

THE IMPACT OF COVID-19 PANDEMIC ON GYNAECOLOGICAL SERVICES AND
REGISTRAR TEACHING IN THREE ACADEMIC HOSPITALS IN JOHANNESBURG

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Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of
Master of Medicine in Obstetrics and Gynaecology
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DECLARATION

I, Sannyboy Surprise Shivuri, hereby declare that this Dissertation Report is of my own unaided work. I am submitting this research report for the degree Master of Medicine (in the submissible format with my protocol and extended literature review) in the branch of Obstetrics and Gynaecology at the University of the Witwatersrand, Johannesburg. This research report has not been submitted before for any degree or examination at this or any other university.



(Signature of candidate)

March 2024

ABSTRACT

Objectives:

To evaluate the impact of the Covid-19 pandemic on gynaecological services and registrar training.

Study design:

This was a descriptive cross-sectional study. Data on gynaecological visits and procedures was gathered from three teaching hospitals in Johannesburg, using hospital patient registers from November 2019 to November 2020. An online survey was used to assess registrar opinions on the impact of Covid-19 restrictions on training. The Monthly Percentage Change (MPC) and p-values were calculated using the formula $(\text{eb1} - 1) \times 100$. The Joinpoint Regression Program (Version 4.9.1.0 2020) was used to measure the magnitude of changes in visits and procedures. A p-value < 0.05 indicated a significant change. The Human Research Ethics Committee of the University of the Witwatersrand approved the study (Ethics clearance number: M220509).

Results:

There was a decrease in gynaecological services during the pandemic: Gynaecological outpatient department (Nov 2019-July 2020 MPC= -13%, $p = 0.05$), Termination of pregnancy services (Nov 2019-June 2020 MPC= -2%, $p = 0.01$), and elective major gynaecological procedures (Nov 2019-July 2020 MPC= -14%, $p = 0.05$).

Of 64 registrars surveyed, 19 (54.3%) were male; 16 (45.7%) were female. The median age was 33 years (IQR = 31-38, range = 27-48 years). Twelve (36.4%) registrars were in the first-year of study, seven (21.2%) second-years, nine (27.3%) third-years, and five (15.2%) final-years. The registrars performed fewer major surgical cases; total abdominal hysterectomies (Nov 2019-Jul 2020 MPC= -7%, $p = 0.05$), vaginal hysterectomies (Nov 2019-Jul 2020 MPC= -2.2%, $p = 0.02$), and myomectomies (Nov 2019-Jun 2020 MPC= -16%, $p = 0.03$). The above gynaecological services began to show recovery after July 2020.

Conclusion:

There was a decline in outpatient and surgical gynaecological services in all participating academic hospitals. The pandemic had a negative impact on registrars' training as seen by the smaller number of major gynaecological cases.

Keywords: Covid-19, Impact, Registrar training, Gynaecology services, South Africa

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ABBREVIATIONS

ANOVA - Analysis Of Variants

ARDS - Acute Respiratory Distress Syndrome

CHBAH - Chris Hani Baragranath Academic hospital

CMJAH - Charlotte Maxeke Johannesburg Academic Hospital

Covid-19 - Coronavirus disease 2019

ENT – Ear, Nose & Throat

GOPD - Gynaecological Outpatient Patient Department

HCW - Health Care Workers

HOD - Head of Department

HREC - Human Research Ethics Committee

ICU - Intensive Care Unit

IUCD - Intra-Uterine Contraceptive Device

IQR - Inter-Quartile Range

LLETZ - Large Loop Excision of Transformation Zone

OASIS - Obstetrics Anal Sphincters

O&G - Obstetrics and Gynaecology

PPE – Personal Protective Equipment

mRNA – messenger Ribonucleic Acid

MERS - Middle East Respiratory Syndrome

MVA - Manual Vacuum Aspiration

NICD - National Institute for Communicable Diseases

RMMCH - Rahima Moosa Mother and Child Hospital

rRT- PCR - reverse Real-Time Polymerase Chain Reaction

RNA - Ribonucleic Acid

SARS - Severe Acute Respiratory Syndrome

SARS-CoV - Severe Acute Respiratory Syndrome Coronavirus

SARS-CoV-2 - Severe Acute Respiratory Syndrome Coronavirus 2

SD - Standard Deviation

TOP - Termination of Pregnancy

WHO - World Health Organization

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The above gynaecological services began to show recovery after July 2020.

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There was a decline in outpatient and surgical gynaecological services in all participating academic hospitals. The pandemic had a negative impact on registrars' training as seen by the smaller number of major gynaecological cases.

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INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) responsible for the infectious disease called coronavirus disease 2019 (Covid-19), was first reported in Wuhan, Hubei area, China in December 2019.¹ The infection spread rapidly across the world and was declared a pandemic by the World Health Organisation (WHO) on March 11, 2020.² As of May 20, 2021, the National Institute for Communicable Diseases (NICD) reported that there were 1 625 003 cases and 56 568 deaths in South Africa.³ The South African government declared the Covid-19 outbreak as a public health disaster on March the 15, 2020,⁴ followed by restructuring of the health care system to focus the limited resources on managing the acute and severe cases of Covid-19 infections.

Consequently, elective and non-urgent medical and/or surgical services were either postponed or reduced in all disciplines in order to mitigate the effects of the Covid-19 pandemic with the exception of obstetrics services and other urgent services in other disciplines. Women with gynaecological problems were triaged and if considered non-urgent, given an appointment after six weeks to ease pressure on the health system. If any surgeon was of opinion that the operation was urgent, the case would be referred to a multi-disciplinary vetting committee, which included surgeons and anaesthetists who would assess whether it was safe for both patient and surgeon to proceed with the surgery. Women who needed urgent surgery and screened or tested positive for Covid-19 were managed in dedicated theatres, wards, high care, and ICUs. The above necessitated changes in the infrastructure and restructuring of duties of health care workers.⁵ Unfortunately, this arrangement had a negative impact on the provision of healthcare services, education, and training.

The Covid-19 pandemic overwhelmed the health care system all over the world. In the United States of America (USA), the overall general surgery residents operating volume declined by 33.5% during the first four months of the Covid-19 pandemic when compared with the first four months of 2018 and 2019.⁶ Similarly, Obstetrics and Gynaecology trainees in Europe were affected as a result of diminished exposure to learning opportunities, surgical

procedures and teaching.⁷ A study reported that 51% of Obstetrics and Gynaecology trainees in Italy experienced critical training impairment and 80% of Urology trainees either experienced reduction in their training or were forced to stop their training because of the Covid-19 pandemic.^{8,9} Gynaecological outpatient services in the United Kingdom (UK) were cancelled and replaced with telemedicine consultations.¹⁰ Surgical and medical specialities in the UK were also not spared as 97% of surgical specialties experienced a reduction in their surgical loads.¹¹ Locally, in Cape Town non-urgent operations and outpatients clinic visits also experienced reduction.¹²

In this study, we aimed to evaluate the effect of the Covid-19 pandemic on gynaecological services by determining the number of patients seen at gynaecology outpatient departments (GOPD), colposcopy clinic, Termination of pregnancy (TOP) clinic, and number of major gynaecological procedures done between November 2019 and November 2020, and to evaluate the effect of the Covid-19 pandemic on Gynaecology post-graduate educational training by determining the number of major gynaecological procedures performed by registrars in three academic hospitals over this period.

We hoped that by conducting this research, we would be able to provide an overview of the effects of a pandemic on gynaecological services and educational training, so that the gynaecological units, trainees (registrars) and trainers could be better prepared to address the challenges that can arise because of the changes made during a pandemic.

MATERIALS AND METHODS

Study setting and participants:

The study was conducted in three academic hospitals in Johannesburg. All three hospitals are affiliated with the University of the Witwatersrand, Johannesburg, South Africa. CHBAH is Africa's largest tertiary hospital, located in Soweto; CMJAH is a tertiary facility located in Parktown; and RMMCH is a specialised regional teaching hospital located in Coronationville.

There are 64 registrars who rotate through these hospitals. They are required to do a minimum of 18 months of time in gynaecology during their training. There are a prescribed minimum number of surgical and clinical procedures that have to be completed in this time as per the College of Medicine of South Africa (CMSA).

Study design & data collection measurement:

This was a cross-sectional study and data on gynaecological services was collected retrospectively from hospital service records at the three teaching hospitals using hospital service records from GOPD, colposcopy clinics, TOP clinics, and gynaecological theatres. Data on training of registrars was collected using an online questionnaire. The registrars were sent an anonymous online questionnaire link to gather information on how the pandemic affected their training. The questionnaire comprised of five sections: demographics information (age, sex, year of study), questions assessing the impact on their clinical training, number of major surgical procedures performed, questions regarding the impact on academic activities and registrar wellbeing. The registrars used their Logbox academic app to determine the number of major surgical procedures done.

The following information was collected: changes in training activities, exam postponements, Covid-19 exposure, availability of personal protective equipment, confirmation of Covid-19 infection through positive Covid-19 test results and need to take sick leave due to contracting Covid-19 infection. In total, the questionnaire had 26 questions, including a 5-point Likert scale and open-ended questions. The online questionnaire link was sent via email to all 64 registrars who rotated through the three hospitals during the study period. The participation was entirely voluntary, and no identifiers were collected. Data were collected and stored using REDCap 13.3.2 – C 2023 Vanderbilt University from January 4, 2023 to February 28, 2023.

