

Prevalence of burnout in O&G registrars in the University of Witwatersrand department during Coronavirus disease 2019 pandemic

Dr Zanele Ngwenya
0701726E

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Medicine in Obstetrics and Gynaecology

Johannesburg 2025

DECLARATION

I, Cynthia Zanele Ngwenya, declare that this research report is my own unaided work. It is being submitted for the degree of Master of Medicine MMed at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

A handwritten signature in black ink, appearing to be 'Cynthia Ngwenya', enclosed within a large, loopy oval stroke.

04 December 2024

DEDICATION

I dedicate this MMed to my mother Irene Ngwenya for everything I am today, and to my son Ablade.

PRESENTATIONS

Protocol presented at Chris Hani Baragwanath Academic Hospital research meeting on 10/04/2021.

ACKNOWLEDGEMENTS

I would like to express my appreciation to my supervisors Prof Lombaard, Dr Mpehle and Dr Balie for their guidance and knowledge in assisting to complete this research. I would also like to thank the department of Obstetrics and Gynaecology for the support towards the study.

Table of Contents

DECLARATION	2
DEDICATION	3
PRESENTATIONS.....	4
ACKNOWLEDGEMENTS	5
LIST OF TABLES	7
LIST OF ABBREVIATIONS.....	8
JOURNAL ARTICLE (SAMJ)	9
ABSTRACT	10
INTRODUCTION	12
METHODS.....	13
RESULTS.....	15
DISCUSSION	18
STUDY LIMITATIONS	21
CONCLUSION	21
DISCLOSURE	22
REFERENCES	22
APPENDICES.....	27
APPENDIX A: APPROVED RESEARCH PROTOCOL	27
APPENDIX B: DATA COLLECTION SHEET	43
APPENDIX C: PERMISSION TO CONDUCT STUDY BY WITS STUDENT ACADEMIC HOD.....	48
APPENDIX D: CERTIFICATE: INTRODUCTION TO RESEARCH ETHICS	49
APPENDIX E: ETHICS CLEARANCE CERTIFICATE.....	51
APPENDIX F: ADHERENCE TO HREC.....	52
APPENDIX G: JOURNAL GUIDELINES FOR SAMJ.....	53
APPENDIX H: TURNITIN PLAGIARISM REPORT	58

LIST OF TABLES

Table 1: Demographics of the registrars working in the department of obstetrics and gynecology

Table 2: Predictors of burnout

LIST OF FIGURES

Figure 1: Frequencies in the levels of emotional exhaustion, depersonalization and personal accomplishment among study participants

LIST OF ABBREVIATIONS

COVID-19 – Corona-virus disease 2019

HCWs- Health Care Workers

HPCSA- Health Professions Council of South Africa

O&G- Obstetrics and Gynecology

PPE- Personal protective equipment

REDCap®-Research Electronic Data Capture

RSA- Republic of South Africa

JOURNAL ARTICLE (SAMJ)

Prevalence of burnout in O&G registrars in the University of Witwatersrand department during Coronavirus disease 2019 pandemic

Authors

Dr C.Z Ngwenya^a

Prof Hendrik Lombaard^b

Dr Chileshe Mpehle^{a,d}

Dr Gaynor Miranda Balie^c

Study setting: Department of Obstetrics and Gynaecology, School of Clinical Medicine, Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa

Conflict of interest:

The authors have no conflicts of interest to declare.

Affiliations

^a Department of Obstetrician and Gynecologist, School of Medicine, University of the Witwatersrand, Chris Hani Baragwanath Academic Hospital

^b Professor Obstetrics and Gynaecology Baylor College of Medicine and Pavilion for Women Texas Children's Hospital Houston Texas USA and Honorary Adjunct Professor school of Clinical Medicine Faculty of Health Sciences University of the Witwatersrand

^c Maternal and Fetal unit, Department of Obstetrics and Gynaecology, Windhoek Hospital Complex, Windhoek, Namibia

^d High intensity Ultrasound unit, Department of Obstetrician and Gynecologist, Chris Hani Baragwanath Hospital

Corresponding author email: zancynthia@gmail.com

ABSTRACT

Background

The symptoms of burnout syndrome are still poorly understood, particularly in the context of healthcare. There are a variety of contributing factors to burnout, including age, gender, seniority, sociocultural background, having children, and marital status. Resilience, a supportive family structure, a productive work environment, and sufficient resource availability are some of the protective factors that can prevent burnout. Over the past few years, there has been a growing interest in the mental health of healthcare professionals, with registrar burnout receiving particular attention.

Objectives

To determine the prevalence of burnout amongst registrars in the Obstetrics and Gynaecology department during the Coronavirus disease 2019 pandemic and to identify possible risk factors and supportive factors which may prevent burnout.

Methods

This study was an analytical, cross-sectional study. Electronic survey in the form of a questionnaire was sent via email to all registrars at the University of Witwatersrand Obstetrics and Gynaecology circuit during the Coronavirus Disease 2019 pandemic from March 2020 to June 2021. The Maslach Burnout Inventory (MBI) was used as a tool to evaluate burnout. It consists of a series of statements related to the feelings and experiences associated with burnout. The Respondents are asked to rate how frequently they experience each statement on a scale from 0 to 6. A high degree of burnout is reflected by high scores on emotional exhaustion and depersonalization subscales and low scores on the personal accomplishment subscale.

Results

There was a 69% response rate from the participants. Of the responding participants, 57.8% were female and 42.2% were male. In this study only 28.9% of the participants showed emotional exhaustion. Depersonalization was high in 53.3% and 75.6% had a low personal achievement. The overall burnout among the O&G registrars was 4.4%. No significant association between sociodemographic (age, gender, marital status) and MBI dimensions was found.

Conclusion

The burnout prevalence among O&G registrars was low potentially because of protective workplace factors. Reducing the risk of burnout may be achieved by creating a supportive work environment and implementing resilience-building programs. These protective factors should be investigated further to guide healthcare burnout prevention strategies.

Keywords:

Burnout, Registrars, Covid-19-pandemic

INTRODUCTION

Burnout syndrome is still not well understood especially in the health care setting. The burnout syndrome is defined as a state of intense emotional exhaustion, which occurs frequently among health care workers.^[1] Tiredness, lack of energy, and weariness are all symptoms of emotional exhaustion.^[2] Anger and unfavorable sentiments toward patients are signs of Depersonalization.^[3] There are multiple factors that contribute to burnout such as age, gender, level of seniority, socio-cultural background, having children and marital status.^[4] Other occupational risk factors that have been associated with burnout are long working hours which lead to sleep deprivation and hence physical and mental exhaustion, increased workload has also been found to be a significant cause of burnout.^[5] Some of the protective factors for burnout are a supportive work environment, adequate availability of resources, supportive family structure and resilience.^[6] The Maslach Burnout Inventory is used to measure burnout. It has 22 items that assess the three aspects of burnout. This instrument defines three components of burnout: emotional exhaustion, depersonalization and a reduced sense of personal accomplishment. Emotional exhaustion occurs when workers feel that they can no longer give of themselves psychologically. Depersonalization occurs when workers have negative and cynical attitudes towards their patients.^[7] Personal accomplishment occurs when workers evaluate themselves positively, particularly in relation to their work with their patients.^[8]

In the last several years there has been an interest in the mental health of health care workers and burnout in registrars has gained major attention. A registrar is a medical doctor undergoing training to become a specialist.^[9] Registrars usually work long hours, have a lot of responsibilities at work and are overwhelmed by the amount of clinical knowledge they have to master, therefore registrars are a group vulnerable to burnout.^[9] A lot of the registrars are on the front lines of the pandemic, frequently being sent to work in places beyond their usual duties thereby heightening their risk of experiencing burnout.^[10] A local university study, published in 2019, having assessed registrars, showed a concerning high burnout level of 84%(4).

Similarly, another study done amongst registrars in Obstetrics and Gynaecology(O&G) showed 85% levels of emotional exhaustion and 78% levels of depersonalization and just under 50% of respondent's experienced low personal accomplishment at work^[5] It is also important to note that both these studies were done outside the Covid-19 pandemic.

The Corona-virus disease 2019 (COVID-19) pandemic was a unique situation for many HCWs as they had not been involved in similar responses before. Healthcare workers served as the initial responders and the initial caregivers for those infected with COVID-19.^[10] This situation led to them encountering unforeseen stressors. Moreover, they were frequently exposed to the virus.^[10] The rationale for the study was to assess the prevalence of burnout in O&G registrars specifically during the COVID-19 pandemic, to identify possible risk factors for burnout among registrars and identify possible supportive factors which may prevent burnout by looking at the demographics of the registrars.

