A retrospective review (audit) of gynaecological emergency surgery at Groote Schuur Hospital for the period of January to December 2019

A minor dissertation in fulfilment for the requirements of the degree Master of Medicine (MMED) in Obstetrics and Gynaecology

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Supervisor: Dr Tracey Sheridan Adams

Faculty of Health Sciences

Department of Obstetrics and Gynaecology

Groote Schuur Hospital/ University of Cape Town

Declaration

I, Tebogo Hlako, declare that the submitted dissertation is my original work. The dissertation forms an integral component of my specialized Master's degree in Obstetrics and Gynaecology at the University of Cape Town. The work is genuine and has not been submitted nor presented for any other academic degree or institution. The research was carried out under the guidance and supervision of an academic mentor within the Department of Obstetrics and Gynaecology. The study adhered to academic protocols, and I secured ethical approval before commencing my research.

I further declare that this research complies with all relevant ethical standards and guidelines. I have not plagiarized any content, and I have properly cited all sources used in this research.

Name: Tebogo Hlako

Signature: Signed by candidate

Acknowledgements

I would like to express my gratitude to my supervisor Dr Tracey Adams for consistently offering guidance and being accessible whenever I needed assistance. Under her guidance, I have acquired a profound understanding of research skills and the pursuit of academic excellence.

I am grateful for Nadine Jannecke, Emelda Booysen and Joseph Auffray who assisted with the retrieval of folders. I would like to thank Innocent Karangwa for assisting me with the statistical analysis.

A special thanks to my late father, Samuel Hlako who supported and encouraged me to further my studies.

Table of contents: **Page Number**

1. Appendices

1.1 Data collection sheet

A retrospective review (audit) of gynaecological emergency surgery at Groote Schuur Hospital for the period of January to December 2019.

Data collection form

Participant no:

A. Demographic data

1. Age ……
2. Gravidity …….
3. Parity ……..
4. medical co-morbidities
(can be more than 1)

Diabetes	
PTB	
Hypertension	
Cardiac disease	
Anaemia	
Other	

If other, specify

……

5. HIV status

Positive	
negative	
unknown	
Not documented	

6. If HIV positive, viral load

LDL	
<100	
100-250	
251-500	
>500	
unknown	
N/A (HIV neg)	

7. If HIV positive, CD4 counts.

<100	
100-250	
251-500	
>500	
unknown	
N/A (HIV neg)	

8.Smoking history

yes	
no	
unknown	

B. Reasons for emergency gynaecological surgery

1. Pregnancy-related:
(Can be more than 1)

Ectopic pregnancy	
Negative laparotomy	
Incomplete miscarriage: Evacuation of uterus (Evac)	
Septic miscarriage EVAC	
Molar pregnancy Suction evac	
Hysterectomy for sepsis post delivery	
Hysterectomy for bleeding post evac	
Other	

If other,
specify……

2. Non-pregnancy-related

Pelvic inflammatory disease	
Wound sepsis post-surgery	
Hysterectomy for bleeding	
Hysterectomy for sepsis	
Ovarian torsion	
Other cyst accidents/pelvi-abdominal masses	
Bartholin's abscess	
Other	

If other,

specify…….

C. Pre-operative

1. Tachycardia

yes	
no	
unknown	

2. Haemoglobin

Hb 10-15	
Hb 8-9.9	
Hb 6-7.9	
Hb below 6	
unknown	

3. Hypovolaemic shock

yes	
no	
unknown	

D. Surgical outcomes

1. Details of outcomes

No morbidity	
morbidity	
mortality	

If mortality,

specify…….

2. Post-Surgical complications

Post-op anaemia	
Wound sepsis	
Thrombo-embolism	
Intra-abdominal bleeding	
Bladder injury	
Ureteric injury	
Bowel injury	
Sheath dehiscence	
Other	

If other,
specify……

E. Relevant times related to emergency theatre.

1. Time woman arrived at the emergency unit:
……

2. Time decision made for surgical intervention.
……

3. Time that surgery took place
……..

4. Time taken for surgical decision-making

<30 min	
30min-1hour	
1-2 hours	
2-4 hours	
4-10hours	
10-15 hours	
15-24 hrs	
>24 hrs	

5. Time taken to get to theatre.

<30min	
30min-1 hour	
1-2 hours	
2-4 hours	
4-10 hours	
10-15 hours	
15-24hours	
>24 hours	

6. If delays greater than 24 hours, why?

Surgery postponed by surgeon	
Surgery cancelled	
No emergency theatre time as other cases prioritised	
Unfit for theatre and delayed by anaesthetist	
Surgery initially declined by patient	
Other	

If other,

specify……

F. Reasons for delays

1. If surgery postponed, reason:

Stable patient and uncertain if surgery necessary	
Stable patient and surgery challenging with risk in early hours	
Patient ate	
No theatre space	
other	

If other,

specify…….

2. If surgery cancelled, reason

Surgery no longer required	
Alternative treatment offered	
Declined by patient	
Incorrect clinical assessment/diagnosis	
other	

If other,

specify……...

G. Hospitalisation duration

1. Time spent in hospital from admission to discharge

3 nights	
4-5 nights	
6-10 nights	
>10 nights	

2. If more than 3 days/nights, reason:

Wound sepsis	
Other infections	
Pulmonary embolism	
DVT	
Persistent tachycardia (? Cause)	
Other medical problem (Incidental to gynae admission)	
Ongoing bleeding	
Needing placement/social reasons	
other	

If other,

specify……

1.2 Ethics approval letter

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

Room G50- Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6492
Email: hrec-enquiries@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

08 September 2021

HREC REF: 563/2021

Dr T Adams
Department of Obstetrics & Gynaecology
H-Floor, OMB
Email: tracey.adams@uct.ac.za
Student: drhlako@gmail.com

Dear Dr Adams

PROJECT TITLE: A RETROSPECTIVE REVIEW OF GYNAECOLOGICAL EMERGENCY SURGERY AT GROOTE SCHUUR HOSPITAL FOR THE PERIOD OF JANUARY TO DECEMBER 2019. (MMED DEGREE – DR TEBOGO HLAKO)

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC) for review.

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

This approval is subject to strict adherence to the HREC recommendations regarding research involving human participants during COVID -19, dated 17 March 2020: 06 July 2020 & 01 July 2021.

Approval is granted for one year until the 30 September 2022.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

The HREC acknowledge that the student: - Dr Tebogo Hlako will also be involved in this study

Please quote the HREC REF 563/2021 in all your correspondence.

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

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

1.3 Hospital approval letter

Western Cape Government
Health

GROOTE SCHUUR HOSPITAL
Enquiries: Dr Bernadette Eick
e-mail: GSHReserach.Request@westerncape.gov.za

DR TRACEY ADAMS
OBSTETRICS AND GYNAECOLOGY

E-mail: tracey.adams@uct.ac.za

Dear Dr Adams

RESEARCH PROJECT: A Retrospective Review of Gynaecological Emergency Surgery at Groote Schuur hospital for the period of January to December 2019 (MMed degree: Dr Tebogo Hlako)

Your recent letter to the hospital refers.

You are granted permission to proceed with your research, which is valid until **30 September 2022.**

Please note the following:

a) Your research may not interfere with normal patient care.
b) Hospital staff may not be asked to assist with the research.
c) **Confidentiality must always be maintained.**
d) No additional costs to the hospital should be incurred as indicated in your Annexure 2 i.e. Lab, consumables or stationery. **If access to TRACK Care/NHLS is required, kindly attach our letter of approval to the application form and approach Information Management to assist with data.**
e) **No patient folders may be removed from the premises or be inaccessible.**
f) Please provide the research assistant/field worker with a copy of this letter as verification of approval.
g) **Should you at any time require photographs of your subjects, please obtain the necessary indemnity forms from our Public Relations Office (E45 OMB or ext. 2187/2188).**
h) Should you require additional research time beyond the stipulated expiry date, please apply for an extension.
i) Please discuss the study with the HOD before commencing.
j) Please introduce yourself to the person in charge of an area before commencing.
k) On completion of your research, please forward any recommendations/findings that can be beneficial to use to take further action that may inform redevelopment of future policy / review guidelines.
l) Please contact Michelle Riley (Patient Fees) at ext. 2276 to ascertain if there will be charges for conducting the Research and to obtain a quote or to discuss charges
m) **Kindly submit a copy of the publication or report to this office on completion of the research.**
n) **At no time should any posters encouraging patients to partake in research, be displayed within a clinical area.**
o) **Please adhere to ALL COVID-19 regulations and Groote Schuur Hospital policies.**

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

Yours sincerely

DR BERNADETTE EICK
CHIEF OPERATIONAL OFFICER
Date: 06 October 2021

C.C. Mr. L. Naidoo, Prof. L. Denny, Dr. F. Conrad, Mr. A. Mohamed

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Private Bag X,
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1.4 Progress report approved by Ethics Committee

UNIVERSITY OF CAPE TOWN

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

FHS016: Annual Progress Report / Renewal

HREC office use only (FWA00001637; IRB00001938)			
This serves as notification of annual approval, including any documentation described below.			
☑ Approved	Annual progress report	Approved until/next renewal date	30/12/2023
☐ Not approved	See attached comments		
Signature Chairperson of the HREC/ Designee		Date Signed	13/12/2022

Note: Please email this form and supporting documents (if applicable) in a combined pdf-file to hrec-enquiries@uct.ac.za.
Please clarify your plan for research-related activities during COVID-19 lockdown.
Please use the latest form found on our website:
http://www.health.uct.ac.za/fhs/research/humanethics/forms

Comments to PI from the HREC
Thank you for the clarification provided

Principal Investigator to complete the following:

1. Protocol information

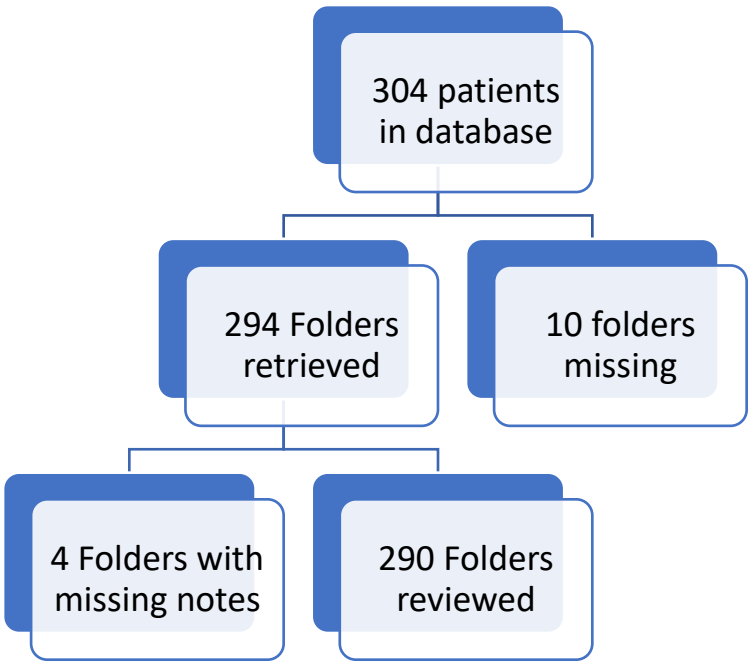
Date (when submitting this form)	08/12/2022		
HREC REF Number	563/2021	Current Ethics Approval was granted until	30 September 2022
Protocol title	A retrospective review of gynaecological emergency surgery at Groote Schuur Hospital for the period of January to December 2019		
Protocol number (if applicable)			
Are there any sub-studies linked to this study?		☐ Yes	☑ No
If yes, could you please provide the HREC Reference number for all sub-studies? **Note:** A separate FHS016 must be submitted for each sub-study.			
Principal Investigator	Dr TS Adams	STUDENT TEBOGO IRAKO	

(Note: Please complete the Closure form (FHS010) if the study is completed within the approval period)