The Fellowship of the College of Obstetricians and Gynaecologists of South Africa does not have a definition for minor and major gynaecological procedures. The gynaecological procedures listed in the logbook as part of the requirements to qualify as a specialist are abdominal hysterectomy, vaginal hysterectomy, laparoscopic procedures, abdominal surgery, and ‘other’ vaginal procedures. In the University of the Witwatersrand circuit, minor surgeries are any procedures of less than one hour and major surgeries are procedures of more than one hour. The theatre registers list the operations by type, classified as major or minor based on the time spent in theatre.

Permission to access hospital patient records was obtained from the Chief Executive Officers (CEOs) and Heads of Departments (HODs) of Obstetrics and Gynaecology at the three participating hospitals. To send online questionnaires, permission was obtained from the Academic Head of the Department (AHD) of Obstetrics and Gynaecology, University of the Witwatersrand. Ethics approval was obtained from the Human Research Ethics Committee (HREC-Medical) of the University of the Witwatersrand (Ethics clearance number: M22050). The study was also registered with the National Health Research Database (GP202203 079).

Statistical analysis:

The Shapiro-Wilk test was used to test for normality distribution of data of continuous variables. The data is presented as means and standard deviation (SD), and non-parametric data presented as median and an inter-quartile range (IQR). Frequencies and percentages were used to describe categorical data. To describe the effects of Covid-19 pandemic on training, academic activities, registrar's wellbeing, we used Microsoft excel to help calculate the descriptive statistics.

To evaluate the impact of Covid-19 and the various lockdown levels on gynaecological procedures, a time-series analysis was conducted by plotting the number of procedures conducted against the month. Any significant changes in the trends of procedures were evaluated by computing the Monthly Percentage Change (MPC) using the linear regression: $\log(\text{rate}_y) = b_0 + b_1y$ with $\log(\text{rate}_y)$, being the natural log of the number of procedures conducted in month y as described previously.^{13,14} The MPCs and p-values were calculated using the formula: $(e^{b_1} - 1) \times 100$ from the Joinpoint Regression Program, version 4.9.1.0, to quantify the magnitude of changes in the gynaecological services and procedures performed over time.¹⁵ The Joinpoint Regression Program was developed to identify the trend change points and breaks the series into periods with distinct trend. The software automatically detects the trend line before and after an MPC point of inflection in the data and compares those two data periods. The negative MPC value before the inflection point simply indicates a substantial decline, whereas the positive MPC after the inflection point indicates a significant or non-significant increase in the number of cases. The Joinpoint regression program was best suited for our study because we aimed at comparing changes in trends before and after the pandemic, the model is able to show whether changes observed in the dependent variable are associated with changes in one or more of the independent variables.

All data analysis were conducted in Stata 15.0® (StataCorp, 4905 Lakeway Drive, College Station, Texas 77845 USA) and Joinpoint Regression Program, version 4.9.1.0 (National Cancer Institute USA). A p-value < 0.05 indicates a significant change in trend.

RESULTS

Gynaecological services results:

The blue curve in Figure 1 indicates the total number of patients seen in the GOPD all the participating hospitals. There was a significant decline in the total number of patients seen in GOPD in all three hospitals from November 2019 to July 2020 (MPC = -13%, p-value = 0.05), in July 2020, the Joinpoint Regression Program detected a point of inflection (indicated by a blue arrow), which was followed by a significant increase from July 2020 to November 2020 (MPC = 10%, p-value = 0.04) (Figure 1). The decline in gynaecological outpatient visits during December 2019 is typical in all three hospitals due to Christmas holidays.

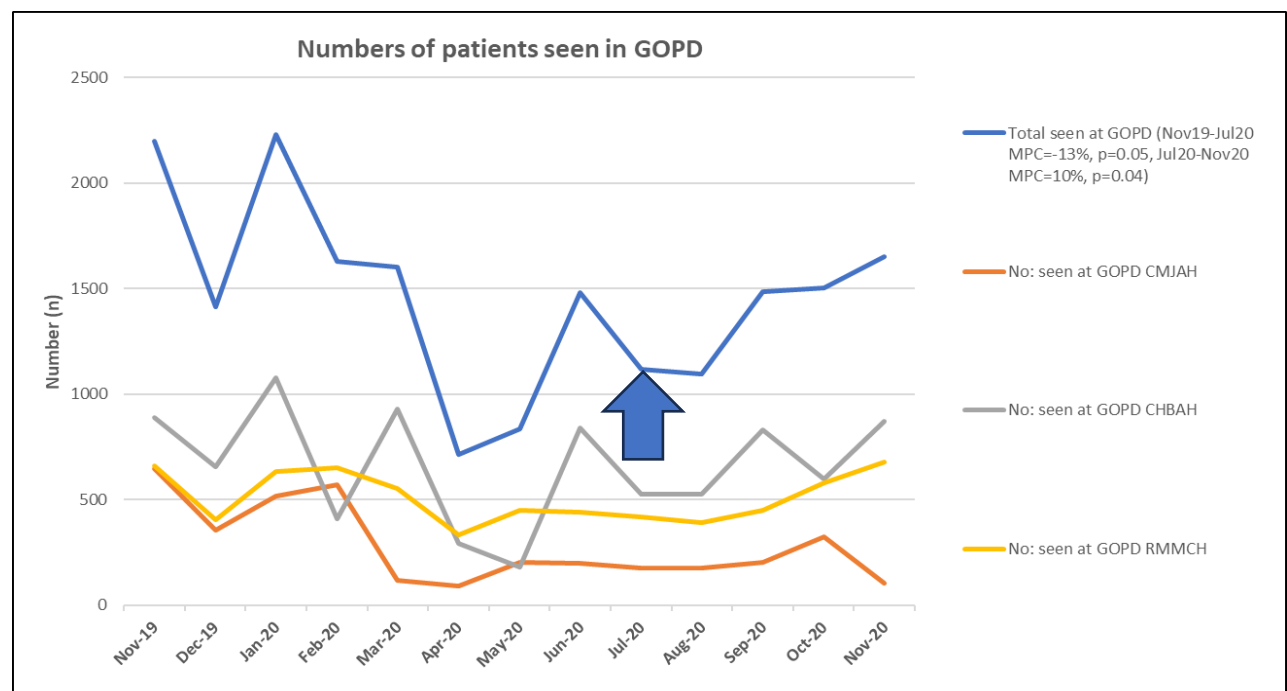


Figure 1: Number of patients seen in GOPD

There were some differences in the number of patients seen in colposcopy clinics at the three hospitals, because CHBAH colposcopy services were not closed during the Covid-19 pandemic from November 2019 to December 2020, whereas the colposcopy clinic at CMJAH was closed from April 2020 to May 2020. The blue curve in Figure 2 indicates the total

number of patients seen in the Colposcopy clinic all the participating hospitals. There was a non-significant decline in the number of patients seen in colposcopy clinics during the period November 2019 to May 2020 (MPC = -2%, p-value = 0.8), in May 2020, the Joinpoint Regression Program detected a point of inflection (indicated by a blue arrow), which was followed by a non-significant rise in the number of patients seen in colposcopy clinic from May 2020 to November 2020 (MPC = 5%, p-value = 0.60) (Figure 2). However, overall the curves in Figure 2 demonstrated normal variation, which signified no effect of the Covid-19 pandemic on colposcopy services.

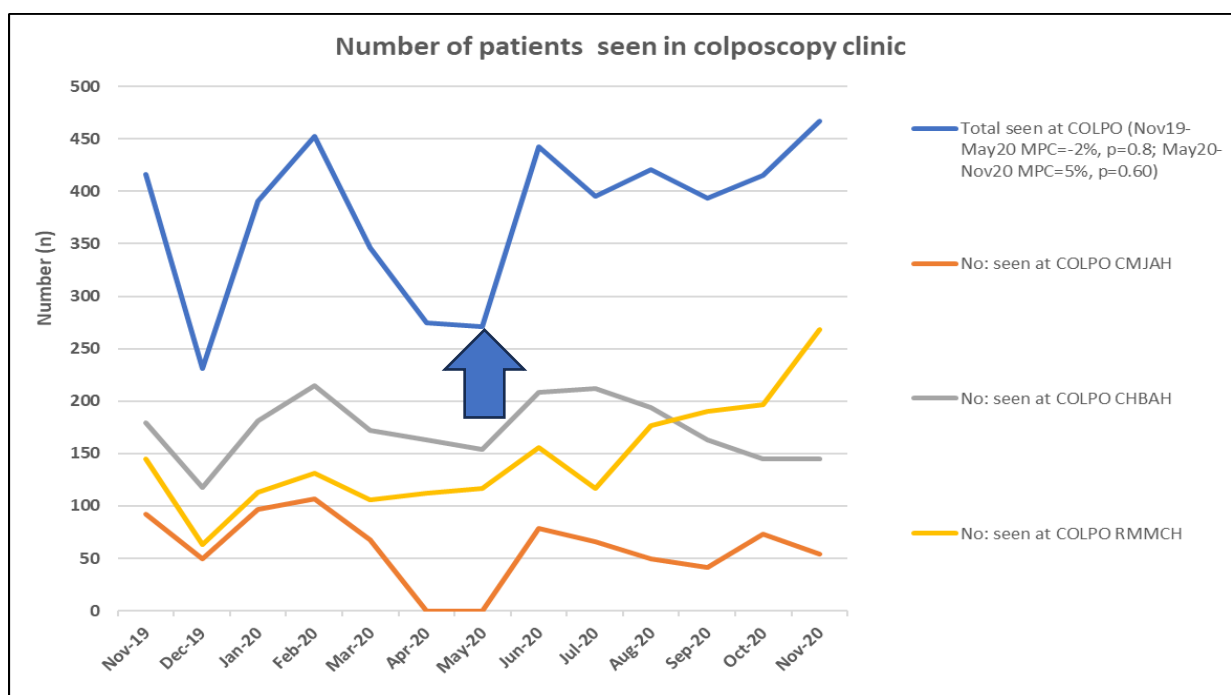


Figure 1: Number of patients seen in colposcopy clinics

There were some differences in the number of Large Loop Excision of the Transformation Zone (LLETZ) procedures performed at the three hospitals due to the CHBAH colposcopy services not being closed in the Covid-19 pandemic during the study period. The blue curve in Figure 3 indicates the total number of patients seen in the LLETZ procedures done in all the participating hospitals. There was a non-significant decline in number of LLETZ procedures during the period November 2019 to August 2020 (MPC = 2%, p-value = 0.92), in August 2020, the Joinpoint Regression Program automatically detected a point of inflection (indicated by a blue arrow), which was followed by a non-significant decline (MPC = -4%, p-value = 0.84) in LLETZ procedures from August 2020 to November 2020 (Figure 3).