METHODS

Design and population

This study was an analytical, cross-sectional study.

The sample size was all the individuals registered for the O&G registrar program, at the University of Witwatersrand, during the period 1 March 2020 to 30 June 2021. At the time of the study there were 64 registrars in the studied department.

Data collection

An electronic survey in the form of a questionnaire was sent via email to participants. The questionnaire was sent via RedCap. The questionnaire comprised two parts. The first part contained socio-demographic questions: age, gender, number of years in the program and marital status. It addressed lifestyle factors and the experience during the COVID-19 pandemic. The second part was the Maslach Burnout Inventory. It is one of the most used and well validated measure of burnout, in scientific literature. Each of the components is given a score from 0 to 6; and scoring high in the first two components and low in the latter component is a positive finding.

The survey link was sent to the registrars via the online Research Electronic Data Capture (RedCap®) database and the responses were submitted, anonymously, to the principal researcher.

Statistical analysis

Descriptive analysis was conducted for categorical variables by computing frequencies and percentages. Continuous data assessed for normality using the Shapiro-Wilk test. Subsequently, normally distributed continuous variables were summarized with means and standard deviations. Non-normally distributed variables were presented as medians and interquartile ranges. The medians of the burnout scores were compared by socio-demographic characteristics using Mann-Whitney U test for variables with two groups (e.g. gender) or Kruskal Wallis test if the variable had more than two groups (e.g. years of experience: <1 year, 1-3 years, >3 years of experience). The participants were divided into high burnout score and low burnout score as described: Briefly, individuals scoring a high emotional exhaustion score (i.e. >27), high depersonalization score (i.e. >10) and low personal achievement score (i.e. <33) were categorized as having a high burnout score. Association between categorical variables and burnout status (low/high burnout score) were assessed using the Fisher's exact test as the small cell sizes precluded the use of Chi-square test. A p-value < 0.05 was statistically significant. Stata statistical software version 15 (Stata Corp, Texas USA) was used for analysis.

Study approval and ethics

Ethical approval was obtained from the Human Research and Ethics Committee of the University of the Witwatersrand before the commencement of the study (ethics number:M211173 MED21-08-032). Permission was also obtained from the Academic Head, of the Department of O&G, at the University of the Witwatersrand. The survey and information sheet were provided to the participants explaining the nature of the study and that Participation was voluntary; the questionnaire was to be answered anonymously, and that consent will be implied by the participant answering and submitting the questionnaire. A distress protocol was also provided for the participants that felt they needed assistance, contact information for the South African Depression and Anxiety Group was made available.

RESULTS

Study demographics

From a total of 67 registrars, 46 responded to the questionnaire (69% response rate). This sample size was representative of the current registrar group at the University of the Witwatersrand's O&G Department. In the age category, 32 (71.1%) were between the ages of 30 and 39 years. More than half of the participants, 26 (57.8%), were females, with only 19 (42.2%) being males. A total of 30 (66.7%) were married, with 2 (18.9%) reporting to be in a stable relationship and only 13 (28.9%) being single. Over seventy percent had children, and 13 (18.9%) did not have any children, and the mean number of children was 2. Out of the 46 participants, 37 (84.1%) were Black, 2 (4.6%) were Indian, 4 (9.1%) were White, and only 1 (2.3%) was colored. See Table 1 for more demographic details. The average working hours per month before and after Covid-19 were similar: 175 and 160 hours, respectively. The average number of years in the registrar program was 3 years, and the average number of years most of the participants spent as medical officers was 1 year.

Regarding the social behavior of the participants, 18 (40%) consumed alcohol and 27 (60%) did not consume alcohol. Most participants, 41 (95%), did not smoke cigarettes, while only 2 (4.6%) reported being smokers. Amongst the participants who consumed alcohol and those that smoked cigarettes, there was no difference in the amount before and after Covid-19. See Table 2 for a breakdown.

Twenty-nine (64.4%) of the participants tested positive for Covid-19. More than half of the participants, 27 (60%), felt they had adequate protective equipment, and 32 (71.1%) felt they had received enough training on how to use the protective equipment. Almost all the participants, 41 (91.1%), had received the Covid-19 vaccine. Reasons given by the participants who did not receive the vaccine were lack of trust, 11 (2.2%); pregnancy, 2 (4.5%); and vaccine unavailability, 1 (2.2%).

Burnout among O&G registrars

Figure 1 refers to the distribution of emotional exhaustion, depersonalization, and personal accomplishment among the study participants. In this study only 28.9% of the participants showed emotional exhaustion, while 71.1% showed low emotional exhaustion.

Depersonalization was high in 53.3% and low in 46.7% of the participants. Personal achievement was high in 24.4% and low in 75.6%. The overall burnout among the O&G registrars was 4.4%. There were no significant predictors of burnout; age had a p-value of 0.25, and gender also did not contribute significantly to burnout with a p value of 0.84. The marital status of the participants also did not seem to contribute to burnout. With the Covid-related factors, only the lack of adequate PPE was marginally associated with an impression of burnout (p-value 0.08).

Table 1. Demographics of the registrars working in the department of obstetrics and gynecology

Description	n (%) or mean (sd) or median (iqr, range)
Age	35 (4.7) or 34 (32-38, 28-48)
Age categories	
20-29	3 (6.7)
30-39	32 (71.1)
40-50	10 (22.2)
Gender (n=45)	
Female	26 (57.8)
Male	19 (42.2)
Race (n=45)	
African	37 (84.1)
Asian	2 (4.6)
Caucasian	4 (9.1)
Coloured	1 (2.3)
Marital status during training (n=45)	
Single	13 (28.9)
Married (legally or cultural)	30 (66.7)
Stable relationship	2 (4.4)
Children (n=45)	
Yes	32 (71.1)
No	13 (18.9)
Number of children (n=29)	2 (1-2, 1-4)
Year of graduation from medical school (n=45)	
2000-2005	6 (13.3)
2006-2010	6 (13.3)
2011-2015	23 (51.1)
2016-2020	6 (13.3)
Number of years in the reg programme (n=45)	3 (2-4, 2-5)
Number of years spent as an MO	1 (1-1)
Numbers of months worked in COVID	24 (12-48)
Ave working hrs before covid	175 (95-235)
Ave working hrs after covid	160 (120-240)

Key: Ave=average; n=number ; sd=mean; iqr=range ; reg=registrar ; MO= medical officer; COVID=Corona virus-19; hrs= hours

Table 2. Predictors of burnout

Description	No-burnout (N=43)	Burnout (N=2)	P-value
	n (%)	n (%)	
Age			0.25
<35	25 (59.5)	2 (100)	
35+	17 (40.6)	0 (0)	
Gender			0.84
Female	24 (57.1)	1 (50)	
Male	18 (42.9)	1 (50)	
Race			0.13
African	36 (87.8)	1 (50)	
Non-African	5 (12.2)	1 (50)	
Marital status			0.52
Single	12 (28.6)	1 (50)	
Married	30 (71.4)	1 (50)	
Children			0.46
Yes	31 (73.8)	1 (50)	
No	11 (26.2)	1 (50)	
Alcohol use			0.79
Yes	25 (59.5)	1 (50)	
No	17 (40.5)	1 (50)	
Smoking			0.75
Yes	38 (95)	2 (100)	
No	2 (5)	0 (0)	
Tested COVID positive			0.30
Yes	27 (64.3)	2 (100)	
No	15 (35.7)	0 (0)	
Had protective equipment			0.08
Yes	26 (61.9)	0(0)	
No	16 (38.1)	2(100)	
Adequate training for using			0.52
PPE	30 (71.4)	1 (50)	
Yes	12 (28.6)	1 (50)	
No			

Vaccinated

0.65

Yes	38 (90.5)	2 (100)
No	4 (9.5)	0 (0)

Key: *N*=number; *n*=percentage; *PPE*= personal protective equipment; *COVID*=Corona virus=19

