symbols or numbers that don't overlap:

References

NB: *Only complete, correctly formatted reference lists in Vancouver style will be accepted. Reference lists must be generated manually and not with the use of reference manager software. Endnotes must **not** be used.*

- Authors must verify references from original sources.
- Citations should be inserted in the text as superscript numbers between square brackets, e.g. These regulations are endorsed by the World Health Organization,^[2] and others.^[3,4-6]
- All references should be listed at the end of the article in numerical order of appearance in the Vancouver style (not alphabetical order).
- Approved abbreviations of journal titles must be used; see the [List of Journals in Index Medicus](#).
- Names and initials of all authors should be given; if there are more than six authors, the first three names should be given followed by et al.
- Volume and issue numbers should be given.
- First and last page, in full, should be given e.g.: 1215-1217 **not** 1215-17.
- Wherever possible, references must be accompanied by a digital object identifier (DOI) link). Authors are encouraged to use the DOI lookup service offered by [CrossRef](#):
 - On the Crossref homepage, paste the article title into the 'Metadata search' box.
 - Look for the correct, matching article in the list of results.

- Click Actions > Cite
- Alongside 'url =' copy the URL between { }.
- Provide as follows, e.g.: <https://doi.org/10.7196/07294.937.98x>

Some examples:

- *Journal references:* Price NC, Jacobs NN, Roberts DA, et al. Importance of asking about glaucoma. *Stat Med* 1998;289(1):350-355. <http://dx.doi.org/10.1000/hgjr.182>
- *Book references:* Jeffcoate N. *Principles of Gynaecology*. 4th ed. London: Butterworth, 1975:96-101.
- *Chapter/section in a book:* Weinstein L, Swartz MN. Pathogenic Properties of Invading Microorganisms. In: Sodeman WA, Sodeman WA, eds. *Pathologic Physiology: Mechanisms of Disease*. Philadelphia: WB Saunders, 1974:457-472.
- *Internet references:* World Health Organization. *The World Health Report 2002 - Reducing Risks, Promoting Healthy Life*. Geneva: WHO, 2002. <http://www.who.int/whr/2002> (accessed 16 January 2010).
- Legal references

- Government Gazettes:

National Department of Health, South Africa. National Policy for Health Act, 1990 (Act No. 116 of 1990). Free primary health care services. *Government Gazette* No. 17507:1514. 1996.

In this example, 17507 is the Gazette Number. This is followed by :1514 - this is the notice number in this Gazette.

- Provincial Gazettes:

Gauteng Province, South Africa; Department of Agriculture, Conservation, Environment and Land Affairs. Publication of the Gauteng health care waste management draft regulations. *Gauteng Provincial Gazette* No. 373:3003, 2003.

- Acts:

South Africa. National Health Act No. 61 of 2003.

- Regulations to an Act:

South Africa. National Health Act of 2003. Regulations: Rendering of clinical forensic medicine services. *Government Gazette* No. 35099, 2012. (Published under Government Notice R176).

- Bills:

South Africa. Traditional Health Practitioners Bill, No. B66B-2003, 2006.

- Green/white papers:

South Africa. Department of Health Green Paper: National Health Insurance in South Africa. 2011.

- Case law:

Rex v Jopp and Another 1949 (4) SA 11 (N)

Rex v Jopp and Another: Name of the parties concerned

1949: Date of decision (or when the case was heard)

(4): Volume number

SA: SA Law Reports

11: Page or section number

(N): In this case Natal - where the case was heard. Similarly, (C) would indicate Cape, (G) Gauteng, and so on.

NOTE: no . after the v

- *Other references (e.g. reports) should follow the same format: Author(s). Title. Publisher place: Publisher name, year; pages.*
- Cited manuscripts that have been accepted but not yet published can be included as references followed by '(in press)'.
- Unpublished observations and personal communications in the text must **not** appear in the reference list. The full name of the source person must be provided for personal communications e.g. '(Prof. Michael Jones, personal communication)'.