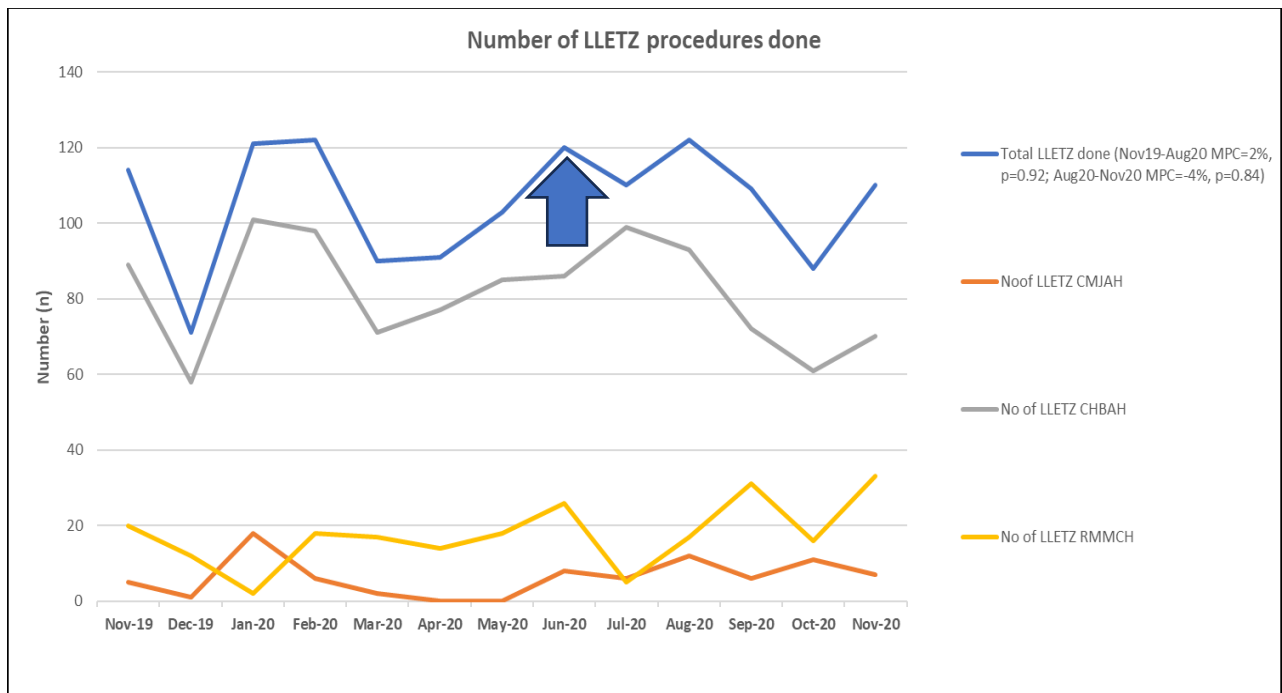


Figure 3: Number of LLETZ procedures

The blue curve in Figure 4 indicates the total number of patients seen at Termination of pregnancy (TOP) clinic. There was a significant decline in the number of patients seen at TOP clinic from November 2019 to June 2020 (MPC = -2%, p-value = 0.01), in June 2020, the Joinpoint Regression Program detected a point of inflection (indicated by a blue arrow), which was followed by a steep but non-significant rise in the number of patients seen at TOP clinic from July 2020 to November 2020 (MPC = 25%, p-value = 0.52) (Figure 4). The TOP services at CHBAH and CMJAH were not closed during the Covid-19 pandemic, while the RMMCH TOP Clinic was established but only opened in August 2020.

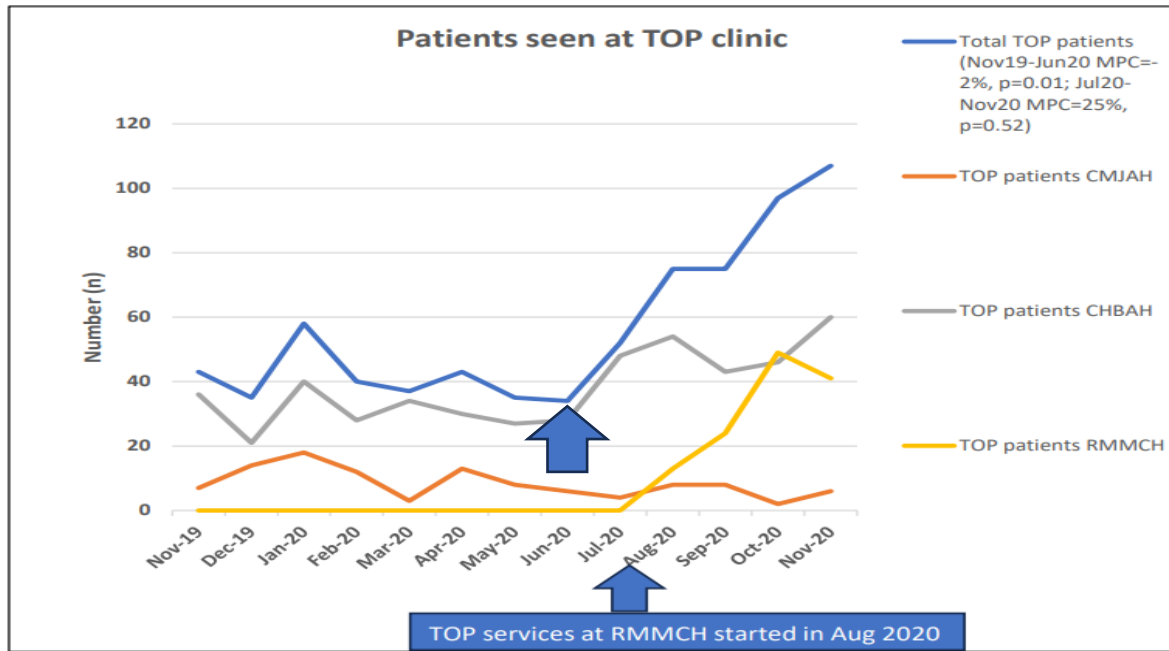


Figure 4: Number of patients seen in TOP clinics

The blue curve in Figure 5 indicates the number of major gynaecological procedures performed in all participating hospitals. There was a significant decline in the number of major gynaecological procedures from November 2019 to July 2020 (MPC = -14%, p-value = 0.05), in July 2020, the Joinpoint Regression Program detected a point of inflection (indicated by a blue arrow), which was followed by a significant steep rise from August 2020 to November 2020 (MPC = 48%, p-value = 0.02) (Figure 5).

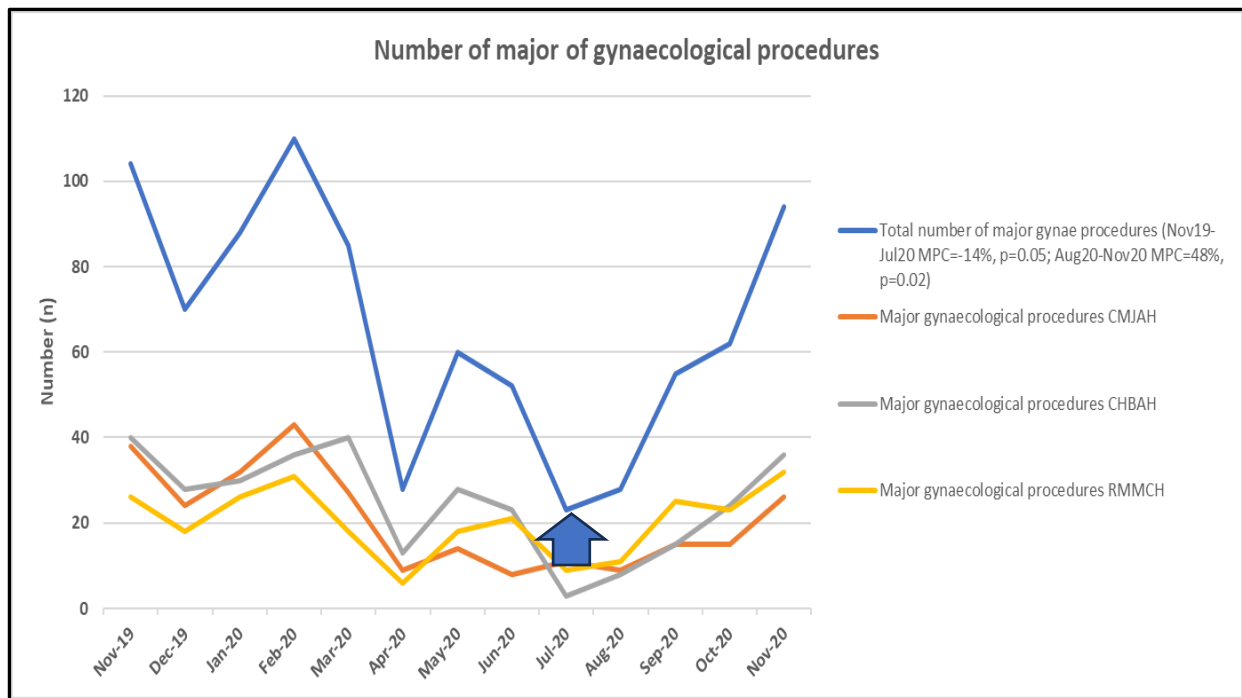


Figure 5: Number of major gynaecological procedures

The findings of an anonymous online survey issued to registrars regarding the number of major elective gynaecological procedures performed by registrars showed an overall decline in the total number of major elective gynaecological procedures performed by registrars in all three hospitals during the study period. The above findings are consistent with the theatre record data for major procedures performed, indicating concordance.