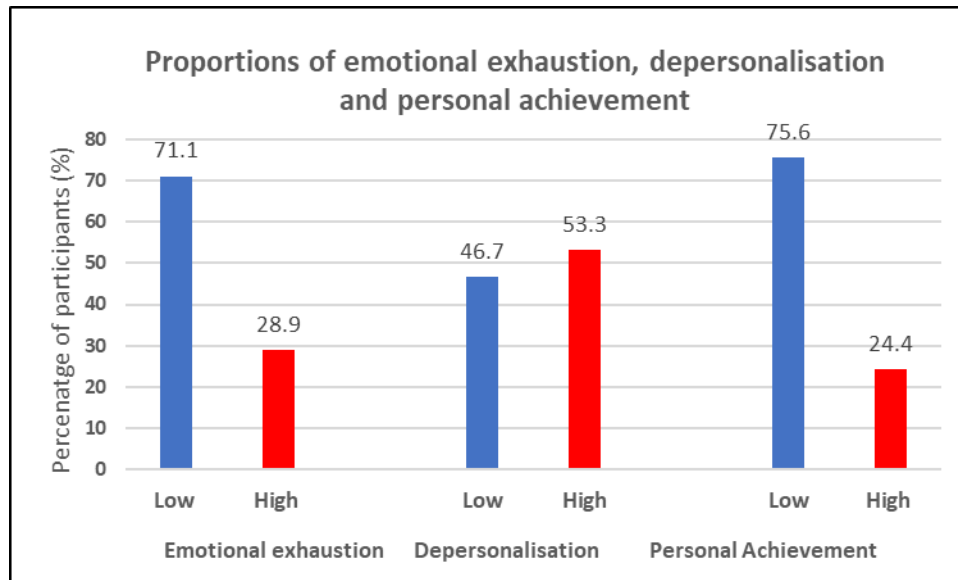


Figure 1: Frequencies in the levels of emotional exhaustion, depersonalization and personal accomplishment among study participants.

DISCUSSION

The overall findings of this study suggest that during the Covid-19 pandemic the burnout rate amongst registrars in the O&G department was low. Overall, the rate of burnout in this study was at 4.4%. This finding is interesting as it is contrary to what may have been expected, judging from the outcomes of previous studies.^[4,5] Balie et al. who assessed burnout rates in O&G registrars, prior to the Covid-19 pandemic, found 85% of participants experienced emotional exhaustion, 78% experienced depersonalization and 44.8% expressed feelings of low personal achievement.^[5] Multiple findings, from our study differ to those of Balie et al. Whilst, it would be logical to expect an increase in all parameters, due to the Covid-19 pandemic, our study found that only 28.9% of study participants indicated emotional exhaustion and 53.3% displayed depersonalization. However, an increase in expression of low personal achievement, to 75.6% was noted. Interestingly, although our findings differed, the study sample sizes were quite similar, Balie had 47 registrars, while this study included 46. One possible explanation for the lower overall burnout rate found during the COVID-19 pandemic could be the implementation

of stronger institutional support structures and wellness initiatives created in response to the crisis such as increased access to psychological support. These interventions may have played a protective role.

The emotional exhaustion in this study was low. A study among HCW's working in rural districts in Mpumalanga province found that married status, practicing a religion, and being a South African citizen, were all highly correlated with less emotional exhaustion.^[10] Health care workers that are married and have children have also been found to have lower burnout.^[11] While the majority of registrars in our study were married, there was no statistically significant association with burnout; religion and citizenship were not assessed. A study by Bentzen found that people are more prone to look to religion for solace and justification, especially in trying times.^[12] Religion may be used to lessen emotional distress that comes from certain unfavorable and unpleasant circumstances.^[13] The assessment of the impact of religion and citizenship may be the focus of future studies that assess burnout in healthcare workers.^[14]

Social support in the workplace from co-workers has the potential to lighten an individual's work experience, help to lighten the workload and ultimately, good relationship with co-workers can make difficult work environments more manageable.^[14] This could be a possible reason why burnout was low in this study. Registrars usually work as a team, as they start the program and go through the registrar program together, they form good co-worker relationships. A study, by Sexton, demonstrated that more familiarity with colleagues increased teamwork and lessened burnout.^[15] Occupational support has also been shown to decrease burnout in registrars.^[16] In this study, many of the participants felt they had enough PPE and had received enough training to use the PPE. Another study revealed that higher levels of burnout were experienced by HCWs working in Covid-19 units who expressed uncertainty about the availability of PPE and whether the type of PPE was appropriate.^[17]

Numerous sociodemographic characteristics, including age, gender, educational attainment, having children, and marital status, have been linked to health care workers' burnout.^[18] In this study there was no statistically significant correlation between the sociodemographic variables and the prevalence of burnout. Similar results were obtained from a study that evaluated registrars from various departments within a Gauteng university's school of medicine. The study population was 759 registrars in nine departments: Family Medicine, Pediatrics, Surgery, Internal Medicine, Radiation Sciences, Neurosciences, Anesthesia, Obstetrics and Gynaecology and Psychiatry which was a large sample size compared to this study. No sociodemographic factor was found to be associated with burnout.^[4] This suggests that burnout rates are not only affected by factors such as age and gender but also by external factors like structure of

management in the workplace.^[19] Additionally, a study conducted among residents in Nepal revealed no correlation between burnout and age or gender.^[20]

Personal achievement is associated with a sense of accomplishment at work and a sense of competence. Personal accomplishment is known to reduce the risk of burnout, and high scores are associated with less experienced burnout. A decline in personal accomplishment is interpreted in the workplace as a sign of failure and a low opinion of oneself.^[21] In the present study, 75.6% of participants reported experiencing low levels of personal success, which suggests a concerning trend toward potential burnout within this population. Resilient people are better able to manage emotional exhaustion and develop their own abilities, which lowers distress and burnout in the workplace. Therefore, there may be a relationship between resilience and personal achievement^[22] In a study involving pediatric residents, those with high resilience scores also had low burnout scores. This implies that the likelihood of burnout decreases with resilience^[23] Therefore, the high proportion of participants in the current study reporting low personal achievement may reflect underlying deficits in resilience.

A registrar must complete a structured academic program and offer clinical services during their four years of study to acquire the knowledge, abilities, and professional traits necessary for their medical specialty. Additionally, a research project is a requirement for the South African specialist training. A study conducted among Bloemfontein registrars revealed the ways in which the early months of the COVID-19 lockdown affected registrars' research progress, postgraduate academic activities, and clinical training environment.^[10] Additionally, some registrars stated that their clinical rotations, logbook requirements, and experience were impacted by the COVID-19 pandemic. There were also cancellations of additional research-based learning events like conferences and workshops which caused anxiety among the registrars about their timely completion of the registrar program^[10] These findings may help explain why over 70% of participants reported low personal accomplishment, suggesting that many of them experienced a lack of progress toward their personal goals.

Experience reduces the likelihood of burnout.^[24] Compared to junior registrars, senior registrars exhibit greater resilience.^[16] The likelihood of burnout decreases with the length of time a doctor has worked in the department.^[5] According to a study conducted among anesthetists in RSA, the longer one has worked, the lower the risk of burnout.^[25] Senior doctors and consultants have less

burnout than junior doctors which also supports that more work experience decreases the risk of burnout.^[1] Previous studies have also demonstrated the advantages of academic affiliation. Academic affiliation comes with research opportunities, mentorship opportunities and access to role models.^[26] Additionally, they discovered that practice settings centered in academia might guard against burnout.^[2] It's possible that registrars have a different role in an academic setting because of responsibilities like mentoring and training junior staff members.^[9] This may help to explain why there was less burnout among this group of registrars. In this study majority of the registrars were seniors with an average of 3 years in the registrar program. This may help to explain why there was less burnout among this group of registrars.

During the Covid-19 pandemic, management of patients was a challenge due to the lack of evidence-based data in managing pregnant patients with COVID-19. The maternal mortality rate increased during the COVID-19 pandemic.^[13] Pregnant patients were a high-risk group for severe complications of COVID-19 infection, ICU admissions and ultimately death.^[27] This increase in adverse outcomes may likely have also contributed to the feelings of poor personal achievement.

The participants in this study showed just over 50% of depersonalization. The depersonalization sub scale of burnout has been shown to have the strongest link with the quality of care and patient dissatisfaction.^[8] Our study site is a high-volume setting and due to a high patient turnover, depersonalization would likely contribute to poorer quality of care and higher dissatisfaction. High volume settings are significantly associated with an increased rate of dissatisfaction. High patient volumes frequently result in overcrowding, longer wait times, and strained resources, all of which have a detrimental effect on patient satisfaction.^[28] A study done in Western Cape District hospitals showed a concerning 64% of doctors had depersonalization.^[29]

STUDY LIMITATIONS

One of the limitations of the study is that it was not done concurrently as the covid pandemic waves so this might have affected the responses of the participants. Participants might have been reluctant to answer survey questionnaires which might have made a small sample size.