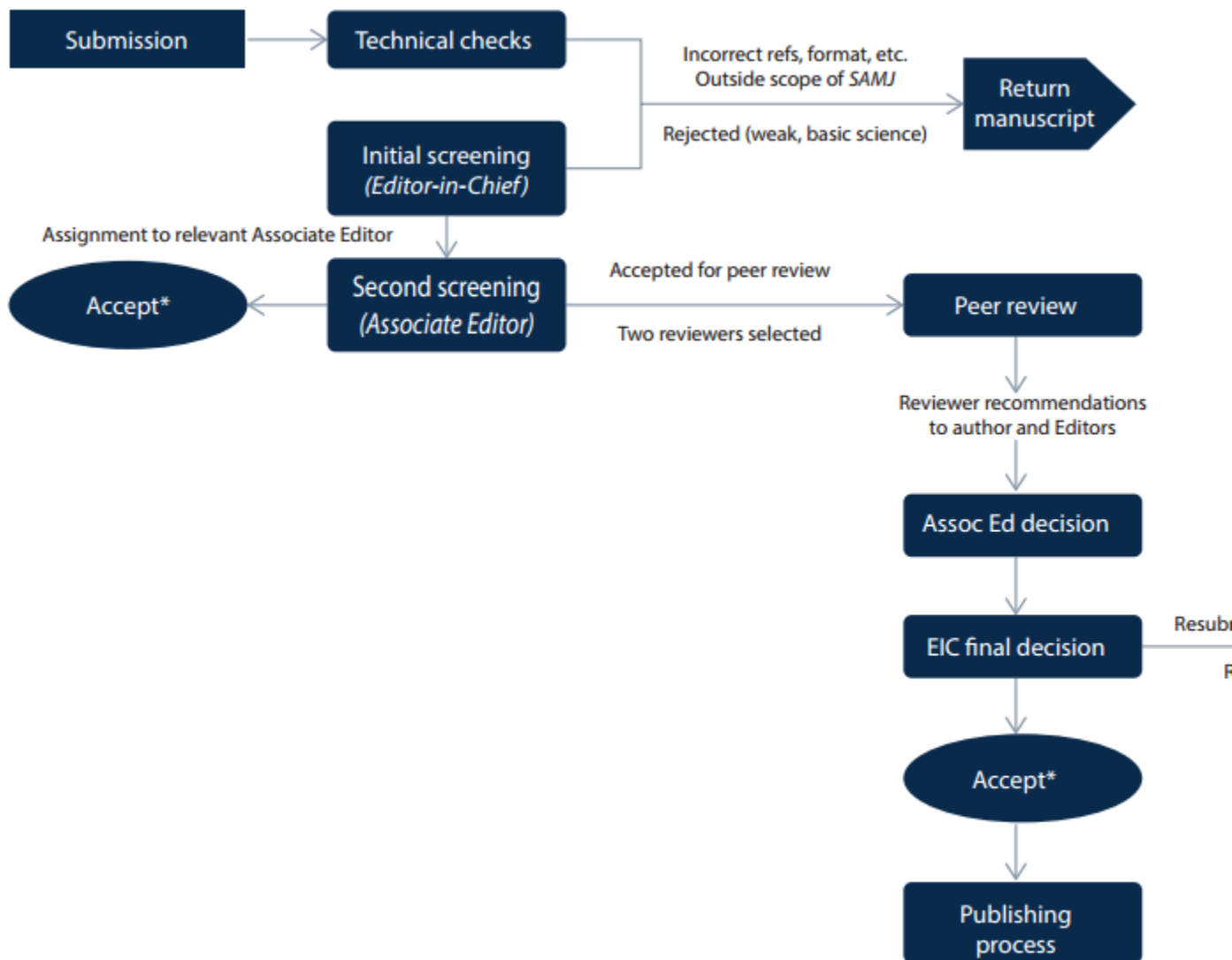
From submission to acceptance

Submission and peer-review

To submit an article:

- Please ensure that you have prepared your manuscript in line with the SAMJ requirements.
- All submissions should be submitted via [Editorial Manager](#)
- The following are required for your submission to be complete:
 - Anonymous manuscript (unless otherwise stated)
 - Manuscript
 - Any supplementary files: figures, datasets, patient consent form, permissions for published images, etc.
- Once the submission has been successfully processed on Editorial Manager, it will undergo a technical check by the Editorial Office before it will be assigned to an editor who will handle the review process. If the author guidelines have not been appropriately followed, the manuscript may be sent back to the author for correcting.

Peer-review process



*Manuscripts accepted at this point are limited to Editorials, Correspondence, Obituaries, Book reviews, Abstracts, CME

**Some minor revisions may be requested

Production process

Please note that there is a 6-month waiting time for publication, once an article has been sent to the production team.

The following process will follow:

1. An accepted manuscript is passed to a Managing Editor to assign to a copyeditor (CE).
2. The CE copyedits in Word, working on house style, format, spelling/grammar/punctuation, sense and consistency, and preparation for typesetting.
3. If the CE has an author queries, he/she will contact the corresponding author and send them the copyedited Word doc, asking them to solve the queries by means of track changes or comment boxes.

4. The authors are typically asked to respond within 1-3 days. Any comments/changes must be clearly indicated e.g. by means of track changes. Do not work in the original manuscript - work in the copyedited file sent to you and make your changes clear.
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8. The CE implements the authors' and proofreader's mark-ups, finalises the file, and prepares it for the upcoming issue.

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Online v. print

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Print

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