The blue curve in Figure 6 indicated the number of total abdominal hysterectomies (TAH) performed by registrars, which showed a significant decline in the number of TAH performed by registrars from November 2019 to July 2020 (MPC = -7%, p-value = 0.04). In July 2020, the Joinpoint Regression Program detected a point of inflection (indicated by a blue arrow), which was followed by a significant steep rise from August 2020 to November 2020 (MPC = 48%, p-value = 0.02).

The orange curve in Figure 6 indicated the total number of vaginal hysterectomies performed by registrars, which showed a significant decline in vaginal hysterectomies from November 2019 to July 2020 (MPC = -22%, p-value = 0.02). In July 2020, the Joinpoint Regression Program detected a point of inflection (indicated by orange arrow), followed by a significant rise from August 2020 to November 2020 (MPC = 91%, p-value = 0.02).

The grey curve in Figure 6 indicated the total number of myomectomies performed by registrars, which showed a significant decline in the number of myomectomies performed by registrars from November 2019 to June 2020 (MPC = -16%, p-value = 0.03). In July 2020, the Joinpoint Regression Program detected a point of inflection (indicated by a grey arrow), followed by a significant rise in the number of myomectomies performed by registrars from August 2020 to November 2020 (MPC = 25%, p-value = 0.01).

The yellow curve in Figure 6 indicated the total number Laparoscopic procedures performed by registrars, which showed a non-significant decline in the number of laparoscopies from November 2020 to May 2020 (MPC = -17%, p-value = 0.35). In May 2020, the Joinpoint Regression Programme detected a point of inflection (indicated by yellow arrow), followed by a non-significant rise in the number of laparoscopies performed by registrars from August 2020 to November 2020 (MPC = 11%, p-value = 0.18).

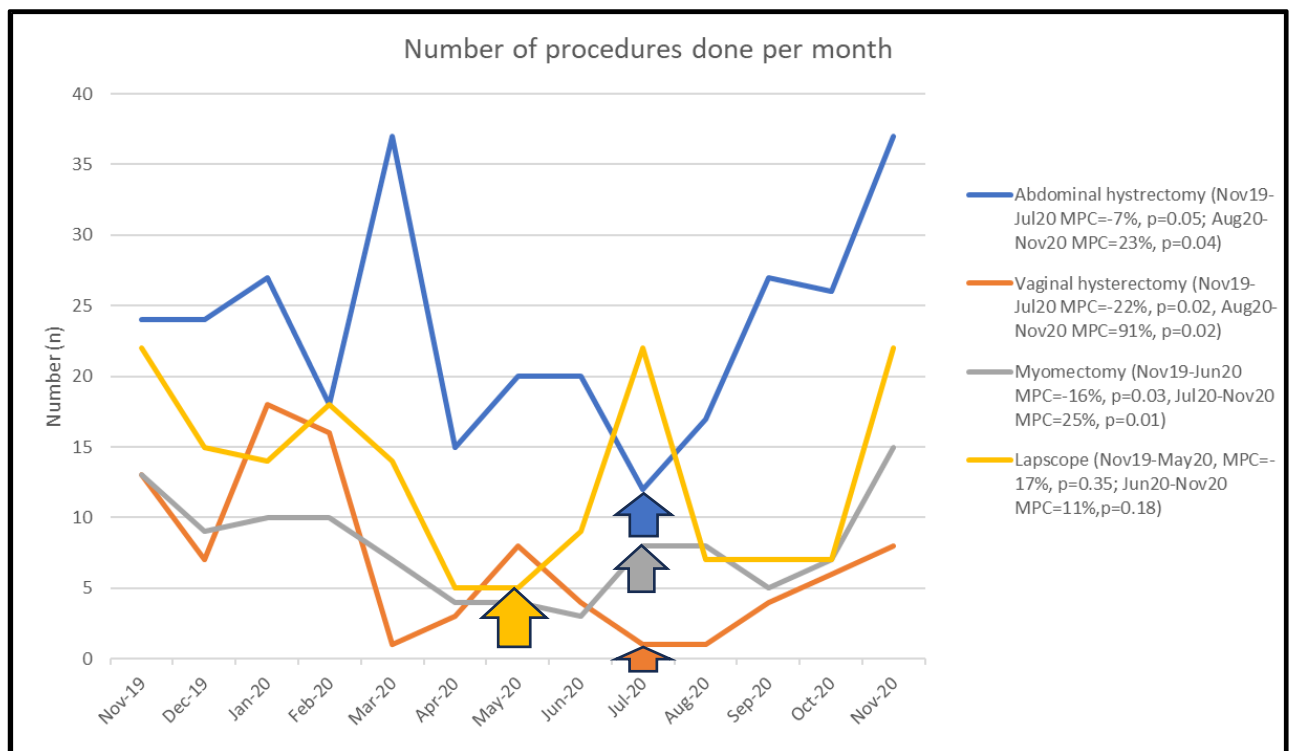


Figure 6: Number of procedures performed by registrars

Questionnaire results:

Study population:

There were 64 gynaecological registrars rotating at the three academic hospitals in Johannesburg who were invited to participate in the study and 35 (54.7%) responded. Nineteen (54.3%) were male and 16 (45.7%) were female. Their ages ranged from 27 to 48 years old, with a mean of 34 years (SD=4.9)). Twelve (36.4%) were first-years, seven (21.2%) second-years, nine (27.3%) third-years, and five (15.2%) final-years. (Table 1).

Table 1: Baseline characteristics of registrars (n=35)

Description	n (%) or mean (SD) or median (IQR, range)
Age	34 (4.9) or 33 (31-38, 27-48)
Gender	
Male	19 (54.3)
Female	16 (45.7)
Year of training	
1 st	12 (36.4)
2 nd	7 (21.2)
3 rd	9 (27.3)
4 th	5 (15.2)
Year of starting training	
2015	2 (5.6)
2016	3 (8.4)
2017	6 (17.1)
2018	6 (17.1)
2019	14 (40.0)
2020	4 (11.4)
Year of reg time completion (n=17)	
2019	1 (5.9)
2020	8 (47.2)
2021	4 (23.6)

2022	3 (17.7)
2023	1 (5.9)

Most of the respondents agreed that overall training was impacted by the Covid-19 pandemic as follows: Gynaecological training experience, 33 (94.2%), GOPD teaching, 29 (82.9%), bedside teaching, 25 (71.4%), and elective surgical training, 33 (94.3%), were impacted by the pandemic. However, the registrars were split equally, at 14 (40%) regarding the impact the pandemic had on emergency gynecological surgical training (Table 2).

Table 2: Registrars' perception about Covid-19 disruption of gynaecological learning experience (N=35)

Description	n (%)
Affected gynaecological training experience:	
Strongly disagree	1(2.9)
Disagree	0 (0)
Neutral	1 (2.9)
Agree	13 (37.1)
Strongly agree	20 (57.1)
Affected GOPD training:	
Strongly disagree	1 (2.9)
Disagree	2 (5.7)
Neutral	3 (8.6)
Agree	12 (34.3)
Strongly agree	17 (48.6)
Affected bedside training:	
Strongly disagree	2 (5.7)
Disagree	5 (14.3)
Neutral	3 (8.6)
Agree	11 (31.4)
Strongly agree	14 (40.0)

Affected overall gynaecological educational opportunity:	
Strongly disagree	2 (5.7)
Disagree	1 (2.9)
Neutral	0 (0)
Agree	17 (48.6)
Strongly agree	15 (42.8)
Affected elective gynaecological surgical training:	
Strongly disagree	1 (2.9)
Disagree	1 (2.9)
Neutral	0 (0)
Agree	9 (25.7)
Strongly agree	24 (68.6)
Affected emergency gynecological surgical training:	
Strongly disagree	2 (5.7)
Disagree	12 (34.3)
Neutral	7 (20.0)
Agree	5 (14.3)
Strongly agree	9 (25.7)

The majority of registrars, 27 (77.1%) agreed that the following were impacted by the pandemic: short course attendance 24 (68.6%), academic conferences 30 (88.2%), and examination postponement 21 (60%). With regard to special rotations (n = 15, 42.9%), 14 (39.9%) registrars disagreed that they were affected by the pandemic (Table 3).

