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The post operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital

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The post operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital

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Student Number: 0600631g

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

20 May 2025

DECLARATION

I, LF Keogotsitse, declare that this research report is my own work. I am submitting it to fulfil the requirement for Master of Medicine in Obstetrics and Gynaecology at the University of the Witwatersrand. I have acknowledged all assistance I have received. This work has not been submitted previously. I declare that the protocol has been approved by the Human Research Ethics Committee at the University of the Witwatersrand (Ethics Clearance Certificate M221120).

Name: Letsholathebe Frans Keogotsitse

Signature: 

CONTRIBUTION LETTER

Letter to confirm contribution of author for a research report in submissible format for MMed

Dear Sir/Madam

This letter serves to confirm author contribution to submission of a research paper.
I confirm that I proposed this research project and state my role in writing this paper, research proposal, data collection, interpretation of results and writing of the manuscript.
My supervisor, Dr L Mbodi, and co-supervisors, Dr C Mphehle and Dr M Moroeng, assisted me in formulating the protocol and writing the manuscript.

Yours sincerely
Dr LF Keogotsitse



Signature: ……

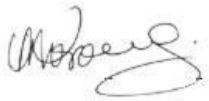
DECLARATION: AUTHOR'S CONTRIBUTION TO ARTICLE AND CO-AUTHORS

I, LF Keogotsitse, student number 0600631g, declare that this research report is my own work and that I contributed towards the research findings reported in this article stated below.
Name of author: Letsholathebe Frans Keogotsitse Signature:

Consensus of co-authors: In signing this declaration, the co-authors listed below concede to the use of this article by the author as part of his research report.

Article Title: The post operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital.

The article has been submitted for publication in the South African Journal of Obstetrics and Gynaecology on 29 July 2024 and acknowledgement of submission has been received.

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LIST OF ABBREVIATIONS

BSO	Bilateral salphingoopherectomy
CMJAH	Charlotte Maxeke Johannesburg Academic Hospital
DVT	Deep Venous Thrombosis
LMWH	Low Molecular Weight Heparin
VTE	Venous Thromboembolism

JOURNAL ARTICLE

Keywords: Enoxaparin, Postoperative thromboprophylaxis, Gynaecological Malignancy.

Title: The post operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in Gynaecologic Oncology patients at Charlotte Maxeke Johannesburg Academic Hospital

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Abstract

Introduction: Patients with gynaecological malignancy, particularly postsurgery, are at an increased risk of venous thromboembolism, which poses a significant risk of morbidity and mortality. Low molecular weight heparin is effective for thromboprophylaxis, with less risk of bleeding and side effects than unfractionated heparin.

The Southern African Society of Thrombosis and Haemostasis recommends initiating enoxaparin within 6-12 hours postsurgery, provided there is no risk of bleeding. This study aimed to assess whether thromboprophylaxis guidelines are being followed in the Gynaecology Oncology unit in a tertiary hospital in Johannesburg, South Africa.

It was a retrospective descriptive study where medical records of patients who had surgery for gynaecological malignancy were reviewed.

Results: During the study period (1st May 2020 to 31st June 2022), 182 patients had surgery in the Gynaecology Oncology unit. Forty patients were excluded, of whom six 6 had an operation for non-malignancy disease and 34 had missing records. A total of 142 patients' records were analysed. The mean age was 49.5 years; most patients were Black and non-smokers. The organ most involved was the ovary (33.1%), followed by the cervix (25.5%), with the vulva and the uterus less commonly involved. The surgery most performed was laparotomy and the mean duration of the operation was 104 minutes. In most prescriptions n=80 (56.3%), the time to initiate enoxaparin postsurgical was not specified. However, most patients received their postoperative enoxaparin within the recommended six to 12 hours postsurgery. Consultants were more likely to specify the time for initiating enoxaparin postoperatively than registrars and subspecialists.

Conclusion: This study found that doctors in the Gynaecology Oncology Unit were not adhering to thromboprophylaxis guidelines, however in the wards enoxaparin is administered within the appropriate time as per guidelines.

Keywords: Enoxaparin, Postoperative thromboprophylaxis, Gynaecological malignancy.

Introduction

Gynaecological malignancies are cancers of the female genital tract, including the vulva, vagina, cervix, uterus and ovaries, accounting for 10% of new malignancies and 12% of cancer mortality in women. Surgery serves both diagnostic and therapeutic roles, with different procedures for various cancers.[1,2] In ovarian cancer, surgery is vital for diagnosis, staging and treatment, helping to confirm if the cancer is confined to the ovary and reducing the need for adjuvant therapy.[1,2] For endometrial cancer, surgery typically involves hysterectomy and salpingooophorectomy, as early diagnosis is common.[1,2] In cervical cancer, surgery may be performed on localised disease, but many patients present with advanced stages unsuitable for surgical intervention. Early-stage cases may receive a hysterectomy with or without a lymphadenectomy. [1.2] Vulvar cancer often affects older women, with treatment options dependent on the patient's health and cancer stage. [1.2]

In gynaecological malignancies, venous thromboembolism (VTE) poses significant risks, with its incidence increasing postsurgery due to hypercoagulability associated with cancer. [8,9]. Risk factors include age, body mass index, cancer staging, chemotherapy history, comorbidities and surgical factors. The incidence of VTE is particularly high postoperatively, with 6-7% of patients affected and a marked increase in the risk of pulmonary embolism during surgical procedures.[6-8] Low Molecular Weight Heparin(LMWH), such as enoxaparin, is preferred for thromboprophylaxis over unfractionated heparin(UFH) due to better bioavailability, longer duration and low risk of complications like thrombocytopenia. It acts by inhibiting factor Xa and is administered subcutaneously. In 2018, after reviewing available literature, The Southern African Society of Thrombosis and Haemostasis recommended the use of Enoxaparin 40 milligrams subcutaneously once daily to commence six to 12 hours postoperatively in gynaecological patients provided there is no active bleeding, the dose of LMWH in extremes of weight and in patients with a high risk of bleeding should be delayed by a minimun of 12 hours postoperatively and be calculated per weight in kilograms. [12,13]

Studies emphasise the need for effective prophylaxis to minimise the risk of VTE and its associated morbidity.[10,11] Despite guidelines recommending LMWH postoperatively, compliance remains low in some healthcare settings. A cross-sectional audit from a tertiary hospital in the Eastern Cape showed only 26% of at-risk patients receiving appropriate thromboprophylaxis.[15] A prospective study at the University of the Witwatersrand reported that

there was poor knowledge of venous thromboprophylaxis among registrars in the Department of Anaesthesia and Orthopaedics.[16] Enoxaparin should be prescribed for thromboprophylaxis postoperatively in gynaecologic surgery as recommended by The Southern African Society for Thrombosis and Haemostasis.[12-14]

We hypothesised that most clinicians who prescribe enoxaparin postoperatively did not specify the exact time to commence it and were specified in the prescription, therefore it may be administered later than the prescribed time. This study aimed to assess whether thromboprophylaxis guideline were followed, by assessing how prescribing clinicians prescribe enoxaparin postoperatively and how those administering the drug initiate treatment

Methods

This was a retrospective descriptive review study of over two years, from 1st May 2020 to 31st June 2022. Medical records of patients who had surgery for a gynaecological malignancy in the Gynaecology Oncology unit in the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) were reviewed. The medical records were accessed from a computer in the records department of the hospital. The data was collected on a hard copy data sheet and later loaded onto an Excel sheet. The study sample included all patients who had surgery for gynaecological malignancy during the study period at the CMJAH Gynaecology unit.

CMJAH is a 1 088-bed tertiary hospital in Parktown, Johannesburg, Gauteng, South Africa. It is one of the teaching hospitals for the University of The Witwatersrand. At the time of this study The Gynaecology Oncology unit consisted of one subspecialist, two consultants and two registrars who rotated every three months. The inclusion criteria for the study were patients who had surgery for gynaecological malignancy and for whom postoperative enoxaparin was prescribed for thromboprophylaxis. The exclusion criteria were patients operated for benign pathology, patients with missing records and patients for whom enoxaparin was not prescribed postoperatively.

Ethics clearance was approved by the University of Witwatersrand Human Research Ethics Committee (Ref. No.: M221120). Informed consent was not relevant for this study; however, permission to conduct the study at CMJAH was granted by the Chief Executive Officer of CMJAH and the Head of Department of the Obstetrics and Gynaecology department.

Information identifying patients, such as names or hospital numbers, was not included on the datasheet; patients were allocated a study number. This study was a retrospective descriptive study and descriptive statistics (mean, frequency, percentage, standard deviation, minimum and maximum) were applied. An inferential statistic chi-square test was applied to assess the level of association between variables. A p-value of 0.05 was used as a level of significance. Statistical Package for the Social Sciences was used to analyse the data.

Results

The study retrospectively identified 182 patients who had been admitted and operated on in the Gynaecology Oncology unit during the period of the study, namely from 1st May 2020 to 31st June 2022. Forty patients were excluded from the study: 34 patients due to lack of records, and six who had surgery for non-malignancy disease. The remaining 142 patients' files were analysed for the study.

The mean age of the patients was 49.6 years, with the youngest patient being 15 years and the oldest 83 years. Most patients were African n=132 (93%), and only n=10 (7%) were Caucasians. Weight was recorded in only n=55 (38.7%) patients; among them the mean weight was 71.03kg with a minimum of 40kg and maximum of 140kg.
The comorbid conditions that were captured included hypertension n=30 (27%), diabetes mellitus n=9 (6%) and deep vein thrombosis n=6 (4%), and all patients who had comorbid conditions were on treatment. The side of malignancy was the ovary n=47 (33.1%), followed by the cervix n=36 (25.4%), with the vulva and uterus accounting for n=34 (23.9%) and n=25 (17.6%), respectively. Only cervix cancer was staged, with most patients being stage 1.

Most of the patients had a laparotomy n=105 (74%) where a hysterectomy or bilateralsalpingectomy, omentectomy, lymphadenectomy or combination was done. The rest of the patients had a vulvectomy n=37 (26%). The mean duration of the surgery was 104.1 minutes (SD±52.6), with the shortest being 20 minutes and the longest 140 minutes. The average blood loss at surgery was 502.7 ml with a minimum of 10 ml and a maximum of 3 000 ml.

In most patients, n=80 (56.3%), the time to initiate postoperative enoxaparin was not specified by the prescribing clinician. In instances where it was specified n=62 (43.7%), it was specified to be six hours n=55 (38.7%), eight hours n=1 (0.7%), 10 hours n=1 (0.7%) and > 12 hours n=5 (3.5%).

In most patients, enoxaparin was administered six hours n=73 (51.4%) postoperatively, followed by eight hours n=22 (15.6%) and 12 hours n=11 (7.6%). In n=36 (25.3%) of patients the time of administration was not specified.

A significant association existed between the dose prescribed and the dose given ($p<0.0001$). In 102/142 (71.8%) patients, a dose of 40 mg was prescribed, and 101/142 patients received the dose of 40 mg. In one patient, however, 40 mg was prescribed but 60 mg was given. The administered dose was not specified in n=16 (11.2%) patients. The dose of the enoxaparin was more likely to be administered as prescribed.

Table 2: The association between the dose prescribed, and the dose administered.

Variable	Description	40mg	60mg	80mg	Total	Chi	df	p-value
40mg	Count	101	1	0	102	244.526a	4	0.0001
	%	100.0%	5.0%	0.0%	0.8095			
60mg	Count	0	19	0	19			
	%	0.0%	95.0%	0.0%	0.1508			
80mg	Count	0	0	5	5			
	%	0.0%	0.0%	100.0%	0.0397			
Not specified	Count %	0 0.0%	0 0.0%	0 0.0%	16 0.112			
Total	Count	101	20	5	142			

There was a significant association between the time specified in a prescription and the time of administering (P value <0.00001). In all the patients where 12 hours postsurgery was the time specified for administering enoxaparin, the drug was given 12 hours postoperatively, and similarly when the times prescribed were 10 and eight hours. However, in one patient where the time was specified as six hours postsurgical, the drug was given eight hours postoperatively. When the time was not specified, the drug was administered six hours postsurgery in n=27 (33.9%), eight hours in n=25(30.7%), 12 hours in n=25 (30.7.%) and 10 hours in n= 3 (4.7%).

Table 3: Timing for administering enoxaparin

Variable	>12	10	6	8	Not specified	Total	Chi	Df	p-value
6	0	0	52	0	21	73	109.590a	20.0000	0.0000
	0.0%	0.0%	94.5%	0.0%	32.8%	57.9%			
8	0	0	1	1	20	22			
	0.0%	0.0%	1.8%	100.0%	31.3%	17.5%			
10	0	1	0	0	3	4			
	0.0%	100.0%	0.0%	0.0%	4.7%	3.2%			
12	5	0	0	0	20	25			
	100.0%	0.0%	0.0%	0.0%	31.3%	19.8%			
24	0					1			
		0	1	0	0				
		0.0%	1.8%	0.0%	0.0%				
		0	1	0	0				
	0.0%					0.8%			
40	0					1			
	0.0%	0.0%	1.8%	0.0%	0.0%	0.8%			
		1	55	1	64				
Total	5	100.0%	100.0%	0.0%	100.0%	126			
	100.0%					100.0%			

*

The table included 126 patients, as 16 patients whose dose was not specified were excluded from this specific analysis.

Most of the postoperative prescriptions were written by consultants (Fellow in Gynaecologic Oncology) n=64 (45%), followed by registrars n=54 (37%) and the sub-specialist (Certificate in Gynaecologic Oncology (SA) n=25 (18%). Consultants specified the time to commence enoxaparin in n=44 (68.7%) of the prescriptions they wrote, whereas registrars only specified the time in n=17 (32.0%), the subspecialist specified the time in just n=1 (4%).

Discussion

Gynaecological oncology patients undergoing surgery are at risk of venous thromboembolism, therefore proper implementation of thromboprophylaxis guidelines is essential to improve the prevention of VTE as well as the morbidity and mortality associated with it. LMWH is commonly used for postoperative thromboprophylaxis with enoxaparin being the LMWH of choice in our setting. The finding that more than half of the study population for whom the time for commencing enoxaparin postoperatively was not specified, is a reason for concern. This demonstrates the lack of adherence to guidelines by prescribing clinicians, or conceivably a lack of knowledge of the existence and contents of said guidelines.

A study conducted by an Anaesthesiology Registrar at The University of Witwatersrand reported that registrars in the Department of Anaesthesia and Orthopaedics had poor knowledge of thromboprophylaxis guidelines. [16] The registrars in Obstetrics and Gynaecology and those rotating through the Gynaecology Oncology Unit are expected to be conversant with the latest guideline with regards to VTE prophylaxis prescription. However, this study found that consultants adhered better to prescribing guidelines with regards to specifying the time for initiation of enoxaparin as compared to registrars and the subspecialist.

Thromboprophylaxis and specifically LMWH is prescribed based on patients' weight in milligrams per kilogram body weight. This demands that body weight in all patients should be measured and recorded in clinical notes. Of 142 patients, weight was only recorded in n=55 (38.7%). The lack of weight recording showed that most patients n=87 (61.3%) had enoxaparin prescribed based on either an estimation of their weight or giving a minimal available dosage per prefilled syringe. This was evident in most of the patients (71%) for whom 40 mg was prescribed, which may have been an inadequate dose in some patients. A study conducted in an Easten Cape tertiary hospital showed that despite the acknowledged high risk of thromboembolism in patients undergoing general surgery, the prescription of thromboprophylaxis was inadequate. [15]. However, our study also found that despite the prescribing clinicians not adhering to guidelines regarding specifying a time of initiation of thromboprophylaxis, the administers of the drug in the wards do follow guidelines, as postoperative enoxaparin was initiated within six to 12 hours in about 90% of patients where time for initiation was not specified in the prescription chart.

The study further demonstrated that when the time for initiation of thromboprophylaxis is specified, the drug is given at the time specified. This indicates that if the time for initiation of post-operative thromboprophylaxis were specified in all patients, it is likely that all patients will receive the thromboprophylaxis at the prescribed time. This would improve the prevention of VTE. A delay in the administering of thromboprophylaxis is often ascribed to the nurses who administer the drug, either due to not following the prescribed initiation time, lack of understanding of guidelines, or fear of causing bleeding in postoperative patients. [17] However, in our study, this was not the case. This study should stimulate institutions to perform an audit of their postoperative thromboprophylaxis prescription, as well as caution prescribing clinicians to adhere to the guidelines as this would ensure adequate prevention of VTE in at-risk patients and the morbidity and mortality associated with it.

Conclusion

In most cases, the prescribing clinicians did not specify on the postoperative prescription the time at which enoxaparin should be given. However, most patients received their thromboprophylaxis within the recommended time frame, even for those patients whose time was not specified in the prescription. The nurses in the wards were adhering to thromboprophylaxis guidelines in terms of giving enoxaparin within the recommended time. There is a need to encourage prescribing clinicians to specify the time of postoperative thromboprophylaxis on their prescriptions, to prevent delays in the administering of thromboprophylaxis. This will aid in preventing VTE and in thromboprophylaxis being given to patients at risk of bleeding post-operation. Further studies are recommended to assess whether the inadequate prescription in the immediate post-operation time applies to when patients are being discharged.

Ethical considerations

No identifiable information was recorded in the data sheets, results or discussion. Patients' privacy was maintained. Ethics clearance was obtained (Ref. No.: M221120).

Declaration of conflicts of interest and funding

The authors have no conflict of interest to declare.

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APPENDICES

Appendix A: Data Collection Sheet

Demographic Data

Age		Parity		Race	
Smoking	Yes	No	Weight		BMI

Disease Status

Organ affected	Ovary	Uterus	Cervix	Vulva	Vagina
Stage (specify substage)	1	2	3	4	Unknown
Neoadjuvant Chemo	Yes		No		

Co-morbid diseases

HPT	Yes	No	Treatment	Yes	No
DM	Yes	No	Treatment	Yes	No
Pre-existing DVT	Yes	No	Treatment	Yes	No

Surgery done

Laparotomy		TAH		BSO		Omentectomy	
Lymphadenectomy		Radical Hysterectomy		Vulvectomy		Inguinal lymphadenectomy	

Others (sepcifiy)							
Duration of surgery (minutes)		Intraoperative complications		Recorded blood loss		Post-op admission ward	

Enoxaparin

Dose prescribed	40mg	60mg		80mg	Other
Prescribed time from surgery to commence	<6 hours	6 hours	>12 hours	Other	Not specified
Dose given	40mg	60mg		80mg	Other
Time from surgery commenced	<6 hours	6 hours	>12 hours	Other(specify)	

Clinician Rank (one writing the script)

Meical Officer	
Registrar	
Consultant	
Subspecialist	

Appendix B: SAJOG Submission Guidelines

Manuscript preparation

Preparing an article for anonymous review

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

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

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

General article format/layout

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

General: • Manuscripts must be written in UK English (this includes spelling).

- The manuscript must be in Microsoft Word or RTF document format. Text must be 1.5 line spaced, in 12-point Times New Roman font, and contain no unnecessary formatting (such as text in boxes). Pages and lines should be numbered consecutively. • 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)'.
- 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.

SAJOG is a general specialist obstetrics and gynaecology journal, therefore for articles involving 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:

o Human Gene Mapping Workshop (HGMW): genetic notations and symbols

o HUGO Gene Nomenclature Committee: approved gene symbols and nomenclature o OMIM: Online Mendelian Inheritance in Man (MIM) nomenclature and instructions o Bennet et al. Standardized human pedigree nomenclature: Update and assessment of the recommendations of the National Society of Genetic Counselors. J Genet Counsel 2008;17:424433: standard human pedigree nomenclature.

Illustrations/photos/scans

- If illustrations submitted have been published elsewhere, the author(s) should provide evidence of consent to republication obtained from the copyright holder.
- Figures must be numbered in Arabic numerals and referred to in the text e.g. '(Fig. 1)'.
- Each figure must have a caption/legend: Fig. 1. Description (any abbreviations in full).
- All images must be of high enough resolution/quality for print.
- All illustrations (graphs, diagrams, charts, etc.) must be in PDF form.
- Ensure all graph axes are labelled appropriately, with a heading/description and units (as necessary) indicated. Do not include decimal places if not necessary e.g. 0; 1.0; 2.0; 3.0; 4.0 etc.
- 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.

- 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.) consecutively as they are referred to 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. **References**

NB: Only complete, correctly formatted reference lists in Vancouver style will be accepted. If reference manager software is used, the reference list and citations in text are to be unformatted to plain text before submitting.

- 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.
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Submission Preparation Checklist

All submissions must meet the following requirements.

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- Where available, URLs for the references have been provided.
- The text is single-spaced; uses a 12-point font; employs italics, rather than underlining (except with URL addresses); and all illustrations, figures, and tables are placed within the text at the appropriate points, rather than at the end.
- The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines.
- he submission file is in Microsoft Word format.
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Material submitted for publication in the *SAJOG* is accepted provided it has not been published or submitted for publication elsewhere. Please inform the editorial team if the main findings of your paper have been presented at a conference and published in abstract form, to avoid copyright infringement.

Appendix C: Protocol

The post-operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in Gynaecologic Oncology patients at Charlotte Maxeke Johannesburg Academic hospital.



UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

Primary Investigator:

Dr. Letsholathebe Keogotsite

Student number: 0600631G

Supervisors

:Dr. Langanani Mbodi

Dr. Chileshe Mpehle

Dr. William Molelenki Moroeng

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1. List of Abbreviations

List of Abbreviations

CMJAH	Charlotte Maxeke Johannesburg Academic Hospital
DVT	Deep Venous Thrombosis
LMWH	Low Molecular Weight Heparin
PE	Pulmonary Embolism
RCT	Randomized Controlled Trials
UFH	Unfractionated Heparin
US	United States of America
VTE	Venous Thromboembolism
NHRD	National Health Research Database
CEO	Chief Executive Officer

Literature Review and Background

Introduction

Gynaecologic malignancies are cancers that arise from female upper and lower genital tract including the vulvar, vagina, cervix, uterus and ovaries. The incidence and prevalence of these malignancies varies depending on patient risk factors and geographic location. (1) Gynaecologic malignancy accounts for 10% of new malignancy in women and 12% of the cancer mortality globally. (2) Surgery is the oldest therapeutic modality of most gynaecologic malignancy. The surgical procedures employed varies for different organ site. The role of surgery in gynaecologic malignancy is both diagnostic and therapeutic. (1)

In ovarian cancer surgery plays a role in diagnosis, staging and treatment of early-stage ovarian cancer. Surgical staging operation for ovarian cancer is the standard to rule out metastasis and to confirm that cancer is confined to the ovary. This also reduces requirement for adjuvant therapy in early disease. (1,2)

In endometrial cancer surgery is a traditional mode of treatment, extra-fascial hysterectomy and bilateral salpingo-oopherectomy with lymphadenectomy is done, as the diagnosis of endometrial cancer is generally early (1,2)

In cervical cancer, radical local resection of the cervix-confined disease can be done. However, women with cervical cancer generally present with advanced stage where surgery is not suitable (1,2). Early-stage cervical cancer is treated with extra-fascial hysterectomy with or without lymphadenectomy depend on the stage. (1) Vulva cancer occurs more frequently in elderly women. Depending on patient fitness for surgery and cancer staging radial vulvectomy with or without lymphadenectomy may be done. (1)

Low Molecular Weight Heparin (LMWH)

LMWH, such as Enoxaparin, is an anticoagulant made from depolymerisation of heparin chain and has molecular weight of one third that of unfractionated heparin (UFH) which is 5000Da (3,5). The use of LMWH in clinical setting has replaced UFH in many parts of the world and its use has increased due to ability to be used in outpatient settings, as well as having a reduced incidence of heparin induced thrombocytopenia (5). LMWH causes anticoagulation by activating antithrombin, thereby inhibiting activated factor Xa more than UFH. The response of LMWH is

more predictable than UFH, due to its better bioavailability, longer half-life and clearance which is dose independent. (5). It is given subcutaneously to have a plasma half-life of 6 hours. Binding to plasma protein and endothelium is reduced and accounts for better bioavailability and slow renal clearance. (5).

LMWH binds less to platelets therefore less inhibition of platelets function and does not increase microvascular permeability, has lower affinity to endothelial cells hence it causes less bleeding (6). Indication of LMWH include thromboprophylaxis peri or post operative in general surgery, orthopedics surgery, acute spinal injury, multiple trauma and treatment of venous thromboembolism and unstable angina. (5)

Timing and Dosing

LMWH as thromboprophylaxis can be started perioperatively and/or postoperatively. However, in a meta-analysis done in 2020 presented at the Society of Urology Oncology in 2021, they found that the rate of bleeding increase when thromboprophylaxis is commenced preoperatively and there was no statically significant decline in the rate of VTE. (7). The Southern African Society of Thrombosis and Haemostasis recommend initiation of Enoxaparin 40mg 6hours postoperative in patients who had major surgery and also has risk of bleeding. The prophylaxis is continued for 7 to 10 days or until patient is fully mobile. (8,9)

Risk of Bleeding with enoxaparin LMWH

In a systematic review of 52 randomised controlled trials (RCTs) that studied deep vein thrombosis (DVT) prophylaxis, the most common bleeding complications were injection site bruises, wound hematoma, drain side bleeding and hematoma and major bleeding complication were infrequent. (10)

A twice or once daily LMWH was shown to have a bleeding risk of 1.7 (95% CI 0.2-17.5) when compared with Nadropan once dose in a cohort study in Anticoagulation Clinic. (11) In another study of plastic surgery patients, LMWH given post-operatively, did not produce clinically relevant increase in the rate of hematoma, requiring revision in theatre. (12)

Study Rationale

Enoxaparin is prescribed for all patients who are surgically managed for gynaecological cancers irrespective of the stage of the disease and duration of the procedure. Societies recommend that the drug is given at least 6 hours post operatively as prophylaxis due to the increased risk for thrombo-embolic diseases in cancer patients. It is used based on the guidelines in Gynaecologic Oncology with no RCTs and the existence of this grey area between drug registered use and society recommendation may create loop holes with regards to timing as well as instil some discomfort and hesitancy with regards to post operative timing of the drug by clinicians and support staff.

The findings of the study will help clinicians establish protocol and design workshop to other healthcare workers in the unit about the drug and problems associated with its use.

Hypothesis

We hypothesize that the majority of clinicians who prescribe enoxaparin post operative do not specify the exact time to commence and those in whom the time of six (6) hours post operative is specified, it is administered longer than the prescribed time to commence.

Aim

This study aims to assess the administration rates of prophylactic LMWH as compared to the prescribed requests made by the surgeons in gynaecological oncology patients and a tertiary hospital.

Study Objectives

1. To assess if the prescription of enoxaparin after cancer surgery is followed as per society recommendation.

2. To assess if the timing and dosing when the drug is administered is in compliant with the written prescription dose as well as the timing.
3. To compare if there is a difference in specifications with regard to timing when comparing different ranks of prescribing clinicians.

Research Methods

Study site

The study will be conducted the Charlotte Maxeke Johannesburg Academic hospital in the department of Obstetrics and Gynaecology, the Gynaecologic Oncology unit.

Study design

This will be a retrospective descriptive quantitative record review over the 2-year period from 01st May 2020 until 31st June 2022

Study population

The study will collect data on all patients who were operated for the gynaecologic malignancy and enoxaparin was prescribed for prophylaxis for the period of two (2) years. Data will be collected on all patients who are above 18 years of age and meet the inclusion criteria. The unit operates on average 4 patients a week. We estimated that over the 2 years period, there will be approximately 250 patients.

Inclusion Criteria

All patients who have been confirmed to have been operated for gynaecological malignancy in the study period and enoxaparin was prescribed

Exclusion criteria

Patients where there is no record of prescribed enoxaparin and those who were operated for benign pathologies.

Patients with missing operative records.

Data Collection

Data will be collected from the patients post operative inpatient records from the admission ward 196 for the period of the study using a data collection sheet. The data will be collected retrospectively. Variables to be collected includes the patients' demographics, co-morbid diseases, the organ system involved by the cancer, procedure done, duration of the procedure, intra-operative complications, admission ward during the post operative state, the dose of enoxaparin prescribed, the time for commencement prescribed, the dose and time given, rank of the clinician prescribing the drug.

All data not available will be recorded as unknown. Data will be cleaned and coded and make ready for data analysis statistical software. Cleaned and coded data will be entered onto the excel spreadsheet and prepared for analysis.

Data Analysis

The study will employ quantitative data analysis principles. Data will be managed and analysed in STATA software. Demographic characteristics and other clinical factors will be summarised using mean/median and standard deviation/range, and percentages for continuous and categorical variables respectively.

We will also describe the organ systems commonly affected by the malignancies in this study was well as the type of surgical management employed.

We will define the malignancy diagnosis as per records in the patients and no pathological review will be done.

The univariate association between the rank of the clinician prescribing the enoxaparin and recording of the first dose initiation / drug timing will be calculated through a Chi2 test and T-and non-parametric tests. Regression methods will be used to assess the independent effect of prescribing the timing of the enoxaparin to be initiated in 6 hours and the rate of adherence to the prescription by those administering the drug.

Ethical Issues

Permission to conduct the study will be sought from the head of the unit, Gynaecologic Oncology unit, The Head of Department, Department of Obstetrics and Gynaecology and the office of the CEO. The study will also be registered with National Health Research Database (NHRD) and the study will not be conducted until ethical creance is received from the University of Witwatersrand Human Research Ethics Committee.

All collected data will be stored in a password-controlled computer and only the researcher and supervisors will behave access to the data. All the identifiers will be removed when data is collected and patients will be assigned a study number.

Timelines

2022	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Protocol												
Submission												
Correction												
Ethics												
Data collection												
2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Data Collection												
Analysis												
Write up												
Marking												
Corrections												

Funding

There will be no sponsor or financial support towards the study. The principal investigator will be responsible for all the costs of the study including but not limited to costs of printing materials, stationery, travel and basic miscellaneous costs. The estimated budget is as tabulated below.

Costing Activity	Quantity	Cost per unit	Subtotal
Travel for data collection (overall)			R3000
Printing and photocopy of data sheets	500 pages	0.50	R250
Data analysis	1	R6000	R5000
Professional editing and proof reading	1	R4000	R4000
Total estimated cost			**R12,250.00**

Potential Bias and Limitations

The study will be a retrospective in nature and the analysis will be that of a single institution and therefore cannot be generalized. The CMJAH does not have electronic record keeping system

and although the patients' files are scanned and saved onto hospital computer system, the location of patient files could be missing between the ward and the records department.

Conclusion

LMWH is used off label for thromboprophylaxis in cancer patient as manufacture has no published studies on gynaecology cancer. There are society guidelines available from European countries as well as locally in South Africa from different clinical specialties. This contrary to the use in orthopedics which is well documented and timing for post operation initiation is well documented.

There is a need to research and document if the prescription of LMWH after cancer surgery is followed as per societies recommendation and if those who administer the drug are compliant to the prescription doses as well as timing from surgeon.

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Annexure A: Data Collection Sheet

Demographic Data

Age		Parity		Race	
Smoking	Yes	No	Weight		BMI

Disease Status

Organ affected	Ovary	Uterus	Cervix	Vulva	Vagina
Stage (specify substage)	1	2	3	4	Unknown
Neoadjuvant Chemo	Yes		No		

Co-morbid diseases

HPT	Yes	No	Treatment	Yes	No
DM	Yes	No	Treatment	Yes	No
Pre-existing DVT	Yes	No	Treatment	Yes	No

Surgery done

Laparotomy		TAH		BSO		Omentectomy	
Lymphadenectomy		Radical Hysterectomy		Vulvectomy		Inguinal lymphadenectomy	
Others (sepcifiy)							
Duration of surgery (minutes)		Intraoperative complications		Recorded blood loss		Post op admission ward	

Enoxaparin

Dose prescribed	40mg	60mg		80mg	Other
Prescribed time from surgery to commence	<6 hours	6 hours	>12 hours	Other	Not specified
Dose given	40mg	60mg		80mg	Other
Time from surgery commenced	<6 hours	6 hours	>12 hours	Other(specify)	

Clinician Rank (one writing the script)

Meical Officer	
Registrar	
Consultant	
Subspecialist	

Appendix D: Turn it in report

Turnitin Originality Report

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Appendix E: Letter from Editor

DECLARATION OF EDITING SERVICES

Petro du Preez
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15 January 2025

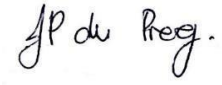
I hereby declare that I have read and edited the following research report:

Author: Dr LF Keogotsitse

Student No.: 0600631g

Title: The post operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital

All proposed changes were subject to the author's approval.



J.P. du Preez

Appendix F: Ethics Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research and Innovation)

TO: Dr L Keogotsitse
School of Clinical Medicine
Department of Obstetrics and Gynaecology
Medical School
University

E-mail: drtsholi@gmail.com

CC: Supervisor: Dr L Mbodi
<mlangi2005@yahoo.co.uk>
and <HREC-Medical Research Office@wits.ac.za>

FROM: Mr Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 2023/03/22

REF: R14/49

PROTOCOL NO: **M221120** (This is your ethics application reference number. Please quote it in all enquiries, oral or written, relating to this study.)

PROJECT TITLE: *The post-operative prescription of prophylactic Enoxaparin and the adherence to the prescribed regimen in gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to Government funding of the University.



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UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R49 Dr L Keogotsitse

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M221120

NAME: (Principal Investigator)	Dr L Keogotsitse
DEPARTMENT:	School of Clinical Medicine Department of Obstetrics and Gynaecology Medical School University
PROJECT TITLE:	*The post-operative prescription of prophylactic Enoxaparin and the adherence to the prescribed regimen in gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital*
DATE CONSIDERED:	2022/11/25
DECISION:	Approved unconditionally
CONDITIONS:	
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR:	Dr L Mbodi
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2023/03/22

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

DECLARATION OF INVESTIGATORS

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

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **November** and therefore reports and re-certification will be due in the month of **November** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator _____ Date _____

05 Feb 2025

Appendix G: Certificate of Final Submission Signed by Supervisors

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG | FACULTY OF HEALTH SCIENCES

CERTIFICATE OF FINAL SUBMISSION FOR GRADUATION SIGNED BY SUPERVISORS OF HIGHER DEGREES CANDIDATES

Full name	**Letsholathebe Frans Keogotsitse**
Student number	**0600631g**

Candidate for the degree of: **Master of Medicine in Obstetrics and Gynaecology**

_____

has submitted his/her thesis/dissertation/research report

Entitled: ___**The post operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital**

Contact no	+27766272292	E-mail	drtsholi@gmail.com

Mark with an X on appropriate box	**Yes**	**No**
Has this thesis/dissertation/research report been submitted with the acquiescence of the supervisor?	X	
To the best of your knowledge are you able to verify that: This is the candidate's work except as otherwise stated by the candidate?	X	
The substance (nor any part of it) has not been submitted in the past nor is being submitted for a degree in any other university	X	
The candidate has acknowledged wherever any information used in the thesis, dissertation or other work has been obtained by him/her while employed by, or working under the aegis of, any person or organization other than the University or its associated institutions	X	

I certify that this thesis/dissertation/research report has the approval of the Animal Ethics Committee / Committee for Research on Human Subjects and the Number of the Certificate of Approval is: __**M221120**_____

List all publications, which your student has published in peer-reviewed journals from his/her postgraduate research report/dissertation/thesis during the course of his/her studies in the Faculty of Health Sciences (Include authors, year, title of paper, name of journal, volume number and page numbers). This information is mandatory.

_____**Pending editors decision from SAJOG**

_____

_____

_____

_____

Name of Supervisor 1: ___Dr Langanani Mbodi_____ Telephone: __0827574072_____

Signature: _____ E-mail: __langanani.mbodi@wits.ac.za_____

Date: _18/05/2025__

Name of Supervisor 2: _Dr_Moleleki William Moroeng ____ Telephone: ___+27825551347_____

Signature: _____ E-mail: __lenki.m@icloud.com_____

Date: __18/05/2025_____

Name of Supervisor 3: __Dr Chileshe Mpehle _____ Telephone: __+27727238827_____

Signature: _____ E-mail: ___chileshempehle@yahoo.com _____

Date: ___18/05/2025_____

Appendix H: Final Submission of Research Report

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

FINAL SUBMISSION OF THESIS, DISSERTATION OR RESEARCH REPORT/PROJECT (Unbound and Electronic Copies)

Faculty _____

of Health Sciences **School of**

Clinical Medicine

Submission of M _____ **Dissertation or M** Med (O&G) **Research/Project or PhD Thesis**

(Note: This form should only be completed at final submission of Dissertation or Research/Project or Thesis)

Payment and submission are for submissions, which have research weighting of 50% or more – so reports where the weighting in relation to the rest of the course work is less than 50% do not have to submit the document.

PLEASE WRITE CLEARLY IN BLOCK LETTERS (If completing form by hand)

1. Name (in full): Letsholathebe Frans Keogotsitse

426 Rifle Range Road, Johannesburg

2001

2. Person Number: Student number: 0600631G **3.** Present mailing address:

Postal code: Fax:

E-mail: drtsholi@gmail.com Cell: +27766272292

Home tel: _____ Work tel:

4. If you are likely to move in the next 6-12 months please provide the mailing address and effective date of a change in address:

Effective date:

Contact telephone numbers:

5. I hereby submit my M___dissertation or M Med (O&G) ___research/project report or PhD thesis.
(Delete whichever is NOT applicable)

5.1 If this is research for a Masters by Dissertation or PhD thesis, please provide your ORCID number:

_____

(*Open Research and Contributor ID (ORCID) – is an alphanumeric code to uniquely identify academic authors and contributors, it is highly recommended that you register and provide this ID. To register or read more see http://orcid.org)*

6. Number of unbound copies:
(Ensure that you have signed and dated all copies)
"Number of CDs: (Please note: an electronic version must be supported by a copy on CD for submission into the Electronic Theses and Dissertation System (ETD):
ETD Submission Form

A payment of **R200** must be made at any one of the two beneficiaries below:

Wits University Cashiers Office	**First National Bank** (A copy of the payment receipt must be submitted to the Faculty with the thesis/dissertation)
Account Code: 001.152.4221103.5122609	Branch: Braamfontein Account number: 51360056499 Branch Code: 251905 Swift Code: firnzajja950

7. Declaration**:**

7.1 I have checked all copies of my dissertation or research/project report or thesis and no pages are missing or poorly reproduced;

7.2 All revisions have been completed in accordance with the recommendations of the examiners and such revisions have been duly approved;

7.3 The electronic copy is identical to the printed copy approved by the Faculty;

7.4 The dissertation or research/project report or thesis complies with the rules relating to abstract and style, copies and formal declaration, duly signed by me, as shown in the General Rules of the University;

7.5 Where any document of which I am not the owner is included in my work, I have obtained and attach hereto the written consent of the holder of the intellectual property rights in such a document allowing distribution as specified in 7.5.1 below;

7.5.1 In the event of copyright permission not being obtainable for visual images or other works, I will not include the full works(s) in my online thesis/dissertation/research report on the ETD system, but undertake to point only to the source (by URL or other means) for such work(s);

7.6 I confirm that I have not used any confidential information in my work without the required permission;

7.7 I have properly acknowledged all sources; and

7.8 I have noted the rules relating to intellectual property and acknowledgement of the award of the programme as shown in the General Rules of the University and the University's Intellectual Property Policy. Insofar as I hold intellectual property rights in my dissertation or research/project report or thesis, and to that extent only, I agree that the University and its agents may archive and make accessible to the public, upon such conditions as the University may determine, my dissertation or research/project report or thesis in its entirety in all forms of media, now or hereafter known.

8. Title of submitted dissertation/research report/thesis:
The post operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in

---

gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital

---

(*Please note: if due to unforeseen circumstances, the above title has changed from your previously approved title, no further action can be taken by the Faculty Office until the amendment has been approved by the Faculty).*

8.1 Keywords:
Enoxaparin, Postoperative Thromboprophylaxis, Gynaecological Malignancy

9. Acknowledgement:

I acknowledge that my dissertation or research/project report or thesis may be placed in the archive of electronic theses and dissertations. I acknowledge that it may be made electronically available in its entirety on the ETD system from four months after the date of submission unless permission for further embargo has been approved by Senate and communicated in writing by myself to the University Research Office, Library and Central Records Office.

The following files are on this CD (*please specify format*):

The following parts of the work may be released immediately for electronic access worldwide:
(Only if an official embargo has been agreed to in terms of General Rule G19 will your abstract not be made available for the agreed period).

Abstract and key bibliographic data (i.e. from submission form)

I acknowledge that I am not entitled to the return of the copies of the dissertation or research/project report or thesis or other work I have submitted for the programme.

10. Did your research involve animal experimentation or the use of human subjects, human tissue or other material, or patient records?

☒ Yes No

☐ If yes, please certify that clearance was obtained from the relevant, approved, University ethics committee:

Clearance number(s):
M221120

11. I understand that I will not graduate unless my University fees have been paid in full.

12. I understand that if I am in material breach of any of the rules, term and conditions governing the submission of a dissertation or research/project report or thesis at the University I may not graduate or it may result in the revocation of the awarded award.

13. The University is not responsible for the safekeeping of the information constituting a dissertation or research/project report or thesis. Should a student use the University ETD system for keeping of a dissertation or research/project repot or thesis in progress responsibility for the maintenance, security and back-up of such work lies with the student. The student absolves the University of any liability whatsoever for any loss or damage to a dissertation or research/project report or thesis and/or information contained in them howsoever it occurs. The student indemnifies and hold the University harmless against any claims or liability whatsoever for any loss or damage to a dissertation or research/project report or thesis and/or information gathered for that purpose or contained in any dissertation or research/project report or theses howsoever it occurs.

14. Candidate:

14.1 The candidate must attach an original "Certificate to Accompany Higher Programmes Research Report" from his/her supervisor(s). ***14.2*** Is this dissertation or thesis supported by funding from *(please tick):*

☐ DST – NRF (e.g. CoE's; SARCHi Chairs; Innovation; African Origins Platform; Knowledge, Interchange and Collaboration; etc.) [*Please underline the programme that applies]*

☐ DST – CSIR (e.g. NEPTTP e-Research; etc.)

Other ☐ (*Please list the full name of the funder*): _____

Signature of candidate: _____ Date: 19/05/2025

15. Supervisor(s):

I confirm that I provided academic oversight as supervisor during the completion of the degree

Name of supervisor: Dr Langanani Mbodi

Discipline: Obstetrics and Gynaecology

School: Clinical Medicine

Signature of Supervisor: _____ Date: 19/05/2025

I confirm that I provided academic oversight as supervisor during the completion of the degree

Name of second Supervisor (*if more than one*): Dr Chileshe Mpehle

Discipline: Obstetrics and Gynaecology

School: Clinical Medicine

Signature of Supervisor:  Date: 19/05/2025

FOR FACULTY OFFICE USE

- ☐ Retain one unbound copy
- ☐ Field of study and biographical information confirmed
- ☐ Two unbound final, corrected copies, as well as final, corrected copy in electronic format, of dissertation or research/project report or thesis submitted and forwarded to Central Records Office (refer to section 6)
- ☐ An electronic copy of the abstract of the dissertation or research report or thesis and receipt for the ETD payment submitted and forwarded to CENTRAL Records Office (refer to section 6)

Note: 1. *Only abstracts of awards with 50% more as a research component must be submitted for uploading onto the ETD system*

2. Please tick the appropriate box below to indicate the percentage of the research component award:

- ☐ 50% or more research
- ☐ Less than 50% research

- ☐ Signed formal declaration submitted (refer to section 7.4) and included as part of dissertation or research/project report or theses
- ☐ Written consent of holder of intellectual property rights included in the work attached – if applicable (refer to section 7.5)
- ☐ Embargo notification attached – if applicable (refer to section 9)
- ☐ Ethics Committee clearance number indicated – if applicable (refer to section 10)
- ☐ Copy of this submission form and attachments included with copies sent to Central Records Office – for forwarding to Library. **Originals placed on student file.**

Faculty Officer: _____ Date: _____

FOR CENTRAL RECORDS OFFICE USE

- ☐ One unbound final, corrected hard copy of dissertation or research/project report or thesis forwarded to Library

☐ Final corrected copy in electronic format and receipt for ETD payment forwarded to Library

☐ Copy of this submission form included with dissertation or research/project report or thesis forwarded to Library

☐

Central Records Office:_____ Date:_____

FOR LIBRARY USE

☐ Electronic version of dissertation or research/project report or thesis abstract activated on ETD

Library ETD Administrator: _____ Date:

_____

Appendix I: Final List of Corrections

List of correction

Dr LF Keogotsitse

Student number: 0600631g

Recommendations/ queries by external examiner	**Page no:**	**Comment**
Abstract • Replace text “ical” with “ery” in the word postsurgical • Rework this sentence as it does not make sense as it is written. Perhaps you could say 'This study showed that doctors in the Gynaecological Oncology Unit are not adhering to thromboprophylaxis guidelines, but in the wards enoxaparin is administered within the appropriate time guidelines.'	vi	• Word post-surgical changed to post-surgery • Last paragraph changed to: This study showed that doctors in the Gynaecologic Oncology Unit are not adhering to thromboprophylaxis guidelines, however in the wards enoxaparin is administered within the appropriate time as per guidelines
Introduction • This sentence does not follow on from the sentences above. Rewrite indicating the reason for the use of heparin and particular LMWH in gynae oncology. This sentence and the following one would be better included in the next paragraph.	3	• Second paragraph, this sentence added and removed from the first paragraph: Low Molecular Weight Heparin (LMWH), such as Enoxaparin, is preferred over unfractionated heparin (UFH) due to better bioavailability, longer duration, and lower risk of complications like thrombocytopenia. It acts by inhibiting factor Xa and is administered subcutaneously

• This part of the sentence needs rewriting. It is unclear what the author is intending to say		• Last sentence of second paragraph changed to: the dose of LMWH in extremes of weight and in patients with a high risk of bleeding should be delayed by a minimum of 12 hours postoperatively and be calculated per weight in kilograms.
• You need to spell out exactly what the SA Society guidelines are. Do they stipulate that the prescription need to include the required time of administration? • Those administering the drug initiate treatment.	4	• First paragraph: the guideline does not mention that the time for administration must be written on the prescription, however an appropriate prescription should include time at which the drug should be given, particularly for drug that are supposed to be given at a specific time, in order to guide administers of the drug. • Second paragraph: rephrase to: This study aimed to assess whether thromboprophylaxis guideline were followed, by assessing how prescribing clinicians prescribe enoxaparin postoperatively and how those administering the drug initiate treatment
Methods • Delete word "of" in first sentence • Add word "for" in the second sentence • Change word rotate to rotated	4	• First sentence corrected to read: This was a retroscepctive descriptive review study over two years • Second sentence corrected to read: Medical records of patients who had surgery for gynaecological malignancy • Sentence 10 corrected to read: The Gynaecology Oncology unit consisted to

		one subspecialist, two consultants and two registrars who rotated every three months
Results • Replace "5" with "6" in 49.5 years • Why are you including the race of the patients? I would delete it, as race is not going to influence whether or not the LMWH was prescribed	5	• First paragraph: 49.5 change to 49.6 • Age and race statistics tables removed
• Delete Figure 1, it is not helpful. • Replace text: "organ most affected by" to "side of" and n47, n36 to n=47, n=36	6	• Figure 1: Pie chart removed • First paragraph: the sentence corrected to read: The side of the malignancy was the ovary n=47 (33.1%), followed by the cervix n=36(25.4%),
• Replace text: p-value less than 0.0001 to p<0.0001 • Erase text: The dose of the enoxaparin was more likely to be administered as prescribed • Replace text: 0.000 to <0.0001 • Replace text: ery in word postsurgical • These numbers add up to 62, which is different from 80, specified on page 6.	7	• First paragraph: P value less than 0.0001 changed to p<0.0001 • sentence: "The dose of the enoxaparin was more likely to be administered as prescribed" erased • P value 0.000 changed to 0.0001 on table 1 • Word: post-surgical changed to post-surgery • Last sentence: numbers corrected to add up to 80

Discussion • Replace text: Gynaecological • Can you say that? The numbers of sub-specialists and consultants are too small to say this categorically	9	• First sentence: word Gynaecologic changed to Gynaecological • Consultant specified time for initiation of enoxaparin more than subspecialist and registrar according to the study, therefore showed better understanding of guidelines
Reference • Give the page numbers	10	• Reference number 3: Page numbers added to reference
Recommendation/Queries by internalexaminers	**Page no**	**Comments**
• Sign declaration form	ii	• Declaration form signed
• candidate gives the explanation that times were rounded off to the nearest hour – but there are no odd hours – so must have been 2 hours, were they rounded up/ down?	6	• Times (duration) on the data collection sheet was 6, 8, 10 and more than 12 hours. Time at which the drug was given was rounded off to this hours
• Table 3 – label the axes. Put the 'hours' in order. Line up the heading of the column with results beneath.	8	• This has been corrected
• It was noted in the first examination sheet that the Chi-square test is to test for association – the prescribing of medication is directly linked to the giving of medication.	8	• This query was corrected on a re-submission report
• it is not necessary to state that X happened 30% of the time and did not	8	• Last part of the paragraph: changed to remove the negatives and the final

happen 70% - putting both the positive and the negative of the same fact is not required .		paragraph reads as: Consultants specified the time to commence enoxaparin in n=44 (68.7%) of the prescriptions they wrote, whereas registrars only specified the time in n=17 (32.0%), the subspecialist specified the time in just n=1 (4%).
• The study objective was to assess if the guideline was followed – not prescribing clexane is a problem – need to comment data not collected	4	• We are of an opinion that if a clinician follows a guideline that stipulate that a drug is recommended to be given at a specific time following surgery, they would translate that into writing prescription that guides administers when the drug should be given, instead of living it to administers discretion. Failure to do so, amounts to ignorance of guidelines

Appendix J: Final Submission Checklist

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG | FACULTY OF HEALTH SCIENCES

ACKNOWLEDGEMENT OF FINAL RESEARCH SUBMISSION

Full name of candidate	Letsholathebe Frans Keogotsitse		
Student number	0600631g		
Qualification	MMed O&G	Date submitted	20 May 2025

Submission requirements Tick list √	
Student enrolled for current year (*the research unit must be part of this enrolment, as a record must be active to capture the PASS result*)	√
Fees: All paid, no outstanding amounts. Submission of research will not be accepted if there are fees outstanding	√
Research Title checked and correct on system	√
Electronic copies of the research (*must be in PDF format*)	√
Declaration signed by the student, with current date (*not 1st submission date*)	√
Copy of ethics clearance certificate (*as an annexure in the research output*)	√
Abstract	√
Signed supervisor submission form (*if more than one supervisor ALL supervisors' signatures must appear*)	√
ETD form (*signed by supervisor(s) and candidate*)	√
ETD payment receipt (*only if research accounts for 50% or more of the qualification)*	√
HOD/HOS approval letter	√
Student's list of corrections – with reference to specific lines, page numbers and/or chapters (*only if corrections had been recommended – in the case where no further corrections is the outcome, this is not needed*)	√
Research report passed with distinction	
Qualified with distinction	
Qualified without distinction	√

For MMed and MDent students: Final CMSA exams passed, prior to final submission of research report? If not, when will final exams be written? _____

Full name of PG Staff: _____

Signature of PG Staff: _____ Date: _____

Signature of candidate: _____ Date: 20 May 2025

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

FACULTY OF HEALTH SCIENCES

ACKNOWLEDGEMENT OF FINAL RESEARCH SUBMISSION

STUDENT NAME: _____ STUDENT NUMBER: _____

QUALIFICATION: _____ FIELD OF STUDY: _____

RECEIVED BY: _____ FACULTY DATED STAMP

SIGNATURE: _____

Appendix K: The Head of Department Letter of Approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

OBSTETRICS AND GYNAECOLOGY
School of Clinical Medicine

1 March 2025

The Registrar

Faculty of Health Sciences

PVT building

University of the Witwatersrand

Parktown, Johannesburg, 2193

Re The post operative prescription of prophylactic enoxaparin and the adherence to the prescribed regimen in gynaecologic oncology patients at Charlotte Maxeke Johannesburg Academic Hospital, LF Keogotsitse

The above MMed received a recommended pass pending corrections approved by the supervisor and the Head of Department. I can confirm that the candidate has addressed all changes suggested by the examiners, as confirmed by his supervisor in writing

We congratulate the candidate and the supervisors on this important milestone.

Sincerely

D Lawrence Chauke

Acting Academic Head