THIRTY DAYS' POSTOPERATIVE COMPLICATIONS AFTER GYNECOLOGIC SURGERIES AT TIKUR ANBESSA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA: A COMPARATIVE CROSS-SECTIONAL STUDY

Binyam Esayas Abuye[1], Esayas Berhanu[1], Yirgu Gebrehiwot[1], Husnia Hussen[1], Dawit Dessalegn[1]

ABSTRACT

BACKGROUND: Any deviation from the normal postoperative course is referred to as a postoperative complication. It is estimated that 11% of patients in low- and middle-income countries experience these complications following elective surgery. The objective of this retrospective comparative cross-sectional study was to determine 30-day postoperative complications and associated factors among patients who underwent gynecologic surgeries at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia.

METHODS: A retrospective comparative cross-sectional study was carried out to assess 30-day postoperative complications in patients who underwent gynecologic surgeries over a three-year period, from January 2021 to December 2023. Data were gathered through a structured questionnaire. The chi-square test was used to compare categorical variables. To identify independent factors linked to the outcome variable, both binary and multivariable logistic regression analyses were conducted, with a significance level set at $p < 0.05$ and a 95% confidence interval (CI).

RESULTS: The study included a total of 355 patients who underwent gynecologic surgery. Of these, 118 had benign conditions, while 237 were diagnosed with malignancies prior to surgery. The median age for patients undergoing surgery for oncologic reasons was 48 years (IQR 40–60), whereas the median age for those with benign conditions was 37 years (IQR 30–45). The overall rate of postoperative complications was 31%.

Nineteen point six percent of histopathology-confirmed benign patients had postoperative complications, whereas 41% of histopathology-confirmed malignant cases had postoperative complications. The most frequently reported complication among patients undergoing benign surgical procedures was surgical site infection (SSI). In contrast, for patients with malignant conditions, the most prevalent complication was the need for intraoperative or postoperative blood transfusion, followed by surgical site infections. Overall, 58 (16%) patients required intraoperative blood transfusions. Postoperative readmission rates were 2.4% for benign cases and 6.4% for malignant cases, with SSI being the leading cause of readmission. Multivariable analysis revealed that being underweight (AOR 3.82, 95% CI 1.39–10.50), overweight (AOR 1.73, 95% CI 1.02–2.94), and having a postoperative diagnosis of malignancy (AOR 3.23, 95% CI 1.96–5.34) were significantly associated with an increased risk of postoperative complications.

CONCLUSION: Postoperative complication rates after gynecologic surgeries are similar to those found in other global studies. This suggests that complications following these surgeries—particularly in patients with malignancies—are not uncommon, with a reported mortality rate of 1.6%. The study adds valuable new insights to the existing literature by focusing on postoperative complications following gynecologic surgeries. It underscores the importance of improving surgical techniques and postoperative care, which can inform clinical practices and guide future research aimed at enhancing care quality in this field.

KEYWORDS: Postoperative complication; Gynecologic surgeries; Oncology

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1 Assistant Professor in Obstetrics and Gynecology and Gynecologic Oncology sub-specialist fellow at Addis Ababa University College of health science department of Obstetrics and Gynecology

INTRODUCTION

Postoperative complications refer to any deviation from the expected recovery process following surgery. While all surgical procedures carry inherent risks, the likelihood of complications varies based on multiple factors. Surgeons aim to reduce risks and carry out surgeries without complications; however, despite their best efforts, complications can still occur, affecting patient outcomes. The Clavien-Dindo classification system is widely used to evaluate these complications[1–3].

In low- and middle-income countries, postoperative complications following elective surgery are estimated to occur in 11% of cases[2]. In contrast, studies suggest that the 30-day postoperative complication rate after gynecologic surgery ranges from 0.2% to 26%[2,5–7]. For instance, a study in the USA reported overall complication rates of 7.9% for benign gynecologic surgeries and 19.4% for malignant cases[8]. Among the most frequent complications identified in the literature are postoperative infections, particularly surgical site infections[2,9–11]. Several factors, such as the Eastern Cooperative Oncology Group (ECOG) performance status, age, American Society of Anesthesiologists (ASA) score, and comorbidities, have been associated with these complications[3,11].