2. List of diagrams, tables and figures

2.1 Diagrams

Diagram 1: Flow chart



2.2 Tables

Table 1: Age distribution

Age group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<20	24	8.3	8.3	8.3
	21 - 30	140	48.3	48.3	56.6
	31 - 40	90	31.0	31.0	87.6
	41 - 50	27	9.3	9.3	96.9
	>50	9	3.1	3.1	100.0
	Total	290	100.0	100.0	

Table 2: HIV status

HIV status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Positive	27	9.3	9.3	9.3
	Negative	70	24.1	24.1	33.4
	Unknown	193	66.6	66.6	100.0
	Total	290	100.0	100.0	

Table 3: HIV Viral load

If HIV positive, viral load

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	LDL	11	40.7	40.7	40.7
	<100	2	7.4	7.4	48.1
	>501	5	18.5	18.5	66.7
	Unknown	9	33.3	33.3	100.0
	Total	27	100.0	100.0	

Table 4: CD4 count

HIV positive, cd4 counts

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	100 - 250	8	29.6	29.6	29.6
	251 - 500	4	14.8	14.8	44.4
	>500	8	29.6	29.6	74.1
	Unknown	7	25.9	25.9	100.0
	Total	27	100.0	100.0	

Table 5: Smoking history

Smoking status	Percentage
Smoker	24.1% (N=70)
Non-smoker	25.9% (N=75)
Unknown	50.0% (N=145)
Total	100% (290)

Table 6: Co-morbidities

Comorbidities	Percentage 15.5% (N=45 of 290 women)
DM	17.8% (8)
Hypertension	42.2 (19)
Cardiac	6.7% (3)
Anaemia	24.4% (11)
TB	2.2% (1)
Others	6.7% (3)
Total	100% (45)

Table 7: Reasons for emergency surgery (pregnancy related)

Reasons for emergency surgery (pregnancy-related)	Frequency	Percentage(%)
Ectopic pregnancy	112	47.9
Evacuation of uterus (incomplete miscarriage)	34	14.5
Evacuation of uterus (septic miscarriage)	24	10.3
Suction evacuation (molar pregnancy)	22	9.4
Evacuation of uterus (post NVD)	17	7.3
Evacuation of uterus (post c/s)	13	5.6
Hysterectomy for sepsis (post-delivery)	4	1.7
Other	8	3.4
Total	234	100.0

Table 8: Reasons for emergency surgery (non-pregnancy related)

Reasons for emergency surgery (non-pregnancy related)	Frequency	Percentage (%)
Pelvic inflammatory disease	14	22.6
Wound sepsis- post surgery	3	4.8
Hysterectomy for sepsis	1	1.6
Ovarian torsion	11	17.1
Other cysts accidents	25	40.3
Bartholin's abscess	8	12.9
Total	62	100.0

Table 9: Reasons for more than 3 nights in the hospital

If more than 3 days/nights, reason

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid					
	Wound sepsis	13	13.4	13.4	13.4
	Other infections	22	22.7	22.7	36.1
	Pulmonary embolism	1	1.0	1.0	37.1
	Dvt	1	1.0	1.0	38.1
	Persistent tachycardia	12	12.4	12.4	50.5
	Other medical causes (incidental gynae admission)	25	25.8	25.8	76.3
	Ongoing bleeding	4	4.1	4.1	80.4
	Needing placement/social reasons	1	1.0	1.0	81.4
	Other	18	18.6	18.6	100.0
	Total	97	100.0	100.0	

2.3 Figures

Figure 1: Tachycardia (pre-operative)

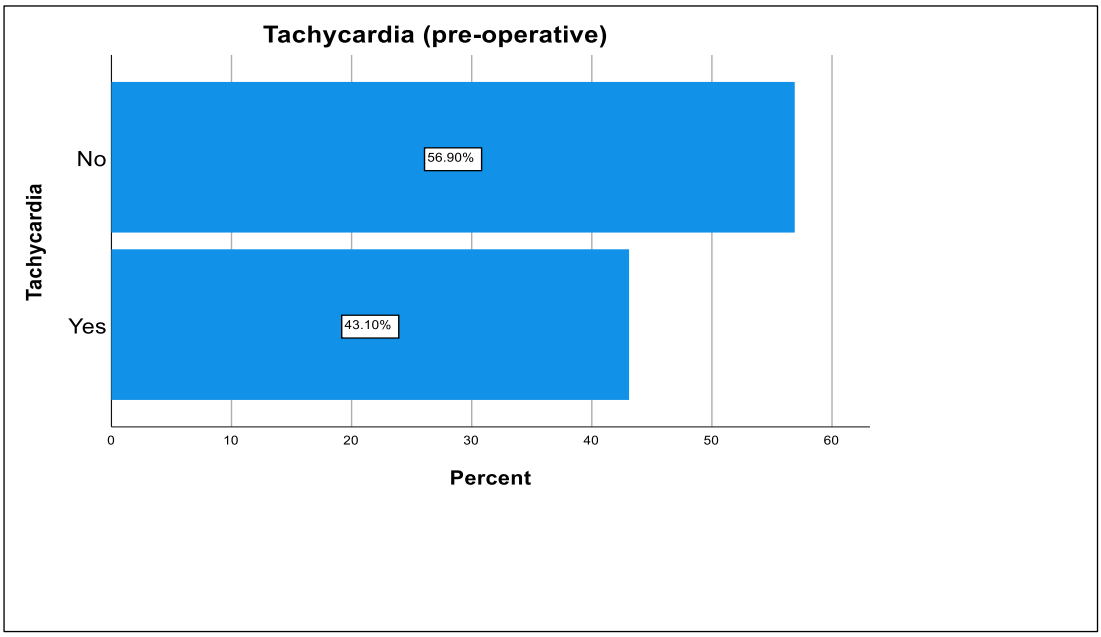


Figure 2: Haemoglobin (pre-operative)

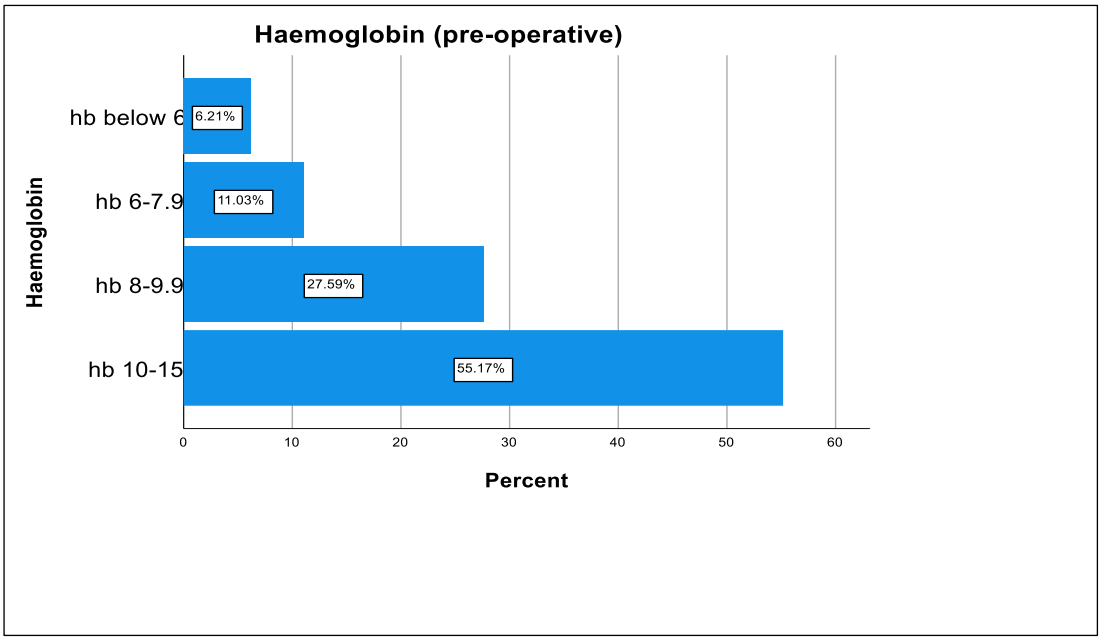


Figure 3: Hypovolaemic shock (pre-operative)

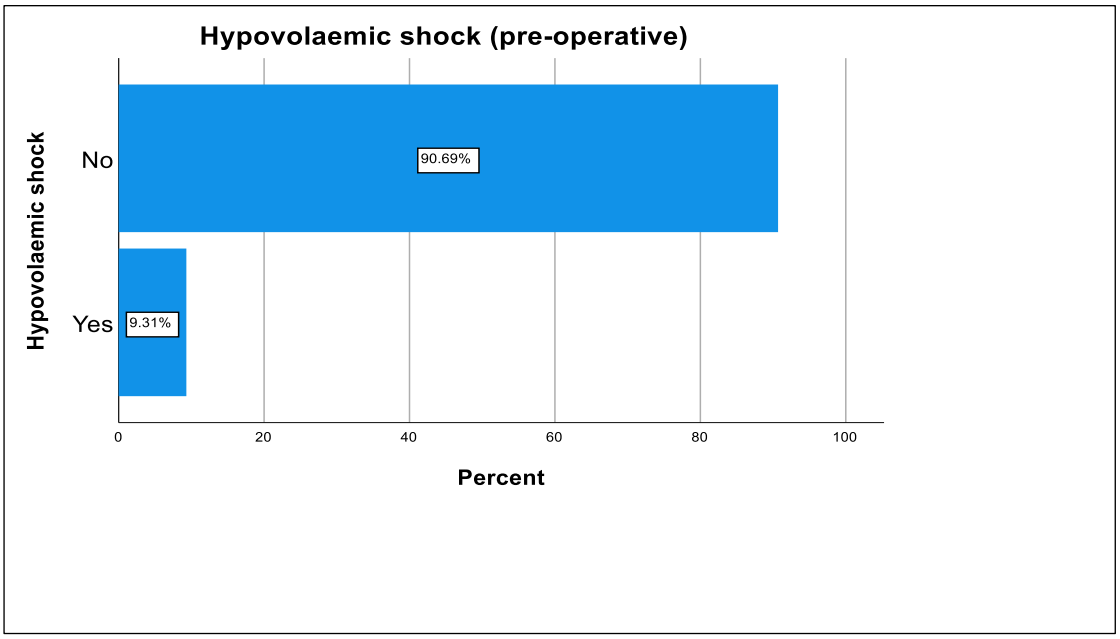


Figure 4: Time taken for decision making

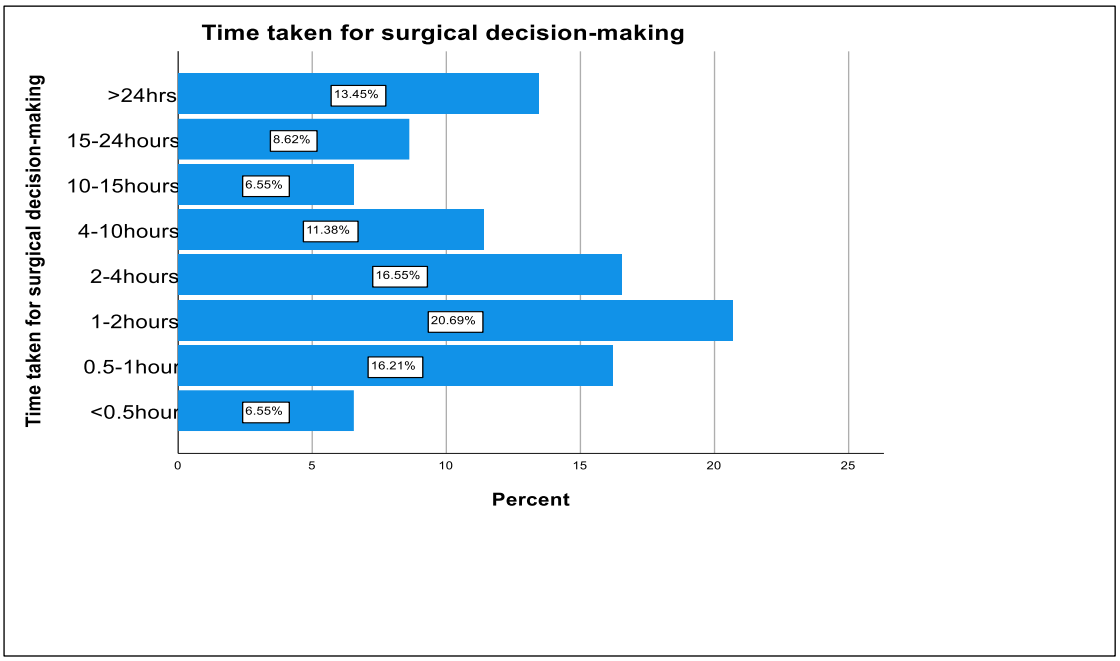


Figure 5: Time taken to get to theatre (from booking the patient to theatre)

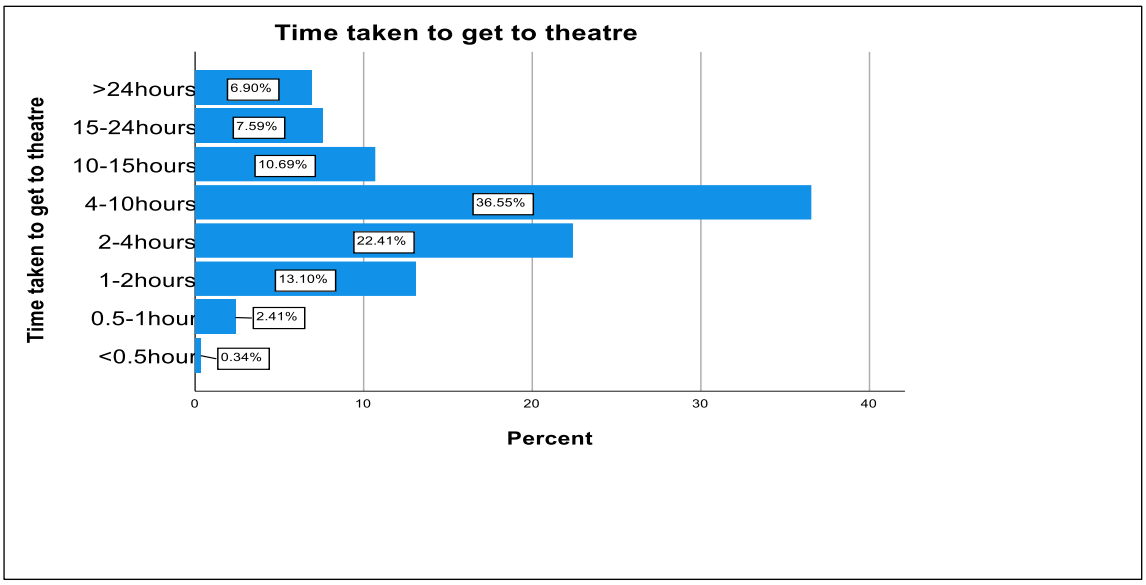


Figure 6: Reasons for delays greater than 24 hours (N=20 of 290)

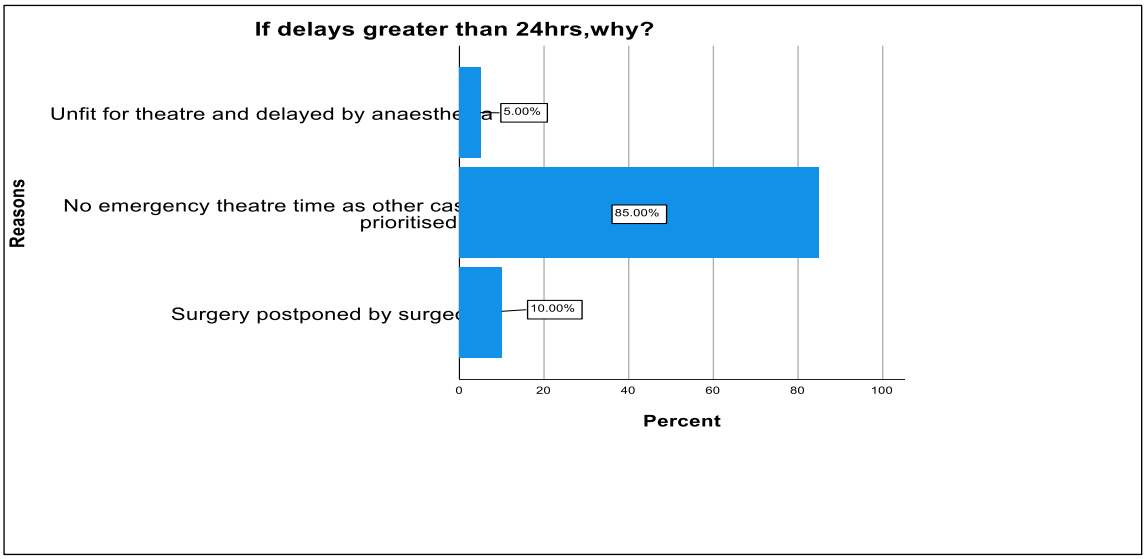


Figure 7: Post-surgical complications

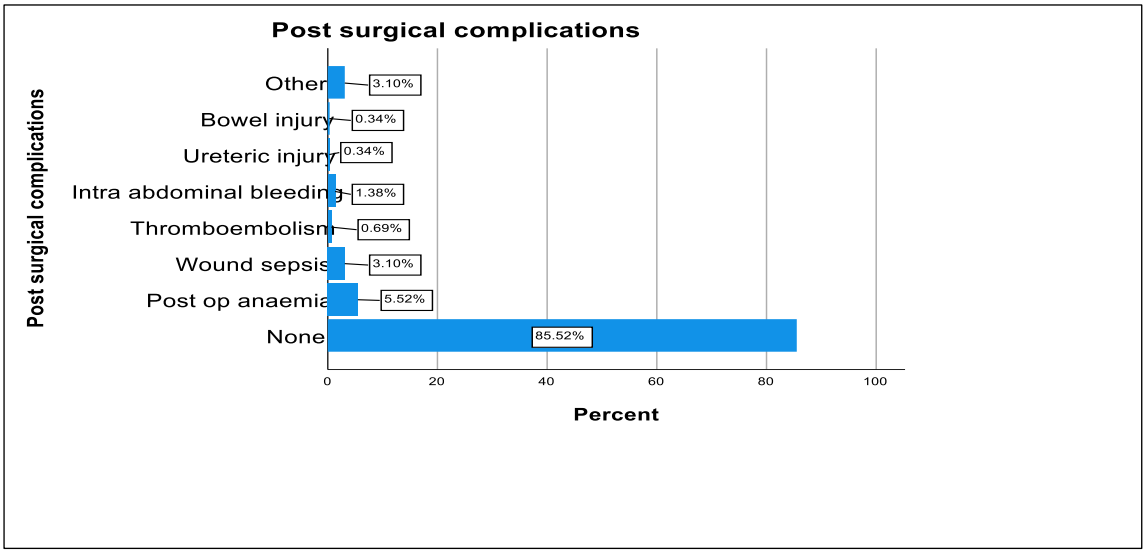
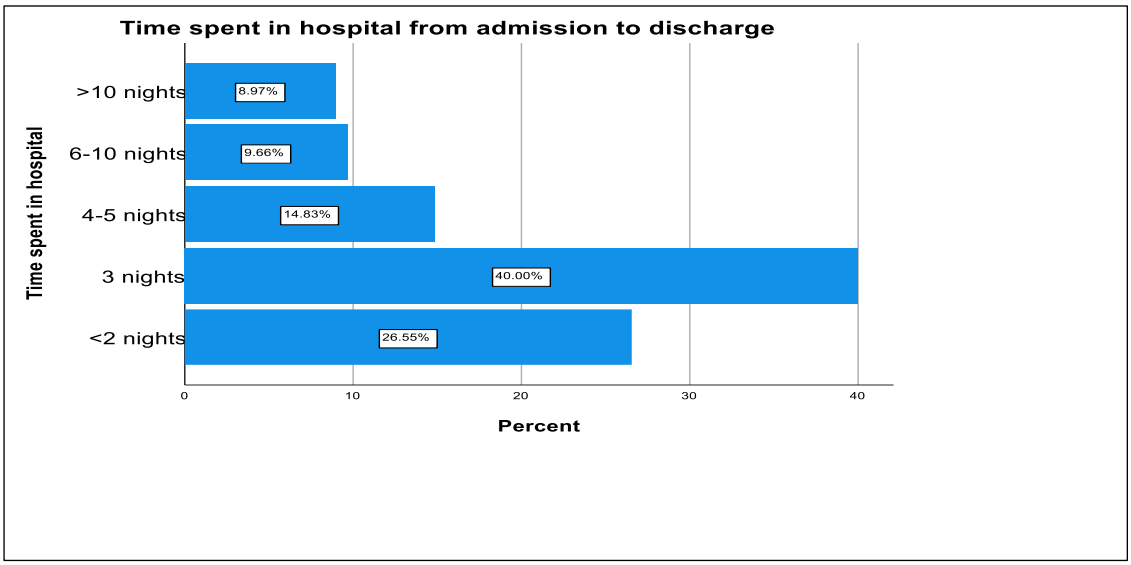


Figure 8: Time spent from admission to discharge



3. Abbreviations

HIV: Human Immunodeficiency Virus
HCG: Human Chorionic Gonadotropin
FSH: Follicle Stimulating Hormone
PID: Pelvic Inflammatory Disease
RCOG: Royal College of Obstetrics and Gynaecologist
ASOS: African Surgery Outcomes Study
TACS: Timing of Acute Care Surgery
Hb: Haemoglobin
DIT: Decision Intervention Time

4. Abstract

Background. Gynaecological emergencies are a common cause of morbidity and mortality among women of reproductive age worldwide. There is less audit done on the burden of emergency surgery in developing countries.

Objectives. The planned study analysed the clinical processes and outcomes of gynaecological emergency surgeries performed at a tertiary level hospital in the Western Cape (Groote Schuur) in the year 2019.

Methods. The study was a retrospective descriptive record review of patients who underwent emergency surgery at Groote Schuur Hospital. Data was captured manually and electronically using theatre data base. Statistical analysis was performed using SPSS Statistics for Windows 2021.

Results. We analysed 290 completed women records. The mean age was 30.16, with 230 (79.3%) women of reproductive age. There were 234 (79.1%) pregnancy related surgical procedures done. The most common occurrence among pregnancy related surgeries was ectopic pregnancy, accounting for 112 (47.9%) cases. A total of 130 (44.8%) women had anaemia and 125 (43.1%) had a tachycardia prior to surgery. Twenty-seven (9.3%) women were in hypovolaemic shock before surgery. A total of 179 (61.7%) women had the surgery 4 hours after being booked in theatre. Only 46 (15.9%) women accessed surgery within 2 hours. Twenty (6.9%) women had to wait for more than 24 hours for their operation to be done. The most common reason for the 24-hour delay, accounting for 85% (N=17), was the lack of emergency theatre time, as other cases from different disciplines were given priority. There were 42 (14.5%) women with complications post operatively and no mortality recorded.

Conclusion. The study indicates good outcomes for emergency gynaecological surgeries performed at Groote Schuur Hospital in 2019. However, significant delays between the decision for surgical intervention and the actual performance of the surgeries were highlighted. The delays in hypovolaemic women were attributed to the need to compete with other surgical disciplines for emergency theatre time.

5. Chapter 1: Introduction and Literature review

5.1 Background

Gynaecological emergencies are a common cause of morbidity and mortality among women of reproductive age globally. In developing countries, gynaecological emergencies present enormous challenges given the lack of health infrastructures and resources. Most of the literature in women reports on maternal mortality and morbidity. [1,2,3] Although this is exceptionally important, surgery beyond obstetrics is rarely documented, described, and audited. Globally, the prevalent gynaecological emergencies include ectopic pregnancies, acute pelvic inflammatory diseases, miscarriages, and complicated ovarian cysts. Managing gynaecological emergencies aims to safeguard life, well-being, sexual function, and the potential for future fertility.[9]

Gynaecological emergencies can be classified into two categories namely pregnancy related and non- pregnancy related emergencies.

5.2 A. Pregnancy related gynaecological emergencies

In developing countries, ectopic pregnancy is the most common surgical gynaecological emergency.[4] The occurrence of ectopic pregnancy is on the rise globally, with reported incidence ranging from 1:60 to 1:250 pregnancies.[5] Ectopic pregnancy stands as the primary cause of maternal mortality during the first trimester and contributes to 10%–15% of all maternal fatalities worldwide.[6]

5.2. A1. Ectopic pregnancy

Ectopic pregnancy is characterized by the implantation of a fertilized egg outside the typical endometrial lining of the uterus, with majority occurring in the fallopian tubes. It is associated with a threat to life as it can lead to massive intra-abdominal haemorrhage resulting in hypovolaemic shock and death. Some of the outcomes which can occur post-surgery is loss of a fallopian tube especially if both tubes are removed or if the remaining fallopian tube is clubbed or diseased, which might compromise fertility and quality of life. It carries a high risk of mortality and morbidity both nationally and internationally. The presentation can be acute or chronic. There is a spectrum of presentation from being asymptomatic with a diagnosis on routine ultrasound versus a shocked patient presenting to a casualty. More commonly women present with lower abdominal pain, mild vaginal bleeding, and amenorrhea. There may be signs of haemodynamic instability with anaemia and generalized abdominal tenderness. Other clinical findings may include cervical excitation tenderness and adnexal tenderness. Sensitive urine- pregnancy test or serum beta Human Chorionic gonadotropin (B-HCG), and transvaginal ultrasound scan can assist in reaching a diagnosis. Surgery remains the mainstay in treating ectopic pregnancy. The procedure done is commonly salpingectomy or salpingostomy carried out by laparotomy or laparoscopy.

5.2. A2. Miscarriage

The World Health Organisation (WHO) defines a miscarriage as an early pregnancy loss before 20 weeks of gestation or birth of a foetus less than 500g when the gestation is unknown.[8] Miscarriages come in various forms, including threatened, inevitable, incomplete, complete, missed, septic, spontaneous and induced. Most women are haemodynamically stable during presentation, but occasionally patients may be bleeding profusely and in shock. This scenario requires resuscitation and an evaluation of the uterus in theatre. A hysterectomy may be indicated in women who present with a complicated septic miscarriage.

5.2. B. Non-pregnancy related gynaecological emergencies

5.2. B1. Pelvic inflammatory diseases

Pelvic inflammatory disease is an infection that ascends and impacts the upper female genital tract, potentially involving a combination of endometritis, salpingitis, oophoritis or tubo - ovarian abscess and pelvic peritonitis. This condition affects young women and can account for a significant percentage of morbidity associated with sexually transmitted infection. Patients often present with pain in the pelvic area, lower abdomen, and foul-smelling discharge as well as inconsistent fever. Gainesville classification is frequently used in the grading of pelvic inflammatory disease, and it is significant in terms of practical management of patients.[30] Ruptured tubo -ovarian abscess (Stage 4) or failure of tubo- ovarian abscess (stage 3) to respond to antibiotics will require surgical intervention (laparotomy). Common long-term complications of pelvic inflammatory disease include ectopic pregnancy, infertility, and premature menopause if both ovaries are removed, though it has a low mortality risk.

5.2. B2. Ovarian cysts

It is a sac or pouch filled with liquid or semi- liquid and can be found either inside or on the surface of an ovary. Majority of these conditions are benign and occurs in the reproductive age group. Ovarian cysts are classified into functional, non-functional benign cysts and neoplastic. The common benign cysts include follicular, theca lutein and corpus lutein. These cysts arise in the normal process of ovulation and can be stimulated by gonadotropins, including follicle-stimulating hormone (FSH) as well as human chorionic gonadotropin (HCG). Multiple functional cysts can occur because of excessive gonadotropin stimulation or sensitivity. The stimulation may occur in cases of gestational trophoblastic disease, multiple pregnancy, and patients on ovulation induction drugs for fertility treatment. Non-functional benign cysts include endometriomata, polycystic ovaries, hyperthecosis and paraovarian cysts. Complications of ovarian cyst can be torsion, rupture, and haemorrhage. Patients on presentation have severe lower abdominal pain, nausea, and vomiting. They can be systematically unwell and have a range of tenderness on palpation of the abdomen to frank peritonitis. Standard treatment is emergency surgery, usually a laparotomy for cystectomy or unilateral salpingo - oophorectomy. It is unlikely that ovarian malignancies present as an emergency, unless women have a bleed into the ovarian cancer, or also present as a torsion or a ruptured ovarian mass. Occasionally women with diagnosed or undiagnosed ovarian cancer

can present with small bowel obstruction due to a large tumour burden. These cases may be seen on the emergency theatre slates.

5.2. C. Other gynaecological emergencies

Other rarer gynaecological disease which can warrant emergency surgical intervention are bleeding gynaecological malignancies, coital lacerations, and sexual assault. Patients with sepsis post caesarean sections may require emergency debridement of the wound or hysterectomy.

5.3. Literature review

There are few studies in recent years reviewing emergency gynaecological surgery. The focus has been on the review of postpartum hysterectomies and modality of surgery in gynaecology (laparotomy, laparoscopic and robotic surgery). [10,11,12,13]

Epidemiology

According to the seventh triennial report on confidence enquiries into maternal death in South Africa, ectopic pregnancy and miscarriage are still among the common causes of maternal death in South Africa.[7] The seventh triennial report indicated that the maternal mortality ratio for miscarriage was 6.00 and ectopic pregnancies 3,45. Under the subcategories of miscarriages, 65% of deaths were from septic miscarriage, while 20% as deaths from non-traumatic haemorrhage, 5% as deaths from uterine trauma, and 7% followed legal termination as well as 3% by gestational trophoblastic diseases. Some of the common final cause of deaths in miscarriages were due to septic shock in 54% and hypovolaemic shock in 32%. In ectopic pregnancy the common cause was found to be because of hypovolaemic shock in 83%. It has been found nationally that sepsis related to miscarriage was higher than that related to ectopic pregnancy.[7] The frequent contributory factors to the deaths were found to be lack of appropriately trained doctors and lack of blood or blood products. Other health related avoidable factors were below average quality of management after making the right diagnosis, failure to make the correct diagnosis or to recognise the severity of the condition. Lack of antenatal care and late presentation to seek medical help were found to be some of the avoidable factors contributing to the deaths.[7] The occurrence of ectopic pregnancy is roughly estimated to be around 1-2% in general population.[8] Around 8–15% of pregnancies that are clinically confirmed end in a miscarriage, and estimates suggest that as many as 30% of all pregnancies may lead to miscarriage. [22,23,24] Adnexal torsion is the fifth most common gynaecologic surgical emergency, with a prevalence of approximately 3%.[25]

Burden of emergency surgery in gynaecology

The burden of emergency gynaecological surgery is especially relevant in limited resource settings because it can result in serious human, and economic resources and an increase in morbidity or mortality.

A study conducted at a tertiary teaching hospital of Dharan in Sunsaria district of east Nepal from April 2010 to March 2012, specifically looked at the burden of surgical emergencies in gynaecology, as well as the course of management at BP Koirala Institute of Health Sciences.[14]

A total of 314 women who presented to the gynaecological emergency unit, were included in the study. The ages of patients ranged from 15-55 years, with 43% in their 25–34-year age range. Ectopic pregnancy was the leading diagnosis in 192 women (61,1%), followed by ovarian masses in 24 (7,6%) patients and ovarian cyst torsion/rupture in 24 (7,6% women). Common presenting complaints and signs were found to be abdominal pain in 238 (75,8%) of the patients, followed by vaginal bleeding among 66 (21,0%) of the patients. Other presentations included vomiting among 34 (10,8%) of the patients and haemoperitoneum among 34 (10,8%). In this study, 47,7% of the patients underwent only salpingectomy for an ectopic pregnancy, while 10,8% had salpingectomy with contralateral tubal ligation and 4,5% for repair of uterine rupture. It was also found that 36,9% of the patients had a subtotal/total hysterectomy with bilateral salpingo-oopherectomy in patients who had ovarian masses/cysts.

The study revealed that gynaecological emergencies are common in tertiary care centres like BP Koirala institute of health sciences. Also, it was found that the gynaecologists could manage these cases better if peripheral health institutes referred patients timely once the diagnosis was suspected or confirmed. Delays in referral of patients and not performing immediate investigations were some of the avoidable factors found. It was also observed that some of the emergencies could have been avoided with minimal precautions, counselling and preconceptual care in time.

A study conducted in India included 2000 patients, who presented with an acute abdomen.[16] The aim of the study was to evaluate the quantity and pattern of the gynaecological problems in emergency surgery. The quantity of women who presented with a gynaecological acute abdomen in this study was 0,7% of all surgical emergencies conducted. This indicated that one in 140 patients had a gynaecological acute abdomen. Ovarian torsion and rupture, followed by ectopic pregnancy were the common findings intraoperatively. The study also indicated that gynaecological emergencies were commonly mistaken for other surgical emergencies, because of the similarities of the patient's clinical presentations and findings on the examination. The gynaecological causes were thought of clinically only in 12% of the patients. In the great majority of the patients (88%) suffering from gynaecological problems, the clinical diagnosis had been appendicitis in 52%, peritonitis in 20% and colic in 8% of patients.

A study done in Nigeria highlighted the clinical spectrum of surgical and gynaecological abdominal emergencies in an urban teaching hospital.[26] A total of 803 patients were reviewed and majority of them were found to be females by 549 (68,4%). Ectopic pregnancy accounted

for 44% of the emergencies. Ectopic pregnancy was the commonest indication for the emergency laparotomy, and they recommended that it should be considered in the diagnosis of acute abdomen in female patients.

Delays in emergency surgeries

Onyebachi et al prospectively described 105 emergency gynaecological cases managed surgically at a federal teaching hospital from 1 January 2012 to 30 June 2013 in Abakaliki, Ebonyi state in Southeast Nigeria.[15] The total number of gynaecological emergency patients seen during the period of study was 2067. The study evaluated the determinants of decision to intervention time in the management and therapeutic outcome of emergency gynaecological surgeries during the period of the study. The incidence of gynaecological emergency surgery conducted was 5,1%. Ruptured ectopic pregnancy was found to be the most common indication (59,0%) for surgery, followed by ovarian cysts rupture/torsion at 28,6%. None of the cases had therapeutic surgical intervention within 30 minutes of the decision to do so. Major reasons for delay of more than 60 minutes for decision to intervention time include; - non- availability of blood/blood products (46,7%), non-availability of medication or surgical material (11,4%), delay in laboratory results (11,4%) and delay in transferring the patient and lack of theatre space (5,7%).
They found that the care received by the women with gynaecological surgical emergencies is still suboptimal in emergency situations, resulting in poor treatment outcomes. Six deaths were recorded, giving a case fatality rate of 5,7%. Blood loss of more than 1000 millilitres was a significant morbidity found, which necessitated blood transfusions (57,1%) for haemorrhagic shock (18,1%) and anaemia (36,2%). Sepsis (66,7%) and haemorrhage (33,3%) were causes of deaths. It was found that the risk ratio of losing 1000 millilitres or more of blood, anaemia, haemorrhagic shock, need for blood transfusion, and sepsis in patients with 120 minutes or more of decision to intervention time (DIT) was statistically greater and significant at 95% confidence interval.
The study also indicated that major factors that resulted in prolongation of decision to intervention time as well as therapeutic outcomes were avoidable and preventable.

An audit in emergency anaesthesia and surgery was done in Nigeria at the main theatre of Ahmada Bello university teaching hospital in year 2001.[17] Data collected included all the emergency surgeries booked at the main theatre. The study indicated that emergency surgeries are sometimes delayed or not done due to lack of theatre space. Three hundred and forty-eight patients were booked as emergency surgical cases, with the cancellation rate of 4,8%. Young adult females with obstetric and gynaecological emergencies contributed 65% of all emergency surgery conducted. Main surgeries included caesarean sections, ruptured ectopic pregnancies and evacuations of the uterus for incomplete miscarriages. The reasons for the delays or cancellations of surgeries were lack of theatre space, awaiting investigation results,

as well as lack of resources like sterile gowns and anaesthetic drugs. The study revealed the importance of the provision of a separate daytime theatre for the emergency surgical cases.

Adams A, e.t al indicated that delayed interventions in patients with abdominal diseases requiring emergency operation were associated with higher morbidity and mortality.[27] The prospective study included 488 adult patients (187 females and 301 males) with surgical emergencies in Nigeria Zaria hospital. They analysed the time interval between the patient's presentation to emergency room to decision and commencement of surgery. In 81,6% operative intervention was delayed beyond 6hours. Financial constraints accounted for 53,8% and waiting for complementary investigations caused delay in 22,1%. With mortality of 5,3% among females and 4,3% males out of the total number of patients. Severe post operative complications were higher in patients with longer waiting periods. Patients whose operations were delayed beyond 24hours, had a longer hospital stay.

Peri-operative outcomes

Surgical complications can arise either intraoperatively or postoperatively.

According to the African Surgery Outcomes Study (ASOS), most African patients receiving surgery were younger than the global average, with a lower risk profile and lower complication rates, and yet it was found that they are twice as likely to die due to substandard care as well as lack of medical infrastructure.[18] In the above- mentioned study, most participants were women (66,4%). Obstetrics surgery represented 33%, while gynaecological surgery was 11,5% and breast surgery 2% respectively. One in five surgical cases had complications and one in ten died. Infections were common complication outcomes and 95% of deaths occurred post operatively, indicating the need for good perioperative safety care. This study found that morbidity and mortality is on a rise in low-income countries due to limited access to safe and affordable surgical treatments.

Anupama Bahadur et al conducted a cohort study that analysed intraoperative and postoperative complications in gynaecological surgery.[28] A total of 389 women underwent gynaecological surgeries. 94 of the patients had perioperative complications, accounting for 24,16% of total cases. Surgical site infections (10,28%) and fever (5,39%) were the most common complications observed. The common route of surgery associated with the complications was open abdominal surgery (34.66%). The average duration of the hospital stay after surgery was 7,91 to 10,79 days. Postoperative (19,28%) complications were higher that intraoperative (5,91%). This study highlighted the importance of strict hygiene factors and prevention of sepsis to avoid post operative morbidity.

Surgical site infections are one the most common healthcare associated infections in low middle income countries.[29] The study done at a teaching hospital in rural India indicated that the incidence of surgical site infection was lower for Obstetrics (1,2%) compared to gynaecological surgeries (10,3%). The aim of the study was identifying the incidence and risk factors for surgical site infections in Obstetrics and gynaecological surgery from a teaching hospital. A total of 1173 patients underwent a surgical procedure during the period from 2010 to 2013. Multiple risk factors identified to be associated with surgical site infections were age

(OR 1.03), vaginal examination (OR 1.31), medical disease (OR 5.76), inappropriate antibiotic prophylaxis, surgery over an hour and prolonged hospital stay increased the risk by nearly 5 times.

Justification for this study

There is less research done both nationally and internationally specifically on gynaecological surgical emergencies performed. Women who require surgical intervention are in most cases booked on the general emergency theatre lists in both local and other institutions across South Africa. According to RCOG Good practice no.9 June 2009, sufficient operating facilities need to be available for gynaecological emergencies during regular working hours.[19]

Prompt response in management of gynaecological surgical cases can have a substantial impact on the surgical outcome for patients experiencing emergencies.[20] In medical emergency (e.g., ruptured ectopic pregnancy) situations, the clinical characteristics will dictate the priority over other surgical emergencies. In addition, it is fitting for these women to anticipate receiving compassionate and timely care during an emotionally vulnerable period. As part of good clinical governance according to RCOG, regular review of clinical processes and outcomes through audits is essential for emergency gynaecological surgery.[19] To achieve an outstanding provision of quality surgical treatment in Africa, comprehensive insight is required regarding the volume of surgical procedures conducted, the surgical resources at hand, and the peri-operative outcomes of patients.

Research Methodology

Study setting

Groote Schuur Hospital is a tertiary specialist-based institution that provides services to the patients referred from secondary hospitals. It is found in the Metro West region of Cape Town.

Aim of the study

This planned study analysed the clinical processes and outcomes of the gynaecological emergency surgeries performed at a tertiary level hospital in the Western Cape (Groote Schuur) in the year 2019. This gave us insight into the burden of gynaecological disease, the waiting times and outcome.

Objectives

Primary objectives

- To determine the number of women who received emergency gynaecological surgery during the above period.
- To document demographic data of the above women
- To classify the reasons for the emergency gynaecological surgery (pregnancy related versus non pregnancy related)
- To determine outcomes of the surgery (full recovery; morbidity; mortality)
- To document any complications related to the surgery and to describe complications.

Secondary objectives

- To document the time that the decision was made for surgery, as well as the time that surgery happened.
- To document if any cases received surgery only 24 hours later or if the surgeon postponed the surgery and the reason for this if documented in the folder
- To document the time spent in hospital from admission to discharge.
- If women spent more than 3 days in the hospital post-operatively, to describe reasons for this prolonged hospital stay.

Study designs

We conducted a retrospective descriptive record review of patients who underwent an emergency gynaecological surgery at Groote Schuur hospital in the period 1 January 2019 to 31 December 2019.

Study population

The study population included all the women who were booked for a gynaecological emergency surgery during the period of 1 January to 31 December 2019. Patients who were booked by other specialities and found to have gynaecological conditions intraoperatively were excluded.

Data collection

The hospital has the main theatre and a separate maternity centre theatre. Main theatre provides both the acute and elective theatre services. There are 2 dedicated emergency theatres offering services 24 hours per day. The emergency main theatre at Groote Schuur is used by all the different specialities, except for maternity and trauma which has separate theatre. The emergency theatre database is manually and electronically captured.

Main theatre emergency booking registers were used initially to retrieve all the names and folder numbers of the patients who had the emergency gynaecological surgery during 2019. With the use of folder numbers, the patient's files were then retrieved from the records department. A data collection sheet designed for the audit was used to collect information from the folders of the patients and was entered into an excel spreadsheet. All the women included in the study were anonymised during the data collection and assigned a specific study number.

Data analysis

Statistical analysis was performed using SPSS Statistics for Windows (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp). Descriptive statistics were used as well as frequency tables, distribution with counts and percentages. Data was presented using flow diagram, bar, and histogram graphs.

Ethical consideration

Ethical clearance was obtained from the University of Cape Town Human Research Ethical Committee (HREC Ref 563/2021). Department of Obstetrics and Gynaecology Research committee and Groote Schuur Research department also granted the permission to proceed with the research. There was no consent required from the participant as it was a retrospective review study and data was obtained in a strictly anonymised technique. The study is in keeping with declaration of Helsinki.[21]

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6. Chapter 2: Publication-ready Manuscript

Title page:

A retrospective review (audit) of gynaecological emergency surgery at Groote Schuur Hospital for the period of January to December 2019

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Abstract:

Background. Gynaecological emergencies are a common cause of morbidity and mortality among women of reproductive age worldwide. There is less audit done on the burden of emergency surgery in developing countries.

Objectives. The planned study analysed the clinical processes and outcomes of gynaecological emergency surgeries performed at a tertiary level hospital in the Western Cape (Groote Schuur) in the year 2019.

Methods. The study was a retrospective descriptive record review of patients who underwent emergency surgery at Groote Schuur Hospital. Data was captured manually and electronically using theatre data base. Statistical analysis was performed using SPSS Statistics for Windows 2021.

Results. We analysed 290 completed women records. The mean age was 30.16, with 230 (79.3%) women of reproductive age. There were 234 (79.1%) pregnancy related surgical procedures done. The most common occurrence among pregnancy related surgeries was ectopic pregnancy, accounting for 112 (47.9%) cases. A total of 130 (44.8%) women had anaemia and 125 (43.1%) had a tachycardia prior to surgery. Twenty-seven (9.3%) women were in hypovolaemic shock before surgery. A total of 179 (61.7%) women had the surgery 4 hours after being booked in theatre. Only 46 (15.9%) women accessed surgery within 2 hours. Twenty (6.9%) women had to wait for more than 24 hours for their operation to be done. The most common reason for the 24-hour delay, accounting for 85% (N=17), was the lack of emergency theatre time, as other cases from different disciplines were given priority. There were 42 (14.5%) women with complications post operatively and no mortality recorded.

Conclusion. The study indicates good outcomes for emergency gynaecological surgeries performed at Groote Schuur Hospital in 2019. However, significant delays between the decision for surgical intervention and the actual performance of the surgeries were highlighted. The delays in hypovolaemic women were attributed to the need to compete with other surgical disciplines for emergency theatre time.

Introduction:

Gynaecological emergencies are a common cause of morbidity and mortality among women of reproductive age globally. [1,2] In developing nations, gynaecological emergencies present substantial challenges given the lack of health infrastructures and resources. Most of the literature in women reports on maternal mortality and morbidity. [3,4,5] Although this is exceptionally important, surgery beyond obstetrics is rarely documented, described, and audited. There is less research done both nationally and internationally specifically on gynaecological surgical emergencies performed. Women who require surgical intervention are in most cases booked on the general emergency theatre lists in both local and other institutions across South Africa. According to RCOG Good practice no.9 June 2009, sufficient operating facilities need to be available for gynaecological emergencies during regular working hours.[6]

Prompt and timely reaction in managing gynaecological surgical cases during emergencies can greatly influence the surgical results for patients.[7] In medical emergency like ruptured ectopic pregnancy, the clinical characteristics will dictate the priority over other surgical emergencies. In addition, it is fitting for these women to anticipate receiving compassionate and timely care during an emotionally vulnerable period. As part of good clinical governance according to RCOG, regular review of clinical processes and outcomes through audits is essential for emergency gynaecological surgery.[6] Conducting an audit within the clinical environment enables the gathering of data with the intent of establishing professional benchmarks, evaluating clinical competence, and adapting clinical procedures as needed.[8] To achieve an outstanding provision of quality surgical treatment in Africa, comprehensive insight is required regarding the volume of surgical procedures conducted, the surgical resources at hand, and the peri-operative outcomes of patients.[9] Surgical care ought to be an essential element of healthcare systems for nations at every stage of development.[10] Annually, a minimum of 77.2million disability-adjusted life years could be averted through fundamental, life-saving surgical interventions.[11]

Globally, the prevalent gynaecological emergencies include ectopic pregnancies, acute pelvic inflammatory diseases, miscarriages, and complicated ovarian cysts.[12] Ectopic pregnancy stands as the primary cause of maternal mortality during the first trimester and contributes to 10%–15% of all maternal fatalities worldwide.[13] Comparing 2014 to 2016 data of the seventh triennial report on confidential enquiries into maternal death in South Africa, there was a 56% increase in ectopic deaths and a 17% increase in miscarriage deaths.[14] According to the African Surgery Outcomes Study (ASOS), most African patients receiving surgery were women (66.4%). Gynaecological and obstetric surgery contributed 11.55 and 33.3% respectively in the ASOS.[15] The study indicated that morbidity and mortality is on a rise in Low-Income Counties due to resource constraints. There are local studies that specifically reviewed ectopic pregnancy and not all emergency surgeries in gynaecology. [16,17] In Africa, there is limited data concerning the factors influencing the decision to intervention time in the management and therapeutic outcome of emergency gynaecological surgeries.[18] Yet the delays in the emergency surgeries have been found to contribute to poor clinical outcomes of the patients.[19] The Lancet Commission identified timely access to essential surgery as a fundamental indicator for tracking universal access to safe health systems.[9]

Aim of the study and objectives:

This planned study analysed the clinical processes and outcomes of the gynaecological emergency surgeries performed at a tertiary level hospital in the Western Cape (Groote Schuur) in the year 2019. This gave us insight into the burden of gynaecological disease, the waiting times and outcome.

Primary objective:
We reviewed the number of women who underwent emergency gynaecological surgery in that period and their demographics. We explored the reasons for the surgery, outcomes, and complications.

Secondary objectives:
We assessed the time that it took for women to get to theatre from the time the decision was made to the intervention. We specifically looked at reasons for the surgery delays, the time spent in the hospital and the reasons if more than 3 days were spent in the hospital post operatively.
Inclusion criteria were all women booked for the emergency gynaecological surgery. Women who were booked by other specialities and found to have gynaecological conditions intraoperatively were excluded as their primary surgical indication was non gynaecological.

Methodology:

Study design and setting

We conducted a retrospective descriptive record review of patients who underwent emergency gynaecological surgery at Groote Schuur hospital during the period 1 January 2019 to 31 December 2019.

Data collection

Groote Schuur Hospital has the main theatre and a separate maternity centre theatre for caesarean sections. The main theatre provides both the acute and elective theatre services. There are 2 dedicated emergency theatres offering services 24 hours per day. The emergency theatre database is manually and electronically captured. Main theatre emergency booking registers were used initially to retrieve all the names, and this was confirmed with the electronic capture by the institution to ensure that no cases were missed. Folder numbers of the patients who had the emergency gynaecological surgery during 2019 were collected and these were used to retrieve the patient's files from the records department. A data collection sheet designed for the audit was used to collect information from the folders of the patients and was entered into an excel spreadsheet. All the women included in the study were anonymised during the data collection and assigned a specific study number.

Data analysis

Statistical analysis was performed using SPSS Statistics for Windows (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp). Descriptive statistics were used as well as frequency tables, distribution with counts and percentages. Data was presented using flow diagrams, bar, and histogram graphs.

Ethical consideration

Ethical clearance was obtained from the University of Cape Town Human Research Ethical Committee (HREC Ref 563/2021). The Department of Obstetrics and Gynaecology Research committee and institutional approval also granted the permission to proceed with the research. There was no consent required from the participant as it was a retrospective review study and data was obtained in a strictly anonymised technique. The study is in keeping with the Declaration of Helsinki.[20]

Results:

Demographic data

A total of 304 women received emergency gynecological surgery and 290 (95%) of their folders were reviewed in the study. Ten folders were missing, and 4 folders had incomplete notes. The ages ranged from 16-55 years with a mean of 30.16 and a mean parity of 1.43. Figure 1 indicates that 230 (79.3%) women who underwent the surgery were in the reproductive age group (between 21-41 years).

There were 45 (15.5% of the entire cohort) women with medical comorbidities (table 1), of which 32 (71.1%) were found to be more than 40 years of age. This did not include HIV status. Twenty-seven women were HIV positive (9.3%), while the HIV status of 193 (66.6%) women were unknown (figure 2). Within the cohort of 27 HIV positive women, 11 (40.7%) were virally suppressed and in 9 (33.3%) women, the viral load was unknown. Only 8 (29.6%) women had the latest CD4 >500 and in 7 (25.9%), the CD4 count was unknown. Seventy (24.1%) participants were found to be smokers and in 75 women (25.9%) the smoking history was unknown.

Reasons for emergency gynaecological surgery

There were 228 (78,6%) women who underwent pregnancy related surgery, while 62 (21.4%) had non-pregnancy related surgery. Of the 228 women, they had 234 pregnancy related procedures for emergency surgery (Table 2). There were six participants out of the 228 women who each had 2 reasons for the pregnancy related emergency surgery, explaining the total of 234 pregnancy related reasons. Of the six participants, three of the women were taken to theatre for wound debridement and evacuation of the uterus at the same time. While the other 3 had evacuation of the uterus and a relook laparotomy. Out of the 234 pregnancy related procedures, ectopic pregnancy was by far the commonest occurrence as there were 112 (47.9%) procedures related to this. Among the 62 women who had non-pregnancy related surgery, cyst accidents were commonest with 25 (40.3%) procedures related to this, followed by 14 (22.6%) with pelvic inflammatory disease and 11 (17.1%) who had ovarian torsion surgical interventions.

Pre-operative status

A total of 125 (43.1%) women had a tachycardia prior to surgery and 130 (44.8%) had anaemia. Anaemia is defined as a haemoglobin (Hb) less than 12 to 15 g/dl, but the Hb of 10 and less was used as the cut off in the cohort study. Hypovolaemic shock in the study was defined as systolic blood pressure of <100mmHg with tachycardia (heart rate >100), and anaemia. Only 27 participants (9.3%) were in shock prior to surgery (Table 4). Distribution of the patients in hypovolaemic shock were ectopic pregnancy- n=14 (51.9%), incomplete miscarriage- n=12 (44.4%) and intra-abdominal bleeding- n=1 (3.7%).

Post-surgical complications

Figure 3 refers to post-surgical complications. There were no mortalities in this study period. In most cases (N=248; 85.5%) there were no complications related to surgery. Only 42 (14.5%) women had complications of which post-operative anaemia (N=16; 5.5% of the entire cohort of 290 women) and wound sepsis (N=9; 3.1% of entire cohort) were the commonest. The group other included 6 cases of septic intra-abdominal collections, 2 vaginal bleeding post evacuation of the uterus and 1 urinary retention.

Decision intervention times (DIT)

In 174 (60%) cases, the decision for surgery was made within 4 hours. Within 10 hours, the decision was already made in 207 (71.4%) of the cases. Table 5 indicates the time it took from booking the theatre case to the actual surgery being performed. A total of 179 (61.7%) women took more than 4 hours from the time they were booked for surgery to the time they arrived in theatre. Only 1 (0.3%) participant was able to get to theatre within 30 minutes from the time of booking for theatre.
Twenty (6.9%) participants took more than 24 hours from decision to intervention time (DIT). There were 8 cases (2.8%) with decision intervention time (DIT) within 1 hour and 46 cases (15.9%) within 2 hours. Out of the 27 (9.3%) participants who were in hypovolaemic shock, none of them went to theatre within 30 minutes of being booked. A total of 25 (92.6%) participants took beyond an hour to get to theatre. One (3.7%) woman in shock took between 10-15 hours before the definitive surgery was accessible (Table 6).

Reasons for the delays more than 24hours

The total number of women who had a delay of greater than 24 hours were 20 (6.9%). A total of 17 women (85% of the 20 cases) were delayed due to lack of theatre time as other cases were prioritised. Two of the cases were postponed by the surgeon and one delayed by the anaesthetist as she was medically unfit for theatre. The other reasons we explored were if the patient had initially declined surgery, surgery cancelled, or patient had eaten. None of the other mentioned reasons were found among the delayed cases in this cohort.

Hospitalisation duration

A total of 193 participants (67%) were admitted for 3 nights and less. Whereas 97 patients (33%) stayed longer than 4 nights. Prolonged hospital stay was defined as beyond 3 nights post-operation, as majority of the emergency gynaecological surgeries cases gets discharged on day 3 after surgery. The most common reasons found for prolonged hospital stay were due to infections by 22 cases (22.7%) and incidental medical findings by 25 cases (25.8%). There were 13 women with wound sepsis (13.4%), 12 persistent tachycardia (12.4%), 4 ongoing bleeding (4.1%), 2 veno-thromboembolism (2%) and 1 for socio-economic reason (1%). Among the eighteen other reasons (18.6%), 8 were attributed to ongoing sepsis, 1 to relook laparotomy, and in 9 cases, the reasons were not clear.

Discussion:

The present study analysed the clinical processes and outcomes of gynaecological emergency surgeries performed at Groote Schuur in the year 2019. Our findings indicated that 79.1% of the emergency surgeries conducted were related to pregnancy procedures. Ectopic pregnancy accounted for 47.9% of all pregnancy related indications, making it the leading reason as expected. This finding is also consistent with most studies worldwide. [21,22] The second common indication was evacuation of the uterus. A surprising finding was that 5.6% of evacuation of the uteri was attributed to products of conception post caesarean section (Table 2). Many women (79.3%) were predominantly of reproductive age with a median of 30.16, and this aligns with the fact that only 15.5% had medical co-morbidities. The median age has some similarities to other local studies done in SA, like the study done in Gauteng district hospital by Nzaumvila D where their median age was 28.9. [16] The study aimed to determine the incidence of ectopic pregnancy and assess the profile of women who presented to the Odi district hospital between 2010 and 2014. [16]

Our audit found that 66.6% women were discharged from the hospital with their HIV statuses unknown, and most of them were pregnant. It is expected according to the South African national guidelines that all pregnant women get tested for HIV. This may be a reflection of early pregnancy complications in that many of these women did not realize that they were pregnant yet, or had not yet had an opportunity for antenatal booking. Within the period, 24.3% of women in the cohort were smoking, which correlated with the Western Cape having the highest prevalence of tobacco smokers among women in South Africa at 26.8%, based on the South African National Health and Nutrition examination in 2012.[23] The Western Cape has also been found to have the highest prevalence of tobacco smokers at 32.9% among both genders, surpassing all other provinces.[23] Evidence has shown smoking to be one of the risk factors for ectopic pregnancy, which might have contributed to the increased incidence during the period of the study.[24] Further studies need to be done to confirm if this can be linked to ectopic pregnancy in our local population.

The preoperative findings revealed anaemia (45%), tachycardia (43%) and hypovolaemia (9.3%) even in the women who were delayed. Like hypovolaemic shock, anaemia has been shown to be associated with an increased risk of mortality and morbidity, such as acute kidney injury and sepsis.[32] This indicates a significant burden on Groote Schuur Hospital's

emergency surgical case management. The high prevalence of anaemia pre-operatively impacts on outcomes, as well as complications post-operatively as anaemia was the commonest complication in this review.

Research has showed that prompt and timely response in the emergency conditions requiring surgical intervention can significantly affect the surgical outcomes of patients. [7,25] Appropriate triaging is critical in patients who need surgical emergencies. Triage is the procedure of determining the priority of patient management based on the urgency of their disease and clinical condition.[25] This process is of paramount significance when there is an inadequate supply of resources to meet the demand of patients.[25] It is more valid in our hospital settings in South Africa, where the same theatre space gets to be shared amongst all different surgical disciplines. The Timing of Acute Care Surgery (TACS) classification study indicated that most institutions worldwide use a colour triage system for acute surgical emergencies which was also recommended by the study itself based on their findings on how effective it can be. It is unfortunate that there is no literature that has looked at the triage mechanisms specifically for gynaecological emergency surgery, as compared to obstetrics. It is critical for gynaecology to have a standardized triage mechanism, especially within our settings where conditions like ectopic pregnancy and miscarriages remain the common causes of morbidity and mortality in South Africa.[14]
At Groote Schuur Hospital, we are aligned with international institutions as we also follow the same colour code triage system in theatre. In our audit, we had 174 women (60%) in which the decision for surgery was made within 4 hours of arrival and 207 (71.4%) within 10 hours. Thirty-nine (13.4%) women were booked after 24 hours. Fourteen of these women required medical management for PID (pelvic inflammatory disease) initially, which was attempted but failed. The rest of the other cases booked after 24 hours were patients who had to wait for biochemical and imaging investigations.

Among the women who experienced hypovolaemic shock (N=27), a total of 20 (74.1%) were promptly booked for surgery within an hour. Out of the 7 cases, 4 (14.8%) were booked within 2 hours, while the remaining 3 (11.1%) were scheduled within 4 hours. Some of the contributing factors identified for patients not being booked within an hour were related to initial assessments made by junior doctors before a senior assessment was conducted. Furthermore, it was observed that the resuscitation of patients with blood products occurred in cases that were booked later than an hour. Based on the TACS classification, the general finding of the study indicated a good triaging and no real delays in decision making.

The audit also found valuable delays in patients getting into theatre for surgical intervention from the time they were booked. There was disproportion of the DIT findings in the study in relation to the colour code triage mechanism used at Groote Schuur Hospital, which is like the TACS study.[25] Out of the 27 women in hypovolaemic shock, only 2 (7.4%) were able to immediately make it to theatre within 1 hour DIT. There was no patient who had a DIT of 30 minutes. The rest of the DITs of hypovolaemic women were as follows: 1-2h = 33.33% (N=9) ; 2-4h =37.03% (N=10) ; 4-10h = 18.51% (N=5) and 10-15h =3.70% (N=1). The 27 women in hypovolaemic shock had ectopic pregnancy (N=14), incomplete miscarriage (N=12) and intra-abdominal bleeding (N=1). Evidence has indicated that hypovolaemic shock carries high morbidity and mortality rate. [26,27] The 2014-2016 and 2017-2019 Saving Mothers report indicated that mortality because of ectopic pregnancy was caused by hypovolaemic shock in 83% and 81% respectively. [14,31]

There were no mortalities in this audit. This may be that our cohort was predominantly young women with less comorbidities and resilient physiological response.[26] Another reason may be that women were adequately resuscitated prior to surgery. A total of 179 (61.7%) participants went to theatre after 4 hours of being booked in theatre. Only 46 (15.9%) women accessed surgery within 2 hours. There was a total of 20 (6.9%) women who had to wait for more than 24 hours for their operation to be done. Out of the 20 patients, 17 (85%) cases were delayed due to lack of emergency theatre time as other cases in other surgical disciplines were prioritised by theatre management. In the remaining 2 (10%), the surgery was postponed by the surgeon and one (5%) of the patients was unfit for anaesthesia at the time. No delays were encountered for any of the women due to having eaten or being stable and surgery anticipated to be challenging in the early hours. The number of delays exceeding 24 hours may seem to be small in our setting, but this is not in keeping with the hospital triage system and TACS study.[25]

Many of these patients had pregnancy related conditions (79.1%) and underwent pregnancy losses. In the literature review, it has been found that patients frequently experience both stress and grief with early pregnancy loss.[28] The quality of service offered to the women has the potential to alleviate rather than worsen these negative outcomes. [29] Women who are compromised both medically, as well as experiencing pregnancy loss, grief and who need to undergo surgery, should not be competing to survive.

Further findings of the study regarding the outcomes of surgeries were generally good. There were only 14,5% of complications post operatively and no mortality was recorded. Most complications were found to be minor based on the Gravien Dindo classification used to grade post operative surgery complications.[30] While there were good outcomes in this study and setting, delays in accessing theatre for women may be catastrophic in more limited-resourced hospitals in the Western Cape and other provinces in South Africa. A total of 193 (66.6%) women spent only 3 nights from admission to discharge as expected due to the type of surgical procedures they underwent. There were only 97 (33.4%) women who spent more than 3 nights.

Limitations of the study

The retrospective nature of the study is a limitation. In addition, the quality of care as experienced by the women could not be assessed. In South Africa, there is a lack of previous similar studies for comparison, as most are conducted internationally.

Conclusion:

The study indicates favourable outcomes for emergency gynaecological surgeries performed at Groote Schuur Hospital. However, there were notable delays between the decision for surgical intervention and the actual performance of the surgeries. All the delays experienced by our hypovolaemic shocked women were because of competing with other surgical disciplines for emergency theatre time. This is due to the absence of designated theatres for early pregnancy complications or emergency gynaecological surgery for women. Maternal morbidity and mortality is a priority, especially in low and middle-income countries. In the care of women, however, it is important to include surgical care beyond maternal mortality. We hope that this study will encourage further discussions and audits in the surgical field of Gynaecology both locally and nationally. As this study was retrospective, we also recommend that the quality of care should also be explored. Most women in this audit had surgery and experienced a pregnancy loss at the same time. The time delays in having definitive surgery and being kept starved while waiting, associated with the process of grieving, has not been explored in the literature. Women's health and surgery needs to be made a priority.

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6.2. Figures and Tables

Figure 1: Age groups of the study population (N=290)

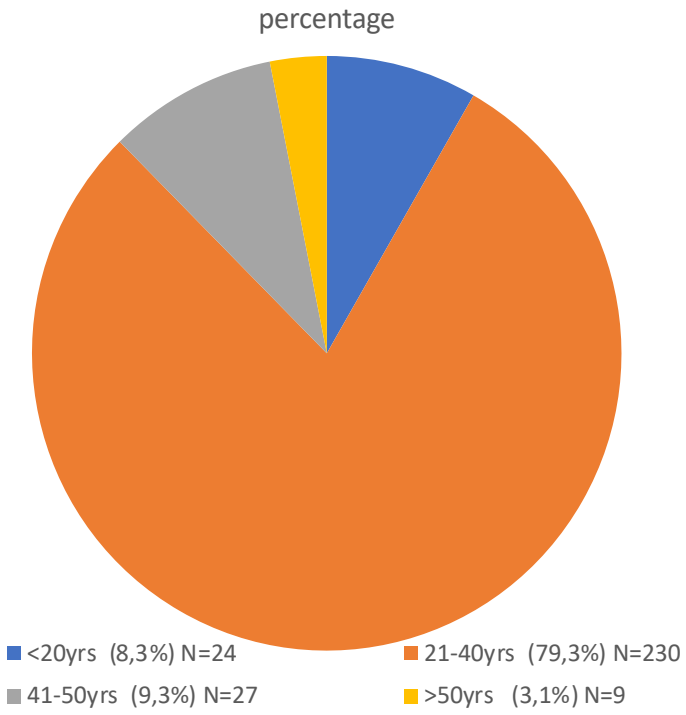

Table 1: Co-morbidities- 45 participants (15.5% of 290 women)

Comorbidities	Percentage 15.5% (N=45 of 290 women)
DM	17.8% (8)
Hypertension	42.2 (19)
Cardiac	6.7% (3)
Anaemia	24.4% (11)
TB	2.2% (1)
Others	6.7% (3)
Total	100% (45)

Figure 2: HIV Status (N=290)

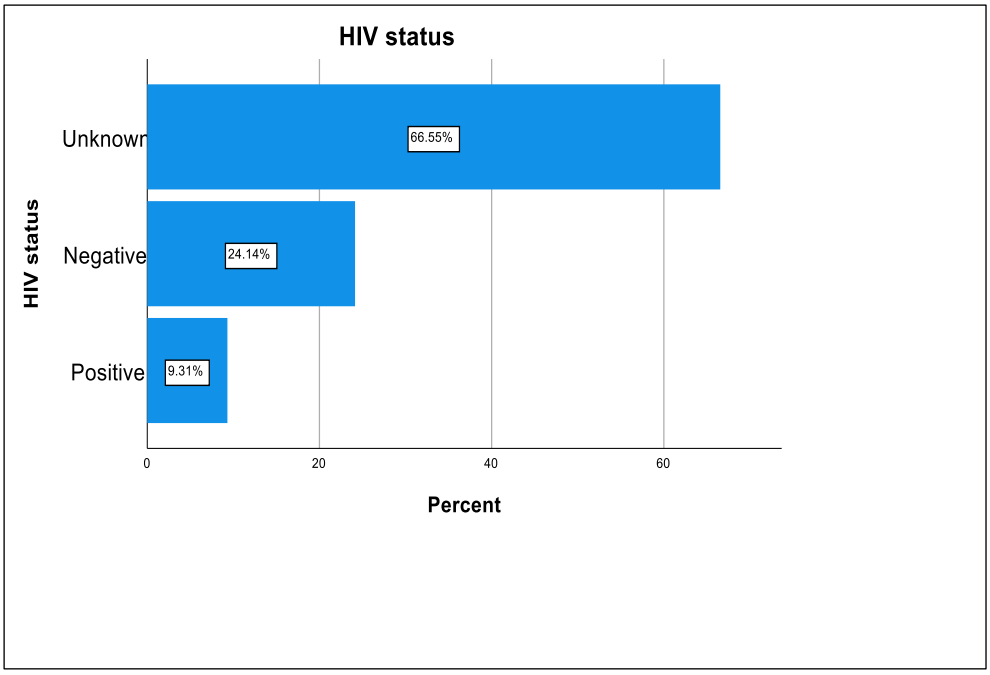

Table 2: Reasons for emergency surgery (pregnancy related)

Reasons for emergency surgery (pregnancy-related)	Frequency	Percentage(%)
Ectopic pregnancy	112	47.9
Evacuation of uterus (incomplete miscarriage)	34	14.5
Evacuation of uterus (septic miscarriage)	24	10.3
Suction evacuation (molar pregnancy)	22	9.4
Evacuation of uterus (post NVD)	17	7.3
Evacuation of uterus (post c/s)	13	5.6
Hysterectomy for sepsis (post-delivery)	4	1.7
Other	8	3.4
Total	234	100.0

Table 3: Reasons for emergency surgery (non-pregnancy related)

Reasons for emergency surgery (non-pregnancy related)	Frequency	Percentage (%)
Pelvic inflammatory disease	14	22.6
Wound sepsis- post surgery	3	4.8
Hysterectomy for sepsis	1	1.6
Ovarian torsion	11	17.1
Other cysts accidents	25	40.3
Bartholin's abscess	8	12.9
Total	62	100.0

Table 4: Pre-operative haemodynamic status

Hypovolaemic shock (pre-operative)

		Frequency	Percent
Valid	Yes	27	9.3
	No	263	90.7
	Total	290	100.0

Figure 3: Post-surgical complications (N=290)

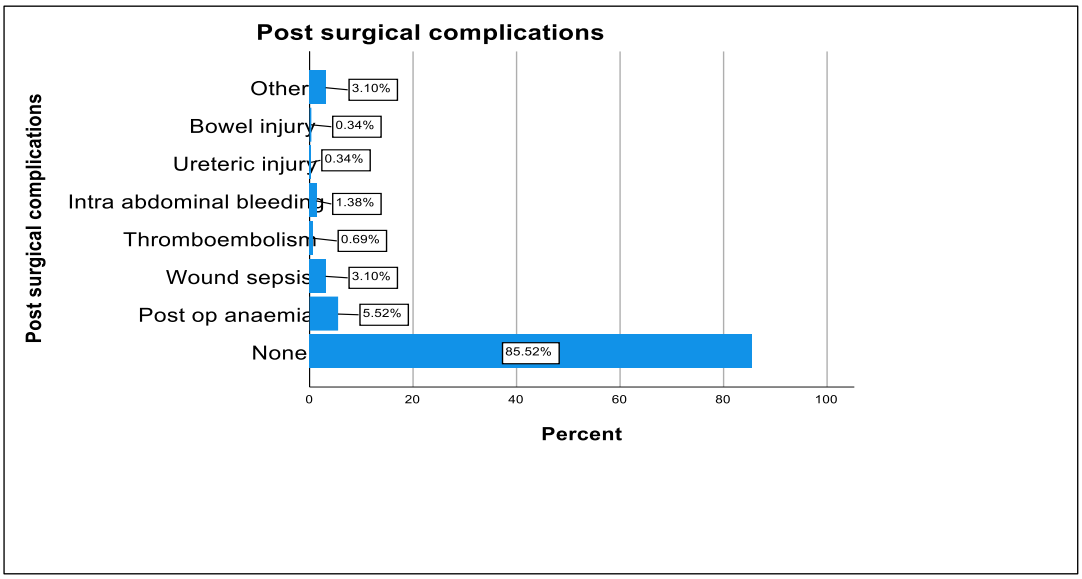

Table 5: Time taken to get to theatre.

Time taken to get to theatre

		Frequency	Percent
Valid	<0.5hour	1	.3
	0.5-1hour	7	2.4
	1-2hours	38	13.1
	2-4hours	65	22.4
	4-10hours	106	36.6
	10-15hours	31	10.7
	15-24hours	22	7.6
	>24hours	20	6.9
	Total	290	100.0

Table 6: Time taken to get to theatre for patients in hypovolaemic shock. (N=27)

Time taken to get to theatre for patients in hypovolaemic shock		
Time h	Frequency	Percentage%
<0.5 hr	0	0
0.5-1hr	2	7.4
1-2hrs	9	33.3
2-4hrs	10	37.0
4-10hrs	5	18.5
10-15hrs	1	3.7
>15hrs	0	0
Total	27	100

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- Article Processing Charges
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- Conflict of interest
- Research ethics committee approval
- Clinical trials
- Protection of patient's rights to privacy
- Copyright notice
- Privacy statement
- Ethnic classification
- CPD

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- Preparing an article for anonymous review
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- Preparation notes by article type
- Illustrations
- Tables
- References

From submission to acceptance

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- Online versus print
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- Please make your article concise, even if it is below the word limit.
- Qualifications, full affiliation (department, school/faculty, institution, city, country) and contact details of ALL authors must be provided in the manuscript and in the online submission process.
- Abbreviations should be spelt out when first used and thereafter used consistently, e.g. 'intravenous (IV)' or 'Department of Health (DoH)'.
- Include sections on Acknowledgements, Conflict of Interest, Author Contributions and Funding sources. If none is applicable, please state ‘none’.
- Scientific measurements must be expressed in SI units except: blood pressure (mmHg) and haemoglobin (g/dL).
- Litres is denoted with an uppercase L e.g. 'mL' for millilitres).
- Units should be preceded by a space (except for % and ºC), e.g. '40 kg' and '20 cm' but '50%' and '19ºC'.
- Please be sure to insert proper symbols e.g. µ not u for micro, a not a for alpha, b 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 Counsellors. J Genet Counsel 2008;17:424-433: standard human pedigree nomenclature.

Preparation notes by article type

- Research
- Editorials
- CME
- In Practice and Case reports
- Reviews
- Clinical trials
- Correspondence
- Obituaries
- Book reviews
- Guidelines

Research

Guideline word limit: 4 000 words

Research articles describe the background, methods, results and conclusions of an original research study. The article should contain the following sections: introduction, methods, results, discussion and conclusion, and should include a structured abstract (see below). The introduction should be concise – no more than three paragraphs – on the background to the research question, and must include references to other relevant published studies that clearly lay out the rationale for conducting the study. Some common reasons for conducting a study are: to fill a gap in the literature, a logical extension of previous work, or to answer an important clinical question. If other papers related to the same study have been published previously, please make sure to refer to them specifically. Describe the study methods in as

much detail as possible so that others would be able to replicate the study should they need to. Results should describe the study sample as well as the findings from the study itself, but all interpretation of findings must be kept in the discussion section, which should consider primary outcomes first before any secondary or tertiary findings or post-hoc analyses. The conclusion should briefly summarise the main message of the paper and provide recommendations for further study.

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

Do not replicate data in tables and in text .

Structured abstract

- This should be 250-400 words, with the following recommended headings:

o **Background:** why the study is being done and how it relates to other published work.

o **Objectives:** what the study intends to find out

o **Methods:** must include study design, number of participants, description of the intervention, primary and secondary outcomes, any specific analyses that were done on the data.

o **Results:** first sentence must be brief population and sample description; outline the results according to the methods described. Primary outcomes must be described first, even if they are not the most significant findings of the study.

o **Conclusion:** must be supported by the data, include recommendations for further study/actions.

- Please ensure that the structured abstract is complete, accurate and clear and has been approved by all authors.
- Do not include any references in the abstracts.

Here is an example of a good abstract.

Main article

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

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

- Objectives (within Introduction/Background): a clear statement of the main aim of the study and the major hypothesis tested or research question posed
- Design (within Methods): including factors such as prospective, randomisation, blinding, placebo control, case control, crossover, criterion standards for diagnostic tests, etc.
- Setting (within Methods): level of care, e.g. primary, secondary, number of participating centres.

- Participants (instead of patients or subjects; within Methods): numbers entering and completing the study, sex, age and any other biological, behavioural, social or cultural factors (e.g. smoking status, socioeconomic group, educational attainment, co-existing disease indicators, etc)that may have an impact on the study results. Clearly define how participants were enrolled, and describe selection and exclusion criteria.
- Interventions (within Methods): what, how, when and for how long. Typically for randomised controlled trials, crossover trials, and before and after studies.
- Main outcome measures (within Methods): those as planned in the protocol, and those ultimately measured. Explain differences, if any.

Results

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

Discussion

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

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

Conclusions

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

Editorials

Guideline word limit: 1 000 words

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

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

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

CME (by invite only)

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

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

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

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

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

Review process

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

Guest editorials

Guideline word limit: 1 000 words

- Include the guest editor's personal details (qualifications, positions, affiliation, e-mail address, and a short personal profile (50words)).
- If possible, include a photograph of the author(s) at high enough resolution for print. It is preferable to provide two guest editorials, one for each issue, so that the content of the articles in each issue is covered.

Articles

Guideline word limit: 2 000 - 3 000 words

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

Personal details

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

In Practice

Guideline word limit: 2 000 - 3 000words

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

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

- Case report
- Clinical practice
- Clinical alert
- Issues in medicine
- Issues in public health
- Healthcare delivery
- Medicine and the environment
- Medicine and the law
- Cochrane corner

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

- Author affiliations and qualifications: to be the same as for Research. Provide all authors' names and initials, qualifications and full affiliations, and corresponding author.
- Short abstract: does not need to be structured, but should capture the essential features of the article
- Introduction: the reason for the article and the issue being addressed
- Recent research, discussion, local policy around the issue – include your own research where appropriate
- All statements should be referenced and, if opinion only, this should be stated
- Discussion: how this article adds to the discussion around a particular topic
- If a clinical practice or policy point is at issue, this needs to be emphasised, using a box with highlights if appropriate.

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

Case reports

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

Please use the following format for case reports:

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

Clinical trials

Guideline word limit: 4000 words

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

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

Review articles

Guideline word limit: 4 000 words

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

Please ensure that your article includes:

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

Correspondence (Letters to the Editor)

Guideline word limit: 500 words

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

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

Book reviews

Guideline word limit: 400 words

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

Obituaries

Guideline word limit: 400 words

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

Guidelines

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

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

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

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

All guidelines should be structured according to Agree II.

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

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

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

Illustrations/photos/scans

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

- Each image must be attached individually as a 'supplementary file' upon submission (not solely embedded in the accompanying manuscript) and named Fig. 1, Fig. 2, etc.

Tables

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

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

Rather:
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:

o On the Crossref homepage, paste the article title into the 'Metadata search' box.
o Look for the correct, matching article in the list of results.
o Click Actions > Cite
o Alongside 'url =' copy the URL between { }.
o 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) woud indicate Cape, (G) Gauteng, and so on.

NOTE: no . after the v

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

From submission to acceptance

Submission and peer-review

To submit an article:

- Please ensure that you have prepared your manuscript in line with the SAMJ requirements.
- The following are required for your submission to be complete:

o Anonymous manuscript (unless otherwise stated)

o Manuscript

o Any supplementary files: figures, datasets, patient consent form, permissions for published images, etc.

- Once the submission has been successfully processed, it will undergo a technical check by the Editorial Office before it will be assigned to an editor who will handle the review process. If the author guidelines have not been appropriately followed, the manuscript may be sent back to the author for correcting.

Peer-review process

Production process

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

The following process will follow:

1. An accepted manuscript is passed to a Managing Editor to assign to a copyeditor (CE).
2. The CE copyedits in Word, working on house style, format, spelling/grammar/punctuation, sense and consistency, and preparation for typesetting.
3. If the CE has an author queries, he/she will contact the corresponding author and send them the copyedited Word doc, asking them to solve the queries by means of track changes or comment boxes.
4. The authors are typically asked to respond within 1-3 days. Any comments/changes must be clearly indicated e.g. by means of track changes. Do not work in the original manuscript - work in the copyedited file sent to you and make your changes clear.
5. The CE will finalise the article and then it will be typeset.
6. Once typeset, the CE will send a PDF of the file to the authors to complete their final check, while simultaneously sending to the 2nd-eye proofreader.
7. The authors are typically asked to complete their final check and sign-off within 1-2 days. No major additional changes can be accommodated at this point.
8. The CE implements the authors' and proofreader's mark-ups, finalises the file, and prepares it for the upcoming issue.

Changing contact details or authorship

Please notify the Editorial Department of any contact detail changes, including email, to facilitate communication.

Publication

Online v. print

The SAMJ is an online journal. The online version of the journal is the one that has the widest circulation, is indexed by bibliographic databases including PubMed and SciELO, and is accessible in academic libraries. A printed edition , containing material selected by the Editor is also published each month and distributed to the membership of the South African Medical Association.

Online

- The full text of all accepted articles is published in full online, open access.
- Citation information of each article is based on its online publication.
- You may want to make use of the advantages of online publication e.g. specify web links to other sources, images, data or even a short video.

Print

- Not all articles will be selected for print.
- An article may be selected for print in a different month from that in which it was published online.
- Research articles will appear in abstract form only, if selected for a print edition.

Errata and retractions

Errata

Should you become aware of an error or inaccuracy in yours or someone else's contribution after it has been published, please inform us as soon as possible via an email to publishing@samedical.org, including the following details:

- Journal, volume and issue in which published
- Article title and authors
- Description of error and details of where it appears in the published article
- Full detail of proposed correction and rationale

We will investigate the issue and provide feedback. If appropriate, we will correct the web version immediately, and will publish an erratum in the next issue. The correction will be indexed, as PubMed has a function for linking errata back to the original article. All investigations will be conducted in accordance with guidelines provided by the Committee on Publication Ethics (COPE).

Retractions

Retraction of an article is the prerogative of either the original authors or the editorial team of SAMA. Should you wish to withdraw your article before publication, we need a signed statement from all the authors.

Should you wish to retract your published article, all authors have to agree in writing before publication of the retraction.

Send an email to publishing@hmpg.co.za, including the following details:

- Journal, volume and issue to which article was submitted/in which article was published
- Article title and authors
- Description of reason for withdrawal/retraction.

We will make a decision on a case-by-case basis upon review by the editorial committee in line with international best practices. Comprehensive feedback will be communicated with the authors with regard to the process. In case where there is any suspected fraud or professional misconduct, we will follow due process as recommended by the Committee on Publication Ethics (COPE), and in liaison with any relevant institutions.

When a retraction is published, it will be linked to the original article.

Indexing

The SAMJ has an impact factor of 1.5.

Published articles are covered by the following major indexing services. As such articles published in the SAMJ are immediately available to all users of these databases, guaranteed a global and African audience:

- Index Medicus (Medline/PubMed)
- ExcerptaMedica (EMBASE)
- Biological Abstracts (BIOSIS)
- Science Citation Index (SciSearch)
- Current Contents/Clinical Medicine
- Scopus
- AIM
- AJOL
- Crossref
- Sabinet
- Scielo

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Contact claudian@samedical.org for information on submitting ad hoc/commissioned supplements, including guidelines, conference/congress abstracts, Festschrifts, etc.

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