CONCLUSION

The significance of mental health among registrars has increased due to its effect on the quality of care provided to patients. The overall burnout in O&G registrars in this study was 4,4% which is lower than previous local and international studies. Examining the burnout subscales, there was a low sense of personal achievement and a high level of depersonalization.

No demographic characteristics were identified as risk factors for burnout in this study. Innate resilience has also been demonstrated to lower the risk of burnout in registrars so this can be a protective factor.

RECOMMENDATION

There needs to be an increase in joint initiatives that include changes in work environment conditions and stress-management programs aimed at assisting people in managing stressful circumstances by acknowledging and addressing the root issues. Health care workers and organizations can collaborate to prevent burnout and enhance overall well-being.

Despite the limitations this study still offers some insight into burnout in HCWs. Future research should be done specifically on protective factors to help prevent burnout in HCWs.

DISCLOSURE

The authors report no conflict of interest in this study.

REFERENCES

1. Smith RP. Burnout in Obstetricians and Gynecologists. Vol. 44, Obstetrics and Gynecology Clinics of North America. W.B. Saunders; 2017. p. 297–310. DOI: <https://doi.org/10.1016/j.ogc.2017.02.006>
2. Low ZX, Yeo KA, Sharma VK, Leung GK, McIntyre RS, Guerrero A, et al. Factors influencing resilience and burnout among resident physicians: a national survey. BMC Med Educ. 2021;21(1):34. doi:10.1186/s12909-021-02950-y
3. Westmoreland KD, Lowenthal ED, Finalle R, Mazhani L, Cox M, Mwita JC, et al. Registrar wellness in Botswana: Measuring burnout and identifying ways to improve wellness. Afr J Health Prof Educ. 2017 Sep 27;9(3):98.DOI: [10.7196/AJHPE.2017.v9i3.881](https://doi.org/10.7196/AJHPE.2017.v9i3.881)
4. Zeijlemaker C, Moosa S. The prevalence of burnout among registrars in the School of Clinical Medicine at the University of the Witwatersrand, Johannesburg, South Africa. S Afr Med J. 2019 Aug 28;109(9):668–72.DOI: <https://doi.org/10.7196/samj.2019.v109i9.13667>

5. Balie GM, Branch SJ, Lombaard HA du T. Burnout among obstetrics and gynaecology registrars in teaching hospitals of the university of the witwatersrand medical school. *S Afr J Obstet Gynaecol*. 2019;25(3):75–8. <https://doi.org/10.1796/SAJOG.2020.v25.i3.1490>

6. Fauzi MFM, Yusoff HM, Robat RM, Saruan NAM, Ismail KI, Haris AFM. Doctors' mental health in the midst of covid-19 pandemic: The roles of work demands and recovery experiences. *Int J Environ Res Public Health*. 2020 Oct 1;17(19):1–16. <https://doi.org/10.3390%2Fijerph17197340>

7. Maslach C, Jackson S, Leiter M. *Maslach Burnout Inventory* (3rd edition). *Evaluating Stress: A Book of Resources*, Volume 1. 1986. p. 191–218. https://www.researchgate.net/publication/277816643_The_Maslach_Burnout_Inventory_Manual

8. Orton P, Orton C, Gray DP. Depersonalised doctors: A cross-sectional study of 564 doctors, 760 consultations and 1876 patient reports in UK general practice. Vol. 2, *BMJ Open*. 2012. <https://doi.org/10.1136/bmjopen-2011-000274>

9. Westmoreland KD, Lowenthal ED, Finalle R, Mazhani L, Cox M, Mwita JC, et al. Registrar wellness in Botswana: Measuring burnout and identifying ways to improve wellness. *Afr J Health Prof Educ*. 2017;9(3):98. DOI: 10.7196/AJHPE.2017.v9i3.881

10. Meyer C, Barrett C, Joubert G, Mofolo N. The effect of the initial months of the COVID-19 national lockdown on MMed training activities at the University of the Free State, South Africa. *Afr J Health Prof Educ* [Internet]. 2022 Mar 18;14(1):33–42. Available from: <http://www.ajhpe.org.za/index.php/ajhpe/article/view/1220>

11. Aljabri D, Alshatti F, Alumran A, Al-Rayes S, Alsalman D, Althumairi A, et al. Sociodemographic and Occupational Factors Associated With Burnout: A Study Among Frontline Healthcare Workers During the COVID-19 Pandemic. *Front Public Health*. 2022 Mar 9;10. <https://doi.org/10.3389/fpubh.2022.854687>
12. Bentzen JS. In crisis, we pray: Religiosity and the COVID-19 pandemic. *J Econ Behav Organ*. 2021 Dec 1;192:541–83. <https://doi.org/10.1016/j.jebo.2021.10.014>
13. Calvert C, John J, Nzvere FP, Cresswell JA, Fawcus S, Fottrell E, et al. Maternal mortality in the covid-19 pandemic: findings from a rapid systematic review. Vol. 14, *Global Health Action*. Taylor and Francis Ltd.; 2021. <https://doi.org/10.1080/16549716.2021.1974677>
14. Norling LR, Chopik WJ. The Association Between Coworker Support and Work-Family Interference: A Test of Work Environment and Burnout as Mediators. *Front Psychol*. 2020 May 5;11. DOI: <https://doi.org/10.3389/fpsyg.2020.00819>
15. Sotile WM, Fallon RS, Simonds GR. *Moving From Physician Burnout to Resilience* 2019. DOI: <https://doi.org/10.1097/grf.0000000000000444>
16. Nituica C, Bota OA, Blebea J. Specialty differences in resident resilience and burnout - A national survey. *Am J Surg*. 2021 Aug 1;222(2):319–28. <https://doi.org/10.1016/j.amjsurg.2020.12.039>
17. Roslan NS, Saiful M, Yusoff B, Asrenee AR, Morgan K. Burnout Prevalence and Its Associated Factors among Malaysian Healthcare Workers during COVID-19 Pandemic: An Embedded Mixed-Method Study. 2021; <http://doi.org/10.3390/healthcare9010090>
18. Odonkor ST, Frimpong K. Burnout among Healthcare Professionals in Ghana: A Critical Assessment. *Biomed Res Int*. 2020;2020. DOI: <https://doi.org/10.1155/2020/1614968>

19. Moses AC, Dreyer AR, Robertson L. Factors associated with burnout among healthcare providers in a rural context, South Africa. *Afr J Prim Health Care Fam Med*. 2023;16(1). <https://doi.org/10.4102/phcfm.v16i1.4163>
20. Shahi S, Paudel DR, Bhandari TR. Burnout among resident doctors: An observational study. *Annals of Medicine and Surgery*. 2022 Apr 1;76. <https://doi.org/10.1016/j.amsu.2022.103437>
21. Da S, He Y, Zhang X. Effectiveness of psychological capital intervention and its influence on work-related attitudes: Daily online self-learning method and randomized controlled trial design. *Int J Environ Res Public Health*. 2020 Dec 1;17(23):1–19. <https://doi.org/10.3390/ijerph17238754>
22. Howell TG, Mylod DE, Lee TH, Martsof GR, Polak R. Physician burnout, resilience, and patient experience in a community practice: correlations and the central role of activation. *J Patient Exp*. 2020;7(6):1562–1569. doi:10.1177/2374373519888343
23. Spilg EG, McNeill K, Sabri E, Duffy MC, Ananny L, Graham ID, et al. A cross-sectional study of the interrelationship between burnout, empathy and resilience in academic physicians. *Psychol Health Med*. 2022;27(8):1813–20. <https://doi.org/10.1080/13548506.2021.1954670>
24. Norvell JG, Baker AM, Carlberg DJ, Diller D, Dziedzic JM, Finnell JT, et al. Does academic practice protect emergency physicians against burnout? *J Am Coll Emerg Physicians Open*. 2021 Feb;2(1). DOI: <https://doi.org/10.1002%2Femp2.12329>
25. Van der Walt N, Scribante J, Perrie H. Burnout among anaesthetists in South Africa. *Southern African Journal of Anaesthesia and Analgesia*. 2015;21(6):27–30. DOI: <https://doi.org/10.1080/22201181.2015.1102798>

26. Zhuang C, Hu X, Dill MJ. Do physicians with academic affiliation have lower burnout and higher career-related satisfaction? BMC Med Educ. 2022 Dec 1;22(1). DOI: <https://doi.org/10.3389/fpsyg.2021.625506>
27. Di Guardo F, Di Grazia FM, Di Gregorio LM, Zambrotta E, Carrara G, Gulino FA, et al. Poor maternal–neonatal outcomes in pregnant patients with confirmed SARS-Cov-2 infection: analysis of 145 cases. Arch Gynecol Obstet. 2021 Jun 1;303(6):1483–8. <https://doi.org/10.1007/s00404-020-05909-4>
28. Ren W, Sun L, Tarimo CS, Li Q, Wu J. The situation and influencing factors of outpatient satisfaction in large hospitals: Evidence from Henan province, China. BMC Health Serv Res. 2021 Dec 1;21(1). DOI <https://doi.org/10.1186/s12913-021-06520-2>

APPENDICES

APPENDIX A: APPROVED RESEARCH PROTOCOL

Prevalence of burnout in Obstetrics and Gynaecology registrars in the University of Witwatersrand department during Coronavirus disease 2019 pandemic

**Dr Zanele Ngwenya
0701726E
Registrar in Obstetrics and Gynaecology
MBChB (WSU) BSc (UZ) Dip Obs(SA)**

**Supervisors:
Prof. Hendrick Lombaard
MBChB (Pret) MMed (OetG)(Pret) FCOG(SA) Pg Dip HSE (Wits)
Consultant, Obstetrics and Gynaecology
Dr. Chileshe Mpehle
BSc (Wits) MBBCh (Wits) FCOG (SA)
Consultant, Obstetrics and Gynaecology
Chris Hani Baragwanath Academic Hospital
Dr Gaynor Miranda Balie
MBChB (Stel) Dip Obs (SA) FCOG (SA) MMed O&G (Wits)
Consultant, Obstetrics and Gynaecology**

Contents:

1. Introduction
2. Literature review
3. Problem statement
4. Justification
5. Research questions
6. Aim of the study
7. Methodology
8. Limitations of the study
9. Ethical considerations
10. Budget and funding
11. Proposed timeline
12. References

Abbreviations

COVID-19 – Corona-virus disease 2019

HCW- Health Care Workers

HPCSA- Health Professions Council of South Africa

ICU- Intensive Care Unit

MBI- Maslach Burnout Inventory

O&G- Obstetrics and gynaecology

PPE- Personal protective equipment

Research Electronic Data Capture- REDCap

RSA- Republic of South Africa

SADAG- South African Depression and Anxiety Group

TB- Tuberculosis

USA- United State of America

WHO- World Health Organisation

1. Introduction

Coronavirus disease 2019 (COVID-19) is a highly infectious disease caused by the severe acute respiratory syndrome coronavirus 2. This outbreak was first reported on 31 December 2019 in Wuhan City, Hubei province of China(1). On 11 March the World Health Organisation (WHO) declared COVID-19 a pandemic(1). On 5 March 2020 the first case was confirmed in the Republic of South Africa (RSA). On 15 March 2020 RSA declared a national state of disaster and announced a national lockdown(2). Since then, the pandemic has been getting worse with increased infections, people dying from the virus and an overwhelming burden placed on the healthcare system. The South African health care system was already strained by health issues, such as tuberculosis (TB) and HIV(2). There still exists uncertainty regarding many aspects of

the clinical course of the virus and clinical guidelines of its management(3). These uncertainties have resulted in anxiety about the future(3).

The COVID-19 pandemic is a unique situation for many healthcare workers (HCW) as most healthcare workers have not been involved in similar responses before. HCW's are the first responders and the first to treat people infected with COVID-19(4). This means that HCW's are facing unexpected stressors. In addition to being highly exposed, they are often required to make difficult triage decisions and they have increased workload which may worsen, as more colleagues get infected and take time off work. They may also experience family and friends avoidance owing to the stigma and fear(5).

Working in the health care sector has always been considered challenging. With the advent of COVID-19 there is an increased risk of exacerbating the stress and amplifying the psychological suffering of HCW's(6). A pandemic can intensify the psychological burden a HCW faces, whether at home or in the workplace(7).

Obstetrics and Gynaecology (O&G) is a stressful field owing to increased litigation amongst other things. Being a registrar is also very demanding as there is increased workload and responsibility to perform well academically(8). This study aims to assess the effects on burnout in registrars in this field, during the COVID-19 pandemic.

2. Literature review

The burnout syndrome is defined as a state of intense emotional exhaustion, which occurs frequently among health care workers. It occurs with prolonged exposure to work-related stress and it has three contributing factors(9).

- i) emotional exhaustion which is the feeling that work is overwhelming and energy levels are depleted
- ii) depersonalisation which is personal detachment from work
- iii) low personal accomplishment indicating feelings of incompetence and lack of personal achievement

Generally, people who suffer from the burnout syndrome are intensely tired, become blunted to caring, and devalue their efforts in the workplace(10).

2.1 Burnout in the Health care setting

Health care workers are prone to burnout, as shown by the descriptive study done in Ghana. It was done in 12 health care facilities and it included pharmacists, doctors, nurses, radiographers and laboratory scientists. They showed 9.90% burnout in all the four different groups of HCW's(11).

A doctor's risk of burning out is higher than that of other professions. A national survey done in the USA comparing doctors to the population demonstrated a 46% rate of a single burnout symptom or more(12).

A registrar is a medical doctor undergoing training to become a specialist(13). Registrars usually work long hours, have a lot of responsibilities at work and are overwhelmed by the amount of clinical knowledge they have to master, therefore registrars are group vulnerable to burnout (13). A local university study done among registrars showed a concerning high burnout level of 84%(14). Similarly another study done amongst registrars in Obstetrics and Gynaecology showed 85% levels of emotional exhaustion and 78% levels of depersonalisation and under 50% of respondent's experienced low personal accomplishment at work(8).

Burnout was also described in the Anaesthesiology department in South Africa and a high burnout level was identified(15). Suman Rajan et Al conducted a survey in emergency centres in Gauteng looking at the prevalence of burnout amongst doctors working full time in casualties. This included medical officers, registrars and specialist emergency physicians. Emergency centre doctors who participated in this study were found to have high burnout rates. Specifically, registrars suffered more from burnout than their medical officer colleagues. A proposed reason for this discrepancy was the difference in work demands and responsibilities(16).

2.2. Risk Factors of burnout

Different socio-demographic factors have been associated with burnout of health care workers such as age, gender, educational level, having children and marital status(11). Females have been found to be 1.2 times more vulnerable to burnout than males(11). Similarly a study done by Balie et al. also noted that females have a high burnout rate(8). It has also been shown that female HCW's are more inclined to report burnout, as opposed to their male counterparts(17). Some of the reasons for these findings are women are primary care givers to family members and primary care givers as parents(18).

Women who have comorbidities and known mental health conditions are at increased risk of burnout. Other factors that increase the risk of burnout in women is single relationship status and lack of social support(19). Married healthcare workers, that have children are also at increased risk of burnout. A proposed explanation for this observation is that married people encounter many different emotional challenges, whilst having children may be a contributory or confounding factor. Junior doctors were also found to have high burnout. Some of the reasons

why junior doctors have increased risk to burnout is they work under pressure to improve their skills and gain experience(9).

There are also occupational risk factors that have been associated with burnout. Long working hours have been associated with a high risk for developing burnout because they lead to sleep deprivation and hence physical and mental exhaustion(9). Increased workload has also been found to be a significant cause of burnout and a risk for other mental health conditions(4).

2.3 Effects of burnout

Burnout affects both personal and professional life. A study done by Shanafelt et al. reported that 37% of HCW's had a positive screen for depression(12). A high level of stress leads to high risk of psychiatric problems, suicide and substance use. In the USA it is estimated that 400 physicians die from suicide each year when compared to the general public. Shanafelt et al. reported 14% of HCW's had considered suicide in the previous year and 1% had attempted suicide(12). Health care workers have poor health seeking behaviour, largely due to the stigma associated with mental illness and as a result they may adopt alcohol and drugs as coping strategies. They found that 10-12% of doctors will acquire substance abuse disorders(12). Another possible reason for the poor health seeking behaviour of HCW's is the fact that HCW's may be required to inform the Health Professions Council of any mental illness diagnosis(17).

Increased absenteeism and reduced productivity in the workplace are some of the workplace consequences of burnout. Health care workers may also be more likely to leave their jobs(10). Patients reported dissatisfaction with the quality of health care they received in hospitals where the HCW's were suffering from burnout. This meant that there was a correlation between quality of care and burnout(20). It also increases the risk of medical errors as burnout is associated with cognitive impairment, like attention deficit and forgetfulness(21). Burnt out HCW's will, for

example, forget to hand over critical patients that may require special attention or they may forget to check important results.

2.4 Burnout of health care workers during the COVID-19 pandemic

Health care workers have been found to have a high rate of mental illness, in an recent South African review, done during the COVID-19 pandemic(5). Health care worker redeployment, as part of the essential response, increases stress and exposure of individuals(2). A study done in Wuhan looking at the psychological impact on 5062 HCW's, during the COVID-19 outbreak, showed that the majority of HCW's reported stress, symptoms of anxiety and depression(3). Another study done in South Arabia looking at mental health amongst HCW's during the COVID-19 outbreak found that depression and anxiety were prevalent amongst HCW's (55, 2 % and 51, 4% respectively)(4).

A global survey was done in the United State of America (USA) to assess the level of burnout amongst HCW's during the outbreak. Sixty countries contributed a total of 2,707 responses, of which 33 countries reported burnout rates (6).

As the pandemic gets worse, the opportunities for recovery experiences diminish. Recovery experiences refer to any psychological detachment from work, to allow for relaxation of an individual(10). Health care workers are also faced with unprecedented dilemmas that they now have to deal with, like balancing ethical duties such as caring for patients with genuine fears of getting infected with COVID-19 and infecting their family members(22).

This is also made worse by limited or lack of personal protective equipment (PPE). Another dilemma involves making decisions on ventilator support for critical patients. Patient triage for

ventilator eligibility, sees the HCWs having to select between critical patients based on their projected prognosis. This difficult task of allocating scant resources is an additional psychological stressor(22).

Obstetrics and Gynaecology has one of the highest burnout rates of any speciality. This may be associated with the fact that Obstetrics and Gynaecology has a high turnover of patients(23).

Unique to the Obstetrics and Gynaecology profession is the added stressor that the doctor is not only responsible for the mother's wellbeing but the baby's as well. Recently there has been an increase in the number of litigations(23).

Obstetrics and Gynaecology in the public sector is faced with the challenge of high patient load and limited resources. The sparsity of literature concerning the management of the COVID-19 positive pregnant woman also has exerted additional stress on obstetricians. There is also uncertainty regarding the short and long-term effects of the virus on the foetus (24).

3. Problem statement

Burnout syndrome is still not well understood especially in the health care setting but it has serious effects. It has effects on the HCW's both personal and professional life. It increases their risk for substance abuse, depression and suicide. It is associated with increased risk for medical errors and contributes to poor patient satisfaction. There is a need to explore this phenomenon, so as to bring to light possible mitigating interventions.

4. Justification

Understanding the levels and risk factors of burnout amongst health care workers is important in supporting health care workers and maintaining a quality health care system. It will also assist in implementing preventative strategies and treatment methods.

5. Research Question

What is the prevalence of burnout in Obstetrics and Gynaecology registrars in the University of Witwatersrand circuit during Coronavirus disease 2019 pandemic?

6. Aim of the study

To determine the prevalence of burnout amongst registrars in the Obstetrics and Gynaecology department during the Coronavirus disease 2019 pandemic.

7. Objectives of the study

1. To describe the demographics of the registrars working in the department of Obstetrics and Gynaecology.
2. To determine the prevalence of burnout amongst registrars in the Obstetrics and Gynaecology department of the University of Witwatersrand during Coronavirus 2019 pandemic
3. To identify possible risk factors for burnout among registrars
4. To identify possible supportive factors which may prevent burnout

8. Methodology

8.1. Study design

Analytic cross-sectional study

8.2 Study site

The study will be conducted in the teaching hospitals of the University of the Witwatersrand circuit. There are three academic hospitals and three regional hospitals that the registrars rotate through. These hospitals are the main hospitals performing COVID-19 testing; receiving patients that test positive for COVID-19 and patients that require ICU admission. The study will be conducted with an electronic questionnaire.

8.3. Study population

All registrars at the University of Witwatersrand Obstetrics and Gynaecology circuit during the Coronavirus Disease 2019 pandemic from March 2020 to June 2021.

8.4. Data collection

Electronic survey in the form of a questionnaire will be sent via email to participants. Consent will be implied by answering the questionnaire and it will have an option for those who prefer not to answer. A reminder email will also be sent.

Questionnaire will have two parts. First part will contain socio-demographic questions: age, gender, number of years in the programme and marital status. It will address lifestyle factors and the experience during COVID-19 pandemic.

Second part will consist of the Maslach Burnout Inventory (MBI). It is one of the most commonly used and most validated measure of burnout in the scientific literature. It is self-administered and takes 10-15 minutes to fill out. It assesses all the three components of burnout syndrome (burnout, depersonalisation and personal achievement) in the form of statements about attitudes and emotions (25).

Each of the components is given a score from 0-6; and scoring high in the first two components and low in the latter component is a positive finding.

8.5. Sample size

At the time of protocol development there were 64 registrars in the studied department. The intended sample size is to be all registrars that meet the inclusion criteria and are willing to participate in the study.

8.6. Data collection and analysis

The collection tool will have a non-identifying study number. This will be entered into a REDCap (Research Electronic Data Capture) database. The data will be transferred to Stata (Statacorp USA) for software analysis.

Descriptive statistics will be done. Categorical variables will be presented as frequency and percentage while normally distributed continuous variables will be presented as mean and standard deviation. Non-normally distributed variables (or skewed data) will be presented as median and interquartile range. The questionnaire is a likert scale. The median score of the burnout scores will be compared by socio-demographic characteristics using Mann-Whitney U test (e.g. gender) or Kruskal Wallis test (e.g. years of experience : <1 year, 1-3 years, >3years of experience).The participants will be divided into high burnout score and low burnout score. Association between categorical variables and burnout status (low/high burnout score) will be assessed using the Pearson's Chi square. Univariable and multivariable binary logistic regression will be conducted to evaluate the relationship or predictors of low/high burn out among the registrars. A P-value < 0.05 will be taken as statistically significant level at 95% confidence interval.

Eligibility criteria

Inclusion criteria

Individuals registered for the Obstetrics and Gynaecology registrar program, at the University of Witwatersrand, during the period 1 March 2020 to 30 June 2021. This will include the registrars that are now recently qualified as specialist.

Exclusion criteria

Registrars not registered in the University of Witwatersrand during the period 1 March 2020 to 30 June 2021.

Anyone unwilling to participate

9. Limitations of the study

Participants might be reluctant to answer survey questionnaire which could therefore affect the sample size.

10. Ethical Considerations

The research will be done in accordance with the ethical and professional guidelines. Ethical approval will be obtained from the Human Research and Ethics Committee of the University of Witwatersrand before the commencement of the study.

Permission will also be obtained from the Academic Head of the Department of Obstetrics and Gynaecology from the University of Witwatersrand.

Participation will be voluntary; the questionnaire will be answered anonymously and will remain anonymous to the researcher as well. Consent will be implied by the participant answering and submitting the questionnaire.

Participants that feel they are in need of assistance can contact the South African Depression and Anxiety Group (SADAG) on the 24 hour Healthcare Workers Care Network Helpline (HWCN)) 0800 21 21 21 or SMS 43001. Online platform is also available on healthcareworkerscarenetwork.org.za.

11. Budget and Funding

Item	Cost (Rands)
Stationery	400
*Conference presentation	4000
*Publication of journal article	1500-30000
Language editor	1000-2000
Statistician	4000
Total cost	10900

*The researcher aims to apply to the university for assistance with fees for conference presentation and publication. All other costs to complete the research will be funded by the researcher.

12. Proposed Timeline of the study

	January	February	March	April	May	June	July	August	September
Preparation of draft of protocol	X	X	X						
Protocol submission to assessors					X				
Addressing the comments of assessors and resubmission						X	X	X	X
Submission to university's ethics committee									X

	October	November	December	January	February	March
Data collection- Questionnaires sent to participants	X	X				
Data analysis			X			
Write up research report and addressing comments of supervisors				X	X	
Submission of research report for examination						X

References

1. Cucinotta D, Vanelli M. WHO Declares COVID-19 a Pandemic. 2020;91(6):157–60.
2. Mabenge MS. Management of Obstetric patients with COVID-19. O & G FORUM. 2020. Vol. 30. 10-12
3. Dreyer G, Snyman L. South Africa's Response to COVID-19; ON THE POSITIVE SIDE. O & G FORUM. 2020. Vol. 30. 1

4. Fauzi MFM, Yusoff HM, Robat RM, Saruan NAM, Ismail KI, Haris AFM. Doctors' mental health in the midst of covid-19 pandemic: The roles of work demands and recovery experiences. *Int J Environ Res Public Health*. 2020;17(19):1–16.
5. Robertson LJ, Maposa I, Somaroo H, Johnson O. Mental health of healthcare workers during the COVID-19 outbreak: A rapid scoping review to inform provincial guidelines in South Africa. *South African Med J*. 2020;110(10):1010–9.
6. Morgantini LA, Naha U, Wang H, Francavilla S, Acar Ö, Flores JM, et al. Factors contributing to healthcare professional burnout during the COVID-19 pandemic: A rapid turnaround global survey. *PLoS One*. 2020;15(9 September):1–11.
7. Karakose T, Malkoc N. Psychological impact of the COVID-19 pandemic on medical doctors in Turkey. *Soc Behav Personal an Int J*. 2021;49(1):1–10.
8. Balie GM, Branch SJ, Lombaard HA d. T. Burnout among obstetrics and gynaecology registrars in teaching hospitals of the university of the witwatersrand medical school. *S Afr J Obstet Gynaecol*. 2019;25(3):75–8.
9. Amoafo E, Hanbali N, Patel A, Singh P. What are the significant factors associated with burnout in doctors? *Occup Med (Lond)*. 2015;65(2):117–21.
10. Stehman CR, Testo Z. Burnout , Drop Out , Suicide : Physician Loss in Emergency Medicine , Part I. 2019;20(May):485–94.
11. Odonkor ST, Frimpong K. Burnout among Healthcare Professionals in Ghana: A Critical Assessment. *Biomed Res Int*. 2020;2020.
12. Investigation O. Burnout and Satisfaction With Work-Life Balance Among US Physicians Relative to the General US Population. 2012;172(18):1377–85.
13. Westmoreland KD, Lowenthal ED, Finalle R, Mazhani L, Cox M, Mwita JC, et al. Registrar wellness in Botswana: Measuring burnout and identifying ways to improve wellness. *African J Heal Prof Educ*. 2017;9(3):98.
14. Zeijlemaker C, Moosa S. The prevalence of burnout among registrars in the School of Clinical Medicine at the University of the Witwatersrand, Johannesburg, South Africa. *S Afr Med J*. 2019;109(9):668–72.
15. van der Walt N, Scribante J, Perrie H. Burnout among anaesthetists in South Africa. *South African J Anaesth Analg* [Internet]. 2015;21(6):27–30. Available from: <http://dx.doi.org/10.1080/22201181.2015.1102798>
16. Rajan S, Engelbrecht A. A cross-sectional survey of burnout amongst doctors in a cohort of public sector emergency centres in Gauteng, South Africa. *African J Emerg Med* [Internet]. 2018;8(3):95–9. Available from: <https://doi.org/10.1016/j.afjem.2018.04.001>
17. Gold KJ, Andrew LB, Goldman EB, Schwenk TL. “I would never want to have a mental health diagnosis on my record”: A survey of female physicians on mental health diagnosis, treatment, and reporting. *Gen Hosp Psychiatry* [Internet]. 2016;43(September):51–7. Available from: <http://dx.doi.org/10.1016/j.genhosppsych.2016.09.004>
18. Sriharan A, Ratnapalan S, Tricco AC, Lupea D, Ayala AP, Pang H, et al. Stress, burnout and depression in women in healthcare during COVID-19 pandemic: Rapid scoping review. *medRxiv*. 2020;
19. State E, Ogboghodo EO, Edema OM. Assessment of Burnout amongst Resident Doctors in Benin City ,. 2020;215–23.
20. Dewa CS, Loong D, Bonato S, Trojanowski L. The relationship between physician burnout and quality of healthcare in terms of safety and acceptability: A systematic review. *BMJ Open*. 2017;7(6).

21. Salyers MP, Ph D, Bonfils KA, Luther L, Firmin RL, White DA, et al. The Relationship Between Professional Burnout and Quality and Safety in Healthcare : A Meta-Analysis. :475–82.
22. Jafarey A. Ethical dilemmas in clinical care during COVID-19 pandemic S-146. :145–8.
23. Bourne T, Shah H, Falconieri N, Timmerman D, Lees C, Wright A, et al. being and defensive medical practice among obstetricians and gynaecologists in the UK : cross- -sectional survey study. 2019;1–11.
24. Vafaei H, Roozmeh S, Hessami K, Kasraeian M, Asadi N, Faraji A, et al. Obstetrics healthcare providers' mental health and quality of life during covid-19 pandemic: Multicenter study from eight cities in Iran. Psychol Res Behav Manag. 2020;13:563–71.
25. Maslach C, Jackson S, Leiter M. Maslach Burnout Inventory (3rd edition). Evaluating Stress: A Book of Resources, Volume 1. 1986. p. 191–218.

APPENDIX B: DATA COLLECTION SHEET

DATA COLLECTION SHEET

A. Socio-demographic information

Age (years)

20-30

30-40

40-50

>50

Gender

Female

Male

Marital status

Single

Married (legally or cultural)

Separated/divorced

Stable relationship

Ethnicity

Black

White

Indian

Colored

Other

Children

Yes

No

Number of children

Ages of children

Year qualified from medical school

Number of years in Registrar program

1

2

3

4

Completed

Time spent as medical officer before registrar training?

Yes

No

If yes how long?

Average working hours a month before the COVID-19 pandemic

Average working hours during the COVID-19 pandemic

Lifestyle factors

Use of alcohol

Do you drink alcohol?

Yes

No

Average Unit* per week (* the approximate unit per week is concentration of alcohol in % multiplied by total volume of alcohol in ml divided by a 100) before COVID-19 pandemic

Average Unit *per week after COVID-19 pandemic

Smoking

Yes

No

Number of cigarettes before COVID-19

Number of cigarettes after COVID-19

Experience during the Coronavirus 2019 Pandemic

Did you test positive for COVID-19?

Did you have adequate Personal Protective Equipment?

Did you have adequate training on how to use the PPE?

Did you receive the vaccine?

If no

Why not?

For each question indicate the score that corresponds to your response

Section A

Questions	Never	A few times a year	Once a month	A few times in a month	Once a week	A few times per week	Everyday
	0	1	2	3	4	5	6
I feel emotionally drained by my work							
Working with people all day long requires a great deal of effort							
I feel like my work is breaking me down							
I feel frustrated							

by my work							
I feel I work too much at my job							
It stresses me too much to work in direct contact with people							
I feel I am at the end of my rope							

Section B

Questions	Never	A few times a year	Once a month	A few times per month	Once a week	A few times per week	Everyday
	0	1	2	3	4	5	6
I feel I look after certain patients impersonally as if they are objects							
I feel tired when I get up in the morning and have to face another day							
I have the impression that my patients make me responsible for some of their problems							

I am at the end of my patience at the end of my work day							
I really do not care what happens to some of my patients							
I have become more insensitive to people since I have been working							
I am afraid that this job is making me uncaring							

Section C

Questions	Never	A few times a year	Once a month	A few times a month	Once a week	A few times a week	Everyday
	0	1	2	3	4	5	6
I accomplish many worthwhile things in my job							
I feel full of energy							
I am easily able to understand what my patients feel							
I look after my							

patients problems very effectively							
In my work I handle emotional problems very calmly.							
Through my work I feel that I have a positive influence on people							
I am easily able to create a relaxed atmosphere with my patients							
I feel refreshed when I have been close to my patients at work							

APPENDIX C: PERMISSION TO CONDUCT STUDY BY WITS STUDENT ACADEMIC HOD

Signatures:

Date: 11/06/21

Applicant's Signature: 11/06/21

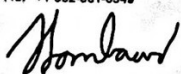
WHO WILL SUPERVISE THE PROJECT? (Where applicable)

Name: Prof Hennie Lombaard

Department: Obstetrics and Gynaecology

Telephone No: +1-852-881-8349

Email: hennie.lombaard73@gmail.com

Signature: 

Date: 5 Sept 2021

HEAD / RESEARCH COORDINATOR OF DEPARTMENT / ENTITY IN WHICH STUDY WILL BE CONDUCTED (Where applicable) (Wits Students Academic HOD must sign)

Name: Y. Aden

Department / Entity: M16

Tel No: 083 260 2638

Email: yaden14@gmail.com

Signature: 

Date: 10/05/2021

APPENDIX D: CERTIFICATE: INTRODUCTION TO RESEARCH ETHICS



Zertifikat
Certificat

Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

**Certificat de formation - Training Certificate**
Ce document atteste que - this document certifies that
zanele ngwenya
a complété avec succès - has successfully completed
Introduction to Research Ethics
du programme de formation YRREE en évaluation éthique de la recherche
of the YRREE training programme in research ethics evaluation

Release Date: 2020/05/04
CID : vPhdEYNE


Professeur Dominique Sprumont
Coordinateur YRREE Coordinator

**FMH** Continuing Education Program (5 Credits)
Programme de Formation continue (5 Crédits)

**FPH** Foederatio Pharmaceutica Helvetica
Programmes de formation continue

Ce programme est soutenu par - This program is supported by :
European and Developing Countries Clinical Trials Partnership (EDCTP) (www.edctp.org) - Swiss National Science Foundation (www.snf.ch) - Canadian Institutes of Health Research (<http://www.cihr-irsc.gc.ca/e/2891.html>) -
Swiss Academy of Medical Science (SAMS/ASSM/SAMW) (www.sams.ch) - Commission for Research Partnerships with Developing Countries (www.kpdc.ch)

[REV : 20170310]

APPENDIX E: ETHICS CLEARANCE CERTIFICATE

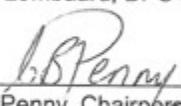
UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



R14/49 Dr Zanele Ngwenya

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

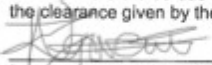
CLEARANCE CERTIFICATE NO. M211173

NAME: Dr Zanele Ngwenya
(Principal Investigator)
DEPARTMENT: Clinical Medicine
PROJECT TITLE: Prevalence of burnout in Obstetrics and Gynaecology registrars in the University of Witwatersrand department during coronavirus disease 2019 pandemic
DATE CONSIDERED: 25/02/2022
DECISION: Approved unconditionally
CONDITIONS:
NOTE: If contact information regarding student study participants is required, please contact the University Registrar's office <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR: Prof H Lombaard, Dr C Mpehle and Dr GM Balie
APPROVED BY: 
Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL: 26/04/2022

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

DECLARATION OF INVESTIGATORS

To be completed in duplicate and ONE COPY returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. I agree to submit a yearly progress report. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in February and will therefore be due in the month of February each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).


Principal Investigator Signature

30/04/22

Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX F: ADHERENCE TO HREC

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



HUMAN RESEARCH ETHICS
COMMITTEE (MEDICAL)

DECLARATION:

Adherence to HREC (Medical) Ethics Application Terms and Conditions

I, the undersigned, hereby declare that I have not collected data/ done secondary data analysis or any other form of research, prior to obtaining clearance certificate from the HREC (Medical) for study no: M211173.

I have read and understood the terms and conditions on page 8-9 of the [HREC \(Medical\) application form](#). I confirm that it is my responsibility to ensure that I have received final HREC (Medical) Clearance before commencing any research.

Cynthia Zanele Ngwenya

Name, Surname and Signature

Student/Staff no if applicable: 07017264E

Handwritten signature of Cynthia Zanele Ngwenya.

Date: 22/10/22

Prof Hennie Lombaard

Handwritten signature of Prof Hennie Lombaard.

Name, Surname and Signature

Supervisor (if applicable)

Date: 19th December 2024

APPENDIX G: JOURNAL GUIDELINES FOR SAMJ AUTHORS GUIDE

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 or RTF document 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)'.
- 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. π 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.

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 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:
- Each row of data must have its own proper row:
- Do not: use separate columns for n and %:

Rather:

- Combine into one column, n (%):
- Do not: have overlapping categories, e.g.:
- Rather:
- 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

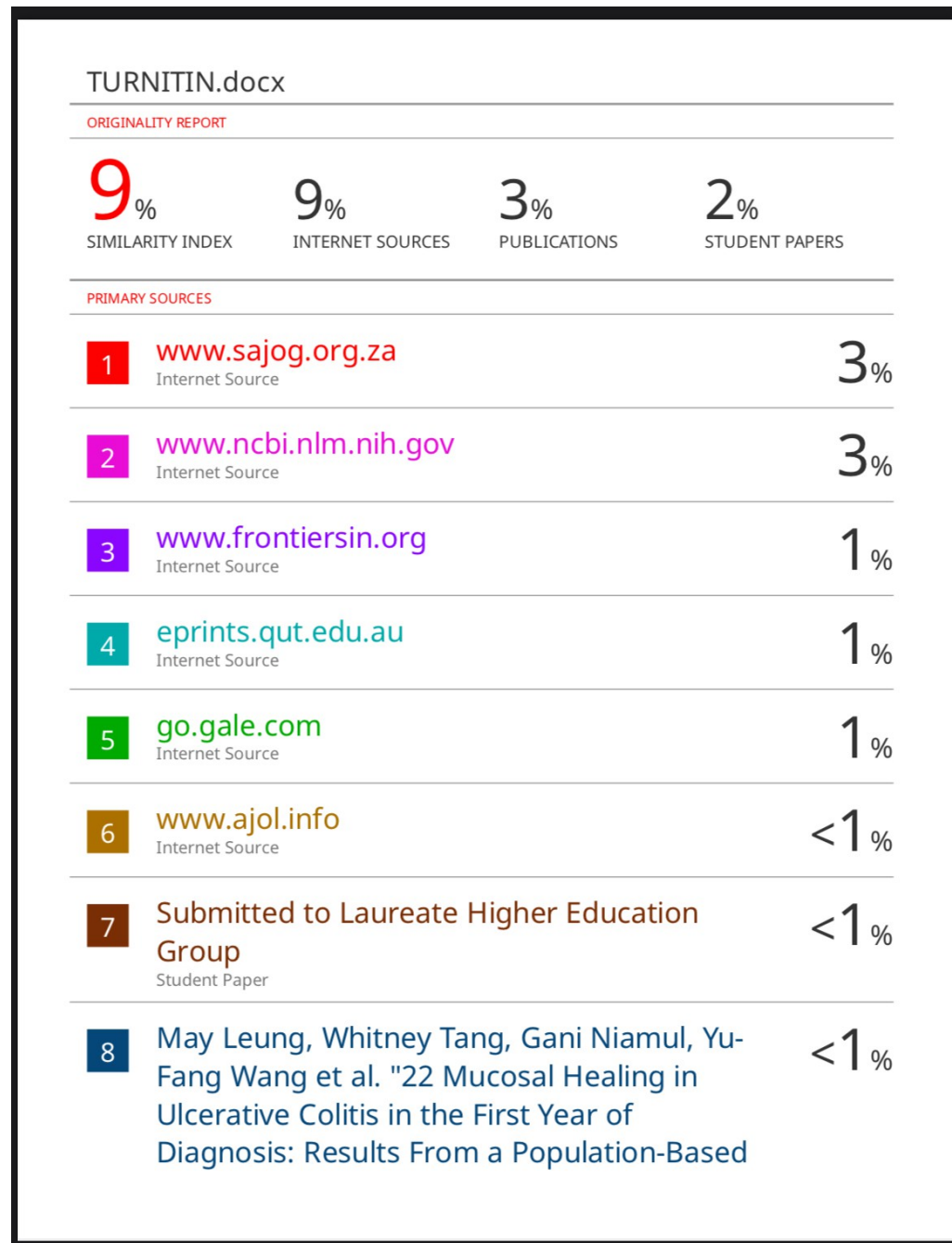
11: Page or section number

(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)'.

APPENDIX H: TURNITIN PLAGIARISM REPORT



Inception Cohort Study From Six Countries in Asia", Gastroenterology, 2016

Publication

-
- 9 Minro WATANABE, Kiyoko WATANABE, Kiyoshi KONNO, Haruo SATO. "GENETIC DIFFERENCES IN THE INDUCTION OF ARYL HYDROCARBON HYDROXYLASE AND BENZO[a]PYRENE CARCINOGENESIS IN C3H/He AND DBA/2 STRAINS OF MICE", GANN Japanese Journal of Cancer Research, 1975

Publication

-
- 10 www.slideshare.net <1 %

Internet Source

-
- 11 arden.ac.uk <1 %

Internet Source

-
- 12 bmcendocrdisord.biomedcentral.com <1 %

Internet Source

Exclude quotes On

Exclude matches < 8 words

Exclude bibliography On