Table 2: Impact of the Covid-19 pandemic on the academic programme

Description	n (%)
Affected the academic program	
Disagree	6 (17.1)
Neutral	2 (5.7)
Agree	14 (40.0)

Strongly agree	13 (37.1)
Affected short courses.	
Strongly disagree	1 (2.9)
Disagree	4 (11.4)
Neutral	6 (17.1)
Agree	9 (25.7)
Strongly agree	15 (42.9)
Affected special rotations	
Strongly disagree	1 (2.8)
Disagree	13 (37.1)
Neutral	6 (17.1)
Agree	10 (28.6)
Strongly agree	5 (14.3)
Affected conference attendance	
Strongly disagree	1 (1.5)
Disagree	3 (8.8)
Neutral	1 (1.5)
Agree	12 (35.3)
Strongly agree	18 (52.9)
Were planning to write exams	
Yes	21 (60.0)
No	14 (40.0)
Postponed exams	
Yes	12 (85.0)
No	2 (15.0)
Postponed exams by how much	
3 months	1 (10.0)
6 months	9 (90.0)

Most respondents, 31 (88.6%), worked in high-risk exposure settings (confirmed Covid-19 positive patients), and the majority, 30 (85.7%), received personal protective equipment

(PPE) training, with a small percentage, five (14.3%), receiving no PPE training. Most respondents, 28 (84.9%), stated that adequate PPE was accessible, while five (15.2%) stated that it was not. Eighteen (48.6%), tested positive for SARS-CoV-2 using a nasopharyngeal real-time PCR assay during this time. The majority of those who tested positive for SARS-CoV-2, 15 (93.7%), suggest that it was due to work-related exposure. Eleven (37.9%) who tested positive received ten days off sick, three (10.5%), received 14 days off sick, and only one (3.5%), received twenty days off sick. The remaining respondents, 11 (37.9%), never received any sick leave. Most respondents, 17 (64.3%), received no days of isolation due to the illness, three (10.5%), received ten days, another three (10.5%), received fourteen days, and a further three (10.5%), received twenty days (Table 4). The leave days due to Covid-19 illness was as per the National Institute for Communicable Diseases (NICD) recommendations.

Table 3: The impact of Covid-19 pandemic on registrars' safety and wellbeing

Description	n (%)
High risk exposure	
Yes	31 (88.6)
No	2 (2.9)
Maybe	3 (8.5)
Did you get training on PPE	
Always	4 (11.4)
Most of the time	26 (74.3)
Rarely	5 (14.3)
Did you enough PPE available	
Always	2 (6.1)
Most of the time	26 (78.8)
Rarely	5 (15.2)
Did you test positive for Covid-19	
No	18 (51.4)
Yes	17 (48.6)
Do you think it was work related exposure	

No	1 (6.3)
Yes	15 (93.7)
Off sick days taken	
0	11 (37.9)
10	11 (37.9)
14	3 (10.5)
20	1 (3.5)
Days in isolation	
0	17 (64.3)
10	3 (10.5)
14	3 (10.5)
20	3 (10.5)

DISCUSSION

The main findings revealed a significant decline in gynaecological services such as GOPD, TOP, and major elective gynaecological procedures. The online survey also demonstrated that there was a significant decline in major gynaecological procedures performed by registrars such as TAH, vaginal hysterectomies, and myomectomies.

Our findings were congruent with prior studies conducted in Europe, which showed that the Covid-19 pandemic was associated with a significant reduction in resident training and medical education across different specialties.^{7,8} Most studies also showed that residents in surgical disciplines where hands-on training cannot be replaced by virtual or online learning, were mainly affected.^{9,16,18} Other studies have also shown that the Covid-19 pandemic has had a significant impact on the psychological well-being of healthcare workers.^{19,20} Virtual learning was shown to be important in reducing the learning deficiencies caused by the pandemic.^{21,22}

The statistically significant decline in the number of patients seen in GOPD can be explained by deferring non-urgent services to contain the spread of Covid-19 infections and to prioritize the limited staff and resources in managing acute cases of Covid-19 infections. There was a non-significant decline in the number of patients seen in the colposcopy clinic and the number of LLETZ procedures performed within the three hospitals compared to the pre-

Covid-19 period, which could be explained by CHBAH services being open during the pandemic because it was considered a semi-urgent case like gynaecological oncology services. The significant decline in the TOP services at CHBAH and CMJAH during the pandemic can also be explained by deferring non-urgent services to contain the spread of Covid-19 infections and to prioritize the limited staff and resources in managing acute cases of Covid-19 infections. Elective gynaecological surgeries were significantly reduced, which can be explained by the cancellation of non-urgent surgery to prioritize the resources in managing acute cases of Covid-19 and containing the spread of infections. The cancellation of non-urgent surgical cases further explains the significant reduction in the number of major surgical procedures performed by registrars, including TAH, myomectomies, and vaginal hysterectomies. There was also a non-significant decline in laparoscopic procedures performed by registrars, which could be explained by the fact that some laparoscopic procedures were performed as emergencies in patients with Covid-19 infections.

These findings imply that if our gynaecological services and registrar training programmes are jeopardised by any type of event, the quality of trainees produced will suffer, as will patients' management and outcomes. As a result, the Covid-19 pandemic has taught us that measures must be implemented to mitigate the detrimental effects of future pandemics, including utilisation of online hybrid teaching platforms, virtual meetings and surgical simulators to bridge gaps in missed learning opportunities.

The study had limitations, such as a small number of respondents (thirty-five). We did not assess the effect on quality of postponement or delay of elective surgery on patient outcomes, or the value of teaching by simulations. Another study is needed to assess the impact of postponing or cancelling exams as a result of the pandemic, psychological impact of Covid-19 on trainees, and a follow-up study to assess the effectiveness of new innovations such as video-conferencing and virtual teaching platforms on training.

I would like to acknowledge the strengths and limitations of the data collection tool, such as an online questionnaire, where some questions on academic activities were too broad and unable to determine whether the Covid-19 pandemic had a negative or positive impact. The number of gynaecological procedures performed by registrars were reliable because they retrieved all of the procedures recorded using their Logbox Academic App.

CONCLUSION

There was a decline in outpatient and surgical gynaecological services in participating academic hospitals. The Covid-19 pandemic had a negative impact on registrars' training seen by the fewer number of major gynaecological procedures performed. Our findings show that we were able to adapt and continue didactic teaching, but clinical and surgical training was affected.

FUNDING SOURCES

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

DECLARATION OF COMPETING INTERESTS

The authors declare no competing interests.

DATA STATEMENT

The study data are available from the corresponding author.

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APPENDICES

Appendix A: Approved Research Protocol

INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) which causes coronavirus disease 2019 (COVID-19) was first announced in Wuhan, Hubei area, China in December 2019(1). On March 11, 2020 the World Health Organization (WHO) proclaimed COVID-19 a worldwide pandemic. All around the world, the COVID-19 cases and related deaths kept on increasing exponentially. Considering the extent and seriousness of COVID-19 pandemic, the South African government declared the Covid-19 outbreak as a public health disaster on March the 15, 2020. Due to the unprecedented severity of the Covid-19 pandemic, South Africa imposed a nationwide lockdown on March 26th, 2020, in an effort to contain the virus and limit its spread, as well as to ensure the preparedness of health-care systems.

The University of Witwatersrand Academic circuit, Johannesburg, South Africa, consists of the three main teaching hospitals, namely Chris Hani Baragwanath Academic Hospital (CHBAH), Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) and Rahima Moosa Mother and Child Hospital (RMMCH). This is a large teaching platform for undergraduate and postgraduate education. Registrars in Obstetrics & Gynaecology (O&G) rotate through these hospitals. There is an extensive gynaecological service and a massive clinical load of around 48 000 deliveries per annum shared between CHBAH, CMJAH and RMMCH (Departmental statistics).

In order to mitigate the effects of Covid-19 pandemic the following changes to health care services were made; elective gynaecology services were cancelled initially; women with oncological conditions continued to be treated; women who needed urgent surgery and tested positive for Covid-19 were treated in dedicated theatres; the number of patients that were booked at clinics were reduced; initially only women who screened positive for covid-19 were tested and as the pandemic progressed all women who were admitted were tested; dedicated wards for isolation needed to be created. This resulted in changes to infrastructure

and re-structuring of duties for all Health Care workers (HCW). The department of O&G cancelled the rotation of registrars in April 2020, so all registrars remained in the hospital that they were allocated to because it was thought that it would be better for patient care. The Human Research Ethics Committee (HREC) put all non-urgent research on hold, and asked for protocols that would mitigate the risk of Covid-19 infection for all studies(2).

LITERATURE REVIEW

The novel Covid variant has a genetic structure like SARS (80%), and possibly originated in bats (3). On March 11, 2020, the WHO declared a worldwide pandemic. The WHO issued thorough guidelines on the most proficient method to identify, test, and oversee arising infections dependent on past experience with Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) outbreaks of 2012.

Risk factors:

Health care workers (HCWs) who work in high-risk exposure areas such as those with interventional medical or surgical procedures that generate respiratory aerosols are at a high risk of acquiring SARS-Cov-2 infection. Those working in pulmonology, microbiology, critical care (Intensive Care Unit (ICU), high care unit, theatre and surgical departments such as Ear Nose Throat (ENT) units are at a particularly high risk. Other risk factors in HCW were suboptimal hand hygiene. Long duty hours in high-risk exposure areas were found to be at higher risk of infections(4).

Covid-19 risk factors associated with severe infection and an increase in morbidity and mortality were found in Africans and Asians ethnicities aged above 55 years, white Europeans aged above 60 years, and people with underlying comorbidities such as hypertension, cardiovascular diseases, diabetes mellitus, chronic kidney disease, chronic obstructive pulmonary disease, and obesity. Other risk factor incorporate sex (male)(5).

Transmission:

Individual-to-individual transmission occur by means of respiratory drops with SARS-CoV-2 and appears to remain on a surface for up to 96 hours(6).

Treatment:

There is no specific antiviral treatment for COVID-19(7). Isolation and supportive therapy includes oxygen, adequate hydration, and treatment of secondary infections is recommended(8).

Prevention and control:

Prevention and control are the cornerstone of management of Covid-19. General wellbeing measures like testing, contact tracing, confining probable cases and isolating confirmed cases, wearing face masks, practising good hand hygiene are all important in reducing the rate of transmission and mortality(9).

Effects of Covid-19 pandemic on Health Care Systems and educational training:

The Covid-19 pandemic has significantly overwhelmed the health care system all over the world. This has adversely affected health services provision, education and training.

Specialties such as general surgery and radiology in the USA showed that the overall general surgery residents operating volume decreased by 33.5 percent during the first four months of the United States covid-19 pandemic when compared to the first four months of 2018 and 2019 at all levels of Postgraduate years. The transition to virtual academic meetings, which included the introduction of surgical process videos and simulators for teaching clinical and surgical procedures, has become more common. The study had number of limitations, Covid-19 pandemic has affected some regions of the USA over others and at different times(10).

In a cross-sectional study from Italy the effect of Covid-19 on the obstetrics and gynaecology training showed that 51% of trainees had critical training impairment. They proposed that methodologies such as online practice questions, telemedicine facilities, utilisation of test systems, and utilisation of recordings be introduced as innovative strategy to reduce training insufficiencies(11).

An online study of Italian urology residents showed considerable reduction or complete cessation of training in up to 80% of the residents related covid-19 pandemic. To address these challenges, they presented methodologies such as telemedicine, smart learning programs and tele-tutoring of surgeries to expand learning opportunities(12).

There was disruption in Surgical training amongst the trainees in the initial phase of Covid-19 pandemic according to an anonymous online survey of surgical specialties conducted in Scotland. These findings also reveal that this has affected learners' confidence in surgical procedures, as well as challenges with completing Web-Based Assessments. The welfare of the trainees was also a concern, with around a third of the trainees being forced to miss work due to the pandemic's regulations such as social distancing & prohibition of mass gatherings. The use of innovation, such as webinars and online courses, provides a solution for keeping updated with the teaching and improving the knowledge(13).

An electronic review including both surgical and physician specialties which showed that COVID-19 significantly affected residency and fellowship training in Saudi Arabia. With those in surgical disciplines, nearly all (97%) said that their surgical exposure was diminished because of the pandemic. The utilization of online courses, web recordings, pre-recorded meetings, and web-based media were used to overcome the difficulties(14).

Trainees in Europe in obstetrics and gynaecology were affected by the diminished exposure to learning opportunities, surgical procedures and teaching during the pandemic. Proposals, for example, learners being made up for any missed training, academic activities utilizing virtual platforms ought to be proceeded, students additionally urged to remain safe and healthy. This also had its own limitation too. Not all European countries were represented in the study, or those that did were represented by a few trainees, which just doesn't provide a reliable review on matters in their particular country. Therefore, this makes it difficult to form a comparison(15).

Locally, the cross-sectional study that was conducted in Cape Town showed that during the hard lockdown, the surgical discipline practice changed significantly to prepare for COVID-19. Non-urgent operations and outpatient departments were drastically reduced or cancelled. Surgical wards and operating theatres were restructured, and surgical staff were deployed in order to focus the limited resources in managing acute cases COVID-19. As a result this can lead to massive surgical care backlog which could have long-term consequences(16).

Effects of Covid-19 pandemic on Gynaecological services:

There were only a few teaching ward rounds due to social distancing. The cancellation of surgery and reduced gynaecological outpatient services impacted on management of benign conditions in the USA. There was a decline in gynaecological services being offered and as a result patient care was affected. Patients with pelvic pains and abnormal uterine bleeding were the most affected(17).

The ongoing Covid-19 pandemic has had a significant impact on gynaecological oncology practice and care in India, according to a study conducted by Bhandoria and colleagues. It showed that in patients with early-stage cancer, surgical intervention, radiation treatment, and follow-up were delayed or discontinued. One third of patients with early-stage cervical cancer who required surgery were given neoadjuvant chemotherapy due to a delay in surgery. It remain to be seen how SARS-Cov-2 infections contributed to overall morbidity and mortality as compared to pre-covid literature(18).

Because of the global epidemic, the way gynaecological services were delivered in the United Kingdom changed dramatically. Gynaecological outpatient services were cancelled and patients were offered telemedicine consultations where doctors and patients contacted each other via telephones to discuss their concerns and symptoms and receive telephone advice. For patients who required endometrial biopsy or hysteroscopy all efforts were made to perform the investigations at outpatient visit to avoid hospital admission for general anaesthesia. Patients with high risk of endometrial cancer were offered Levonorgestrel-releasing intrauterine system while awaiting surgery that was being delayed due to the pandemic(19).

JUSTIFICATION

The South African health-care system needed to be restructured so that its limited resources could be focused on managing the acute and severe cases of COVID-19 infection. The three teaching hospitals in Johannesburg which make up the teaching and training platform had to also make changes to meet the clinical requirements. The changes made were redeploying staff, changing infrastructure for clinical needs and making changes to teaching and training. The teaching and training on the clinical platform is traditionally done using bed-side teaching, teaching ward rounds, and clinical audit meetings. Surgical and clinical procedures

are also taught with hands-on supervision on patients. These changes have changed the academic performance and experience for trainees.

This study therefore, aims to ascertain how the Covid-19 pandemic has affected the Gynaecological services and educational training program within the hospitals affiliated to the University of the Witwatersrand. We hope that by conducting this research, we will be able to provide an overview of the effects of the Covid-19 pandemic on gynaecological services and educational training, so that the gynaecological unit, trainees (registrars) and trainers will be better prepared to address the challenges that have arisen because of the changes made during the pandemic.

AIM:

This study therefore, aims to ascertain how the Covid-19 pandemic has affected the gynaecological services and educational training program within hospitals affiliated to the University of Witwatersrand from November 2019 to November 2020.

OBJECTIVES:

Describe the number of patients seen at GOPD, colposcopy clinic, TOP clinic, and number of major gynaecological procedures done between November 2019 and November 2020.

Describe the number of major gynaecological procedures performed by registrars over this period.

METHODS:

STUDY SETTING:

The study will be conducted at the three teaching hospitals in Johannesburg which are affiliated to the University of the Witwatersrand. CHBAH is Africa's largest tertiary hospital, located in Soweto; CMJAH is a tertiary facility located in Parktown; and RMMCH is a specialised regional teaching hospital located in Coronationville.

There are 64 registrars who rotate through these hospitals. They are required to do a minimum of 18 months of time in gynaecology during their training. There are a prescribed minimum number of surgical and clinical procedures that have to be completed in this time as per the College of Medicine of South Africa (CMSA).

STUDY POPULATION:

To assess the effect of Covid-19 on gynaecological services, the study will gather weekly data on the number of women who attended the gynaecology outpatient department (GOPD), those who were booked for gynaecological theatre, colposcopy clinic, and TOP clinic) at the three hospitals from November 2019 to November 2020. For the second objective regarding training, the study will include all Obstetrics & Gynaecology registrars who rotated at the three hospitals for at least one month in gynaecology from November 2019 to November 2020. Time spent in gynaecology at peripheral hospitals affiliated with University of Witwatersrand such as Klerkorp Provincial hospital and Sebokeng hospital will be excluded.

STUDY DESIGN:

This will be a cross-sectional study and data on gynaecological services will be collected retrospectively from hospital records at the three teaching hospitals while data on training of registrars will be collected using an online questionnaire. The first period will be pre-Covid from November 2019 to February 2020, and second period will be from March 2020 to November 2020.

DATA COLLECTION

Data on gynaecological service activity will be collected from GOPD records, colposcopy clinic records, gynaecology theatre records, and TOP clinic records at CHBAH, CMJAH and RMMCH for the period, November 2019 to November 2020.

To collect data from registrars, an online individually administered questionnaire will be emailed to all registrars in O&G who rotated at the three hospitals from November 2019 to November 2020. The online questionnaire will include demographics of the registrars (age, sex), questions on how clinical training was affected, number of surgical procedures, the academic activities, and health and safety of registrars.

Major and minor gynaecological surgeries:

The distinction between major and minor surgeries remains unclear. The American surgeons identified the following 12 common variables that classify a procedure as minor or major. These include mortality rate, amount of trauma, extension of dissection, preoperative condition, potential functional or cosmetic loss, usual duration of the operation, space

requirements, equipment requirement, anaesthetic use, number of assistance required, difficulties assessed preoperatively, and special training required (22).

The Fellowship of the College of Obstetricians and Gynaecologists of South Africa also does not have a definition for minor and major gynaecological procedures. The gynaecological procedures listed in the logbook as part of the requirements to qualify as a specialist are abdominal hysterectomy, vaginal hysterectomy, laparoscopic procedures, abdominal surgery, and 'other' vaginal procedures.

In the University of Witwatersrand circuit, minor surgeries are any procedures that takes less than one hour, and major surgeries are procedures that are more than one hour.

Minor gynaecological procedures include manual vacuum aspiration (MVA) of the for retained products of conception, diagnostic & therapeutic dilatation and curettage of the uterus, cervical cerclages, Obstetrics anal sphincters (OASIS) repair, tissue biopsies (vulval biopsy, cervical biopsy, endometrial biopsy, etc.), large excision of the transformation zone (LLETZ), marsupialization, and insertion and removal of the intrauterine contraceptive devices (IUCDs).

Major procedures include vaginal and abdominal hysterectomy, myomectomy, unilateral or bilateral salpingectomy and oophorectomy, staging laparotomy, ovarian cystectomy, and gynaecological laparoscopic procedures.

DATA ANALYSIS:

To analyse the data, we will make use of Stata version 15. Continuous variables, that are normally distributed, will be presented as mean and standard deviation, and those that are not normally distributed they should be presented as median and an inter-quartile range (IQR).

To determine the implications of Covid-19 pandemic on gynaecological services we will use frequencies and percentages to describe categorical data. For continuous data, mean and standard deviation (SD) will be used if normally distributed, while median and IQR will be use if not normally distributed. To test for normality of continuous variables, the Shapiro-Wilk test will be implemented.

To compare the clinical gynaecological services pattern we will divide our study period into six, namely pre covid-19, according to five types of alert levels of lockdown as gazetted by South African government, August 7th 2020. Then the gynaecological visits for these periods will be compared using analysis of variance (ANOVA) if the data is normally distributed, and if the data is not normally distributed will make use of the Kruskal-Wallis test which is a non-parametric alternative to the ANOVA. The p-value will be used to quantify the significance of the differences and the association will be regarded as significant if p-value < 0.05 else it will be considered as insignificant.

The time period will be divided into six categories, which are the pre Covid-19 period (01 November 2019 to February 2020), according to five types of alert levels of lockdown as gazetted by South African government, August 7th, 2020 (cite gazette). Alert level 5 lockdown (26th March 2020 to 30th April 2020), alert level 4 lockdown (1st May 2021 to 31st May 2021), alert level 3 lockdown (1st June 2020 to 17th August 2020), alert level 2 lockdown (18th August 2020 to 20th September 2020) and alert level 1 lockdown (21st September 2020 to 30th November 2020).

TOOLS:

An online questionnaire (Appendix A) will be used for the registrars and a data sheet to collect the statistics on the clinical gynaecological services rendered at CHBAH, CMJAH and RMMCH (Appendix B).

ETHICAL CONSIDERATION:

Ethics approval will be obtained from the Human Research Ethics Committee (HREC) of the University of the Witwatersrand. Permission to conduct the study at CHBAH, CMJAH and RMMCH will be obtained from the Clinical Executive Officers, Head of department (HOD) Obstetrics and Gynaecology. Permission to send a questionnaire will be requested from the Academic HOD of Obstetrics and Gynaecology. The study will be registered with the National Health Research Database.

TIMELINE:

	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
	21	21	21	21	22	22	22	22	22	22	22	22	22

Literature review	X	X											
Protocol preparation	X	X											
Protocol assessment			X	X	X	X							
Ethics application							X	X					
Data collection									X	X			
Data analysis											X	X	
Paper write-up											X	X	
Submission													X

FUNDING:

This study does not have any funding. Any form of expenses will be incurred by the researcher.

Item:	Amount:
Printing	R 700.00
Travelling cost	R 1000.00
Re-imburement of Biostatistician	R 2000.00
Conference cost	R 10000.00
Total:	R13700.00

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Appendix B: Data collection sheet (Gynaecological services)

Before covid-19 pandemic (November 2019 to February 2020):

	Nov 2019	Dec 2019	Jan 2020	Feb 2020
Number of patients seen at GOPD				
CMJAH				
CHBAH				
RMMCH				
Number of patients seen at colposcopy clinic				
CMJAH				
CHBAH				
RMMCH				
Number of LLETZ done				
CMJAH				
CHBAH				
RMMCH				
Number of patients seen at TOP clinic				
CMJAH				
CHBAH				
RMMCH				

Number of major gynaecological procedures done				
CMJAH				
CHBAH				
RMMCH				

During covid-19 pandemic (March 2020 to November 2020):

	Mar 2020	Apr 2020	Jun 2020	Jul 2020	Aug 2020	Sept 2020	Oct 2020	Nov 2020
Number of patients seen at GOPD								
CMJAH								
CHBAH								
RMMCH								
Number of patients seen at colposcopy clinic								
CMJAH								
CHBAH								
RMMCH								
Number of LLETZ done								
CMJAH								
CHBAH								

Appendix C: Data collection sheet (Registrar's questionnaire)

THE IMPACT OF COVID-19 ON GYNAECOLOGICAL SERVICES AND REGISTRAR TRAINING IN THREE ACADEMIC HOSPITALS IN JOHANNESBURG

Page 1

Good day,

My name is Dr. Sannyboy Surprise Shivuri, and I am a Master of medicine (Obstetrics and Gynaecology) student at Wits Medical School under the Faculty of Health Sciences under the supervision of Dr. Amy Wise, Prof. Yasmin Adam, and Prof. Lawrence Chauke. To fulfill the requirements of the Master's program, I am undertaking a research project to determine 'The impact of Covid-19 on Gynaecological services and registrar teaching in three academic hospitals in Johannesburg'.

By conducting this research, we will be able provide an overview of the effects of the Covid-19 pandemic on gynaecological services and registrar training, so that the gynaecological department, the trainers, and registrars will be better prepared to address the challenges that may arise from future pandemics.

Your participation is in this survey entirely voluntary and there are no consequences to refusal. Should you require further details regarding the the study, please contact me at 0713449r@student.wits.ac.za or supriseshivuri@gmail.com or by telephone at 079 836 2620.

This study has been approved by Human Research Ethics Committee (Medical) of the University of Witwatersrand, Johannesburg ("Committee"). A principal function of this committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research. If you have any concern over the way the study is being conducted, please contact the Chairperson of this committee who is Dr Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the committee secretariat are 011 717 2700/1234 and e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za.

By completing this survey you are indicating that you are atleast 18 years old, have read and understand this consent form and agree to participate in this research study as well as the I agree to terms and conditions.

Thank you for reading this Study Information Sheet.

Date: September 2022

Dermographics

Age on 1 November 2019

Gender

- ☐ Male
☐ Female
☐ Prefer not to say

Year of registrar training on 1st November 2019

- ☐ 1st
☐ 2nd
☐ 3rd
☐ 4th

In which month and year did you start registrar time?

If you completed your registrar program in the period in question (November 2019 to November 2020) please provide the month and year.

Clinical training questions:

Has Covid-19 pandemic affected your gynaecological training experience?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected your gynaecological outpatient department (GOPD) training experience?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected the bedside clinical teaching?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected your overall gynaecological educational opportunities and training experience?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Surgical procedures

Has Covid-19 pandemic affected your elective gynaecological surgical training experience

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected your emergency gynaecological surgical training experience?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Number of procedures before covid-19 pandemic (1st November 2019 to 28th February 2020)

Nov 2019 Dec 2019 Jan 2020 Feb 2020

Hospital _____

Rotation _____

Total abdominal hysterectomies _____

Vaginal hysterectomies _____

Myomectomies _____

Laparoscopes _____

Number of procedures during covid-19 pandemic (1st March 2020 to 30th November 2020)

Mar 2020 Apr 2020 May 2020 Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

Hospital _____

Rotation _____

Total abdominal hysterectomies _____

Vaginal hysterectomies _____

Myomectomies _____

Laparoscope _____

Hospital _____

Academic activities:

Has Covid-19 pandemic affected the Academic program?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected the ability to attend short courses?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected the ability to do special rotations such as Intensive Care Unit (ICU), sub-speciality clinics, ultrasound training etc?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected the ability to attend academic conferences?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Were you planning to write any examinations from November 2019 to November 2020?

- ☐ Yes
☐ No

When? _____

Did you miss or postpone any exams between November 2019 to November 2020?

- ☐ Yes
☐ No

By how many months? _____

Were online classes and webinars during Covid-19 pandemic helpful?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Number of procedures during covid-19 pandemic (1st March 2020 to 30th November 2020)

Mar 2020 Apr 2020 May 2020 Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

Hospital _____

Rotation _____

Total abdominal hysterectomies _____

Vaginal hysterectomies _____

Myomectomies _____

Laparoscope _____

Hospital _____

Academic activities:

Has Covid-19 pandemic affected the Academic program?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected the ability to attend short courses?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected the ability to do special rotations such as Intensive Care Unit (ICU), sub-speciality clinics, ultrasound training etc?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Has Covid-19 pandemic affected the ability to attend academic conferences?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Were you planning to write any examinations from November 2019 to November 2020?

- ☐ Yes
☐ No

When? _____

Did you miss or postpone any exams between November 2019 to November 2020?

- ☐ Yes
☐ No

By how many months? _____

Were online classes and webinars during Covid-19 pandemic helpful?

- ☐ Strongly disagree
☐ Disagree
☐ Neither agree or disagree
☐ Agree
☐ Strongly agree

Registrar health and safety

Did you have any high-risk exposure to Covid-19 positive patients during the period of November 2019 to November 2020?

- ☐ Yes
☐ No
☐ Maybe
☐ Other (specify)

Did you get any training on personal protective equipments (PPE)?

- ☐ Always
☐ Most of the time
☐ Rarely
☐ Never

Did you have enough PPE available?

- ☐ Always
☐ Most of the time
☐ Rarely
☐ Never

Did you test positive for Covid-19 during the period of November 2019 to November 2020?

- ☐ Yes
☐ No

Do you think it may be due to work-related exposure?

- ☐ Yes
☐ No

How many days were you off as a result of positive COVID results during the period of November 2019 to November 2020?

How many days were you off as a result of an exposure and the need to isolate during the period of November 2019 to November 2020?

Any other comments?

Appendix D: Permission letters to conduct the study



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MEDICAL ADVISORY COMMITTEE

CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL

PERMISSION TO CONDUCT RESEARCH

Date: 11th August 2022

TITLE OF PROJECT:

THE IMPACT OF COVID-19 PANDEMIC ON GYNAECOLOGICAL SERVICES AND REGISTRAR TEACHING IN THREE ACADEMIC HOSPITALS IN JOHANNESBURG.

UNIVERSITY: Witwatersrand

Principal Investigator: Dr S S Shivuri

Department: Obstetrics & Gynaecology

Supervisor : Dr A Wise/ Prof Adam / Prof Chauke

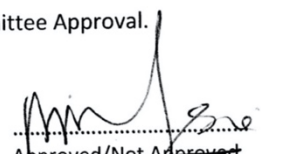
NHRD Number: GP_202203_079

Permission Head Department (where research conducted): Yes

The Medical Advisory Committee recommends that the said research be conducted at Chris Hani Baragwanath Academic Hospital. The CEO / management of Chris Hani Baragwanath Academic Hospital is accordingly informed and the study is subject to:-

- **Permission having been granted by the Committee for Research on Human Subjects of the University of the Witwatersrand.**
- The Hospital will not incur extra costs as a result of the research being conducted on its patients within the hospital
- The MAC will be informed of any serious adverse events as soon as they occur
- Permission is granted for the duration of the Ethics Committee Approval.


Recommended
(On behalf of the MAC)
Date: 11/08/2022


Approved/Not Approved
Hospital Management
Date: 11/08/2022

**CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL
UNIVERSITY OF THE WITWATERSRAND**

Cluster Research Committee
7 Jubilee Rd, Parktown 2196, Johannesburg
Enquiries: Office of the CEO
Ms. T. Ndlovu; Tel: 011 488 4211 Fax 011 488 3753
Ms L. Nkosi Tel: 011 488 3500
Email: Lindiwe.Nkosi@wits.ac.za

Dear Dr. Sannyboy Suprise Shivuri

The Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) Research Cluster Committee has reviewed your request to research "THE IMPACT OF COVID-19 PANDEMIC ON GYNAECOLOGICAL SERVICES AND REGISTRAR TEACHING IN THREE ACADEMIC HOSPITALS IN JOHANNESBURG. _".

I am pleased to inform you that you have been granted to research Charlotte Maxeke Johannesburg Academic Hospital provided that;

1. Charlotte Maxeke Johannesburg Academic Hospital will not anyway incur or inherit costs as result of the said study.
2. Your study shall not disrupt services at the study sites.
3. Strict confidentiality shall be observed at all times.
4. Informed consent shall be solicited from patients participating in your study.

The data collection to be started only after obtaining the Human Research Ethics Committee (HREC) unconditional approval.

Kindly note that it is a requirement at CMJAH that for unconditional approval to be granted, all pending documents highlighted below are to be submitted as soon as they are available or within 3 months, and if not applicable, kindly elaborate. Failure to comply with the above-stated requirements may result in the withdrawal of this research's approval at CMJAH.

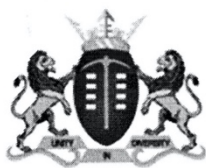
Head(s) of Department(s) Approval Letter	Provided
Human Research Ethics Committee Approval	Provided
The National Health Research Database Registration	Provided
Data Collection Sheets	Provided
Informed Consent Documents	N/A

Kindly forward this office with the results of your study on completion of the research.

I wish you every success with your research.

Yours sincerely,

Ms G. Bogoshi
Chief Executive Officer



GAUTENG PROVINCE

HEALTH
REPUBLIC OF SOUTH AFRICA

MEDICAL ADVISORY COMMITTEE

CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL

PERMISSION TO CONDUCT RESEARCH

Date: 11th August 2022

TITLE OF PROJECT:

THE IMPACT OF COVID-19 PANDEMIC ON GYNAECOLOGICAL SERVICES AND REGISTRAR TEACHING IN THREE ACADEMIC HOSPITALS IN JOHANNESBURG.

UNIVERSITY: Witwatersrand

Principal Investigator: Dr S S Shivuri

Department: Obstetrics & Gynaecology

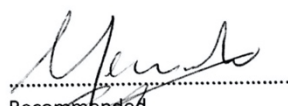
Supervisor : Dr A Wise/ Prof Adam / Prof Chauke

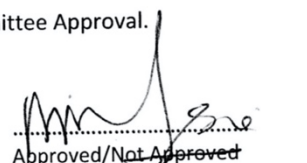
NHRD Number: GP_202203_079

Permission Head Department (where research conducted): Yes

The Medical Advisory Committee recommends that the said research be conducted at Chris Hani Baragwanath Academic Hospital. The CEO / management of Chris Hani Baragwanath Academic Hospital is accordingly informed and the study is subject to:-

- **Permission having been granted by the Committee for Research on Human Subjects of the University of the Witwatersrand.**
- The Hospital will not incur extra costs as a result of the research being conducted on its patients within the hospital
- The MAC will be informed of any serious adverse events as soon as they occur
- Permission is granted for the duration of the Ethics Committee Approval.


.....
Recommended
(On behalf of the MAC)
Date: 11/08/2022


.....
Approved/Not Approved
Hospital Management
Date: 12/08/2022

Appendix E: Ethics certificate



R49 Dr SS Shivuri

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL) CLEARANCE CERTIFICATE NO. M220509

NAME: Dr SS Shivuri
(Principal Investigator)

DEPARTMENT: School of Clinical Medicine
Department of Obstetrics and Gynaecology
Medical School
University

PROJECT TITLE: *The impact of COVID-19 pandemic on Gynaecological services and Registrar training in three academic hospitals in Johannesburg*

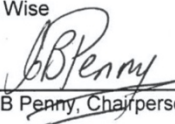
DATE CONSIDERED: 2022/05/27

DECISION: Approved unconditionally

CONDITIONS: This approval applies only to the study sites listed in Annex 1 attached
Further sites may be added on presentation of evidence of management approval to the HREC (Med)

NOTE: If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>

SUPERVISOR: Dr A Wise

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

DATE OF APPROVAL: 2022/09/19

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

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

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 submit details to the Committee. **I agree to submit a yearly progress report.** When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **May** and therefore reports and re-certification will be due in the month of **May** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator

Date

Annex 1

Protocol No. M22/05/09

Study sites approved under this Clearance Certificate

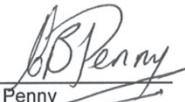
Study site

Charlotte Maxeke Johannesburg Academic Hospital
Chris Hani Baragwanath Academic Hospital
Rahima Moosa Mother and Child Hospital

Dr SS Shivuri

Date of HREC (Med) Approval

2022/10/25
2022/09/19
2022/09/19



Dr CB Penny
Chair: HREC (Medical)
University of the Witwatersrand, Johannesburg

Date: 2022/10/25

Appendix F: Guidelines for Journal of Surgical Education

GUIDE FOR AUTHORS

INTRODUCTION

The *Journal of Surgical Education (JSE)* is dedicated to advancing the field of surgical education through original research. The journal publishes research articles in all surgical disciplines on topics relative to the education of surgical students, residents, and fellows, as well as practicing surgeons. Our readers look to JSE for timely, innovative research findings from the international surgical education community. As the official journal of the Association of Program Directors in Surgery (APDS), JSE publishes the proceedings of the annual APDS meeting held during Surgery Education Week.

ORIGINAL MANUSCRIPTS

Manuscripts must meet the following criteria (taken from JAMA's Instructions for Authors⁵): the material is original; the writing is clear; the study methods are appropriate; the data are valid; the conclusions are reasonable and supported by the data; the information is important; and the topic is of interest to surgeons, educators, or trainees in any surgical disciplines. All original research papers are to follow the instructions for manuscript submission, with three additions. Each original manuscript should include four to six key words or phrases that describe the key concepts, content, or medical terminology discussed within the manuscript. These key words should appear on the title page. For help in finding key words or phrases look in the Medical Subject Headings from Index Medicus. The second page of all original research manuscripts should contain a structured abstract of, at most, 300 words, summarizing the objectives, design, setting, participants, results, and conclusions of the study. The third requirement for an original manuscript is to select at least one of the six ACGME competencies that the manuscript addresses and list these at the end of the structured abstract. Original manuscripts that are not "scientific" in nature, form, or scope, like reviews, historical articles, information articles, or other special section articles, are not required to have key words or abstracts. All original manuscripts should be identified as dealing with one of the six ACGME competencies.

APDS PRESENTATIONS

A manuscript must be submitted for all plenary presentations at the annual APDS meeting. These are to be submitted according to the time lines established by the program committee and Editor-in-Chief of the journal.

LETTERS TO THE EDITOR

Letters to the editor are welcome. Letters referring to a recent journal article are best received as soon as possible after that article is published. If letters about an article continue to pour in long after an article's publication, these letters may be published, but they will not be as timely and substantial. Letters should be no more than three double-spaced, typed pages, including references. Receipt of letters will be acknowledged. Unpublished letters will be returned only by request. Often a reply from the principal author of the article in question will be printed along with your letter. Letters not related to a JSE article will be reviewed by the editorial staff, but rarely are accepted.

PERSPECTIVES

Perspectives are brief (max 1500 words) pieces on a current topic in surgical education. These submissions should provide an opinion or perspective on the topic, but also be grounded in the current evidence and published literature. Submissions should be original work and not published previously, but they do not need to contain original data.

HOW I DO IT

How I Do It articles enable authors to describe novel educational techniques or programs without the requirement for rigorous data; data are welcomed but not required. These submissions should be brief (max 1200 words) explanations of innovative curricula, teaching techniques, or programmatic improvements that could be applied or modified by other programs or educators to benefit surgical trainees.

Contact details for submission

Sherry Campbell
Managing Editor
jsured@hotmail.com

Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:

- E-mail address
- Full postal address

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School of Clinical Medicine

Senate Plagiarism Policy

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