In recent years, there has been a noticeable trend of increased postoperative complications in patients with malignant gynecologic conditions compared to those with benign ones. These complications, including blood transfusions, infections, and readmissions, are notably more frequent in cases of ovarian cancer and other gynecologic cancers. For instance, studies conducted in the USA have found that the complication rate for malignant cases is significantly higher (19.4%) than for benign cases (7.9%)[8]. Additionally, surgical site infections (SSIs) and readmission rates are also elevated in oncologic surgeries[12–16].

This shift can be attributed to the increased complexity of surgeries for malignant conditions, which often involve more extensive procedures such as cytoreductive and debulking surgeries, both of which carry higher risk (17). Additionally, the higher rate of complications is likely associated with factors such as the patient's overall health, the advanced stage of cancer, and the requirement for multiple treatments throughout the course of care[18].

Different studies on 30-day postoperative readmission rates after gynecologic surgery indicate that rates vary from 4% to 20.6%, with higher rates associated with malignant cases compared to benign cases[12–16].

While numerous studies have assessed postoperative outcomes after gynecologic oncology surgery in developed countries and have sought to create predictive models for complication rates, no such studies have been conducted in Ethiopia[6,8,12,13]. The context of gynecologic oncology care is unique, as patients may require both medical and surgical interventions, regardless of a cancer diagnosis. Understanding the rate of postoperative complications and their causes is crucial for evaluating the quality of surgical care. To enhance patient care in gynecologic oncology, it is essential to identify the rate of complications and associated factors. Thus, we conducted a retrospective comparative cross-sectional study focusing on all patients who presented with postoperative complaints. The objective of this study was to assess 30-day postoperative complications after gynecologic surgeries at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia.

Methods

Study Setting:

The study was conducted at Tikur Anbessa Specialized Hospital, a university teaching hospital located in Addis Ababa, the capital of Ethiopia.

Study Design:

A retrospective comparative cross-sectional study was conducted. Patients who underwent surgeries for gynecologic oncology were compared with those who underwent surgeries for benign gynecologic conditions.

Study Population:
The study included women diagnosed with and treated for gynecologic diseases at Tikur Anbessa Specialized Hospital during the specified timeframe.

Eligibility Criteria:
The inclusion criteria consisted of patients who underwent gynecologic oncologic and benign surgeries between January 2021 and December 2023 and experienced postoperative complications within 30 days. Only patients with complete medical charts were included in the study, while those with incomplete chart information were excluded.

Sample Size Determination:
The sample size was calculated using Epi Info software, based on the prevalence of postoperative complications reported in a previous study conducted in Ethiopia (24), which found a prevalence of 32.6%. A confidence level ($Z\alpha/2$) of 1.96, corresponding to a 5% alpha value, and a power level ($Z\beta$) of 80% ($\beta = 0.84$) were applied. Using these parameters, the total sample size was determined to be 337.

Sampling Procedure:
Although the sample size was calculated based on the assumptions above, all patients treated during the study period were included in the study.

Data Collection Methods:
Data were collected using a structured questionnaire adapted from existing literature and modified to extract relevant information from patients' files. The data collection was conducted by doctors specializing in obstetrics and gynecology, who received half-day training on the study's objectives and the data collection tool. The principal investigator ensured the completeness of the data at each stage. The collected data were cleaned, coded, and entered into SPSS for analysis.

Variables
Dependent Variable:
- 30-day postoperative complication rate

Independent Variables:
- Age
- BMI
- ASA (American Society of Anesthesiologists) grade
- Length of preoperative hospital stay
- Final diagnosis (oncologic vs. benign)
- Receipt of neoadjuvant chemotherapy

Operational Definitions:
Postoperative complication: Any deviation from the normal postoperative course, as defined by the revised Clavien-Dindo surgical complication classification[1]. Patients with any such deviation were classified as having a postoperative complication; those without were classified as having no complication.
30-day postoperative period: The time period following surgery during which complications are monitored. A 30-day window was chosen under the assumption that most patients return at least once for follow-up and that most surgery-related complications occur within this timeframe[19].
Blood transfusion: A transfusion initiated during surgery and continued postoperatively was considered a postoperative complication.
BMI classification: Underweight (<18.5), normal weight (18.5–24.9), overweight (≥25.0), and obese (≥30.0)[20].
ECOG Performance Status: Scale ranges from 0 (fully active) to 5 (dead), with intermediate scores reflecting levels of restricted activity and self-care (21).
ASA Score: A subjective assessment of overall health classified as:
1 – Healthy patient
2 – Mild systemic disease
3 – Severe systemic disease (not incapacitating)
4 – Incapacitating disease (constant threat to life)
5 – Moribund (not expected to survive 24 hours with or without surgery)[22]

Neoadjuvant chemotherapy (NACT): Chemotherapy administered before surgery or radiation to shrink a tumor. Also known as primary or induction chemotherapy[23].

Data Analysis:

The completed checklists were reviewed for completeness, cleaned, coded, and entered into SPSS version 23 for analysis. Descriptive statistics were used to summarize the cohort data using frequencies, percentages, means, medians with interquartile ranges (IQRs), and standard deviations. The Shapiro–Wilk test was used to assess data normality. Categorical variables were compared using the chi-square test. Both binary and multiple logistic regression analyses were performed to identify factors associated with complications, with statistical significance set at $p < 0.05$. Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) were calculated for predictors of 30-day postoperative complications. Results were presented in the form of text, graphs, figures, and tables.

Ethical Considerations:

To ensure patient safety and privacy, ethical approval and a waiver of informed consent were obtained from the Department of Research and Publication Committee (DRPC), under IRB number DRPC 2024/08/22_2. This waiver allowed for the use of existing patient records without direct interaction, thereby minimizing risk. All data were handled with strict confidentiality in compliance with ethical standards for research involving human subjects.

Results

A total of 355 patients who underwent gynecologic surgery were analyzed during the study period, with 118 classified as benign and 237 as malignant cases preoperatively. The median age of patients with malignant conditions was significantly higher, with a median of 48 years (Interquartile Range [IQR] 40–60), compared to 37 years (IQR 30–45) for those with benign conditions. Notably, 62% of oncologic patients were postmenopausal, while only 20.8% of benign patients fell into this category (table 1&2).

Table 1 : Sociodemographic Characteristics of Patients in the Study on 30-Day Postoperative Complications following Gynecologic Surgery at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia from January 2021 – December 2023 G.C.

Variables		Frequency	Percent(%)
Age			
	<20	6	1.7
	20-30	56	15.8
	31-40	108	30.4
	41-50	85	23.9
	51-60	51	14.4
	>60	49	13.8
Menopausal status			
	Premenopause	204	57.5
	Postmenopause	151	42.5
Parity			
	Nulliparous	106	29.9
	Primiparous	63	27.7
	multiparous	186	52.4
Religion (n= 114)			
	orthodox	68	59.6
	protestant	25	21.9
	Muslim	12	10.5
	catholic	1	0.9
	Other *	8	7

* those described as others are Jehovah witness, only Jesus and Adventist religion followers

Table 2: Clinical characteristics of Patients in the Study on 30-Day Postoperative Complications Following Gynecologic Surgery at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia from January 2021 – December 2023 G.C.

Variables		Frequency	Percent(%)
Medical illness			
	No medical illness	226	63.7
	HTN	40	11.3
	DM	7	2.0
	HIV	54	15.2
	other	28	7.9
BMI			
	normal	206	58
	underweight	19	5.4
	overweight	99	27.9
	obese	7	2
	Unknown	24	6.8
ECOG performance (n= 342)			
	0	319	93.2
	1	20	5.8
	3	3	0.9
Pre-Operative diagnosis			
	ovarian cancer	104	29.3
	cervical cancer	74	20.8
	vulvar cancer	22	6.2
	endometrial cancer	20	5.6
	uterine sarcoma	11	3.1
	Gestational trophoblastic neoplasm	5	1.4
	vaginal cancer	1	0.3
	benign tumor	118	33.2
ASA grade			
	1	76	21.4
	2	242	68.2
	3	37	10.4

Preoperative and Postoperative Complications in Gynecologic Surgery

Preoperative transfusions were administered to 10 patients, with 4 (2.1%) in the oncologic group and 6 (3.6%) in the benign group receiving transfusions. Serum albumin levels indicated that 30% of oncologic patients experienced hypoalbuminemia compared to 1.7% of benign cases. Additionally, 12.3% of oncologic patients received neoadjuvant chemotherapy (NACT), with a median interval of 3 months to surgery afterward.

Postoperatively, 23.2% of presumed oncologic cases were found to have benign histopathology. Among benign surgeries, the most common procedures included myomectomy (48 patients) and total abdominal hysterectomy (TAH, 31 patients), with 20.3% experiencing complications, primarily anemia and surgical site infections (SSI). In contrast, among the 104 patients with presumed ovarian cancer, 40.3% developed complications, including blood transfusions, SSIs, and other issues like deep vein thrombosis and fascial dehiscence. For vulvar cancer, 45.4% of patients experienced postoperative complications. Patients diagnosed with gestational trophoblastic neoplasia also had complications, with one requiring blood transfusion and others experiencing SBO or SSI.

Table 3: A 30-Day Postoperative Complications following Gynecologic Surgeries at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia from January 2021 – December 2023 G.C.

Type of Post OP complication	Total (N=110)	Percent
Surgical site infection	31	28,2%
Deep vein thrombosis	1	0.9%
Mortality	3	2.7%
Cardiac disease	1	0.9%
Acute urinary retention	1	0.9%
Postoperative blood transfusion	37	33.6%
Small bowel obstruction	4	3.6%
Fascial dehiscence	3	2,7%
Urinary tract infection	4	3.6%
Acute kidney injury	1	0.9%
Anemia	14	12.75
Hospital acquired infection	7	6.3%
Pelvic peritonitis	1	0.9%
Electrolyte abnormality	2	1.8%

Overall, the study reported a 31% postoperative complication rate, with a median onset of complications occurring around 8 days for malignant cases and 7.5 days for benign cases. Among histopathologically confirmed malignancies, 41.2% developed complications compared to 19.6% of benign cases. The most frequent complications in benign surgeries were SSIs, while malignant cases primarily experienced postoperative blood transfusions. Unfortunately, there were three postoperative deaths among malignant cases within the 30-day follow-up period (table 3).

Regarding blood transfusions, 58 patients (16.3%) required intraoperative transfusions, with 8.3% of benign and 23.5% of malignant patients receiving transfusions. The median intraoperative blood loss was 250 ml for benign cases and 400 ml for malignant cases, with an average of two units of blood transfused for both groups. The postoperative readmission rate was 4.5% overall, with 2.4% for benign cases and 6.4% for malignant cases, primarily due to SSIs.

Univariate analysis revealed several significant associations with complications, including age, parity, menopausal status, presence of medical illness, BMI, preoperative transfusions, NACT, final diagnosis, length of preoperative hospital stay, and ASA grade, with p-values less than 0.25. Multivariate analysis showed that the likelihood of complications was 2.7 times greater in malignant cases compared to benign, and that underweight patients had a threefold increased risk, while overweight patients faced a 1.7-fold increased risk of postoperative complications compared to those with normal BMI across all groups (both benign and malignant). Each additional day a patient stay in the ward before surgery increases the likelihood of postoperative complications by 4.4%. (table 4).

Table 4: Predictors of postoperative complication of Patients in the Study on 30-Day Postoperative Complications Following Gynecologic Surgery at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia from January 2021 – December 2023 G.C.

Variable	P value	COR 95% CI	P value	AOR 95% CI
Age (per 1 year increase)	0.076	1.01(0.99-1.03)	0.652	0.99(0.96-1.02)
Parity:				
Nulliparous	-	1		1
Primi-parous	0.05	2.04(1.01-4.13)	0.08	2.01(0.93-4.38)
Multiparous	0.42	1.26(0.72-2.19)	0.95	0.98(0.5201.84)
Menopausal status: ref: postmenopausal	0.03	0.59(0.37-0.93)	0.50	0.82(0.45-1.48)
Known medical illness: ref: Yes	0.12	1.457(0.90-2.35)	0.92	1.03(0.60-1.77)
BMI				
Normal	-	1	-	1
Underweight	0.06	2.47(0.95-6.40)	0.03	3.16(1.12-8.99)*
Overweight	0.06	1.64(0.98-2.73)	0.04	1.73(1.02-2.95)*
Obese	0.35	2.06(0.45-9.49)	0.29	2.37(0.48-11.6)
ECOG performance status	0.57	-	-	
Preoperative blood transfusion given: ref: Yes	0.21	0.45(0.13-1.58)	0.28	0.47(0.12-1.85)
NACT given: ref: yes	0.03	0.39(0.17- 0.92)	0.25	0.575(0.23-1.46)
Final diagnosis: ref: Benign	< 0.01	2.57(1.57-4.20	< 0.01	2.70(1.59-4.53)*
Preoperative length of hospital stays in days: continuous	0.08	1.06(1.01-1.10)	0.05	1.04(1.01-1.09)*
ASA grade				
ASA 1		1	-	1
ASA 2	1.04	0.56(0.28-1.13)	0.22	0.63(0.30-1.32)
ASA 3	0.01	0.31(0.13-0.75)	0.29	0.59(0.22-1.56)
Intraoperative transfusion: ref: yes	0.99	- -	-	

Discussion

In this study, the overall postoperative complication rate was 31%, with 41.2% of patients with malignancies experiencing complications. Intraoperative or postoperative blood transfusion was the most common complication, followed by surgical site infections (SSI). The 30-day postoperative mortality rate was 1.6%. Comparable to this study, a study conducted in Ethiopia assessing the postoperative complication rate following hysterectomy found a rate of 32.6%[24]. While no studies directly compare complications between benign and malignant gynecologic cases, a study by Sumer K. Wallace et al. reported complication rates of 19.4% for malignant cases and 7.9% for benign cases after hysterectomy[8]. This finding aligns with a study by Ikram et al. in Yemen, where 30.6% of patients developed postoperative complications[2]. Similarly, in Bangladesh (2014), 30.0% of gynecologic surgeries led to postoperative complications. Additionally, a study by Lambrou N. et al. in Baltimore, Maryland (USA, 2000), found that 33% of patients developed postoperative complications following gynecologic surgeries[25,26].

The majority of these complications occurred in patients who underwent surgery for ovarian cancer (40%). A study conducted in Sweden evaluating postoperative complications after cytoreductive surgery for ovarian cancer reported a complication rate of 65%, while a similar study by Kati et al. in 2022 reported a 76% postoperative complication rate following extensive debulking surgery[27,28]. The lower complication rate observed in this study may be attributed to the retrospective study design, where incomplete data recording may have led to an underestimation of the true prevalence of the primary outcome.

In this study, the risk of developing postoperative complications was nearly three times greater in underweight patients and two times greater in overweight patients compared to those with a normal BMI. Wound infection was one of the most frequent postoperative complications observed. This result is consistent with existing literature, which shows that the risk of wound infection increases with higher BMI compared to normal BMI after abdominal surgery[29,30].

The risk of postoperative complications was found to be more than 2.7 times higher for malignant cases compared to benign cases. Most benign patients underwent myomectomy and simple hysterectomy, while more complex procedures were performed for malignant conditions. These findings suggest a correlation between the extensive procedures carried out in malignancy cases and the increased rates of associated complications.

In our study, 16.3% of patients received intraoperative blood transfusions, and 23.5% of postoperative malignant patients were transfused, with a median (IQR) of 2 (1–3) units transfused. In contrast, a study conducted in India reported a blood transfusion rate of 3.69%, which is lower than the rate observed in our study. One possible explanation for this is that the majority of the Indian study population consisted of benign gynecologic cases[9]. Another study conducted in the USA reported an overall transfusion rate for gynecologic oncologic cases after laparotomy of 22.4%[24], which is more consistent with the findings of this study. Similarly, studies by Jaron M. et al. and Sumer K. Wallace et al. reported transfusion rates of 5.9% and 18%, respectively, both lower than the rate observed in our study[32,33].

The postoperative readmission rates in this study were 2.4% for benign patients and 6.4% for malignant patients. Readmissions were more frequent among patients undergoing surgery for malignancy compared to those treated for benign conditions. Surgical site infection was the most common cause of readmission.

In comparison, Lorry C. et al. reported readmission rates of 3% for benign cases and 8.2% for oncologic cases[12]. A similar study conducted in Saudi Arabia found unplanned readmission rates of 9.4% for benign conditions and 7.7% for malignant conditions[34]. Additionally, Lori A. et al. reported readmission rates of 1.75% for benign cases and 5% for oncologic cases, while Morell A. et al.

found an overall readmission rate for gynecologic oncologic cases of 3.5% (13,35). Other studies have reported readmission rates ranging from 4.3% to 20.9%[14,15,16].

This study was conducted at a single center, limiting the generalizability of the findings. However, the inclusion of all patients in the analysis helps to mitigate this limitation. Additionally, the retrospective nature of data collection meant that incomplete patient files led to missing values, which may have affected the assessment of risk factors and their association with outcomes. The most commonly missing data were BMI values, absent in 6.8% of patient charts. Furthermore, patients who presented with postoperative complications to other centers may not have been captured by our data collection method.

Conclusion and Recommendation

Postoperative complication rates following gynecologic surgeries are similar to those reported in other global studies. This suggests that complications—particularly among patients with malignancies—are not uncommon, with a reported mortality rate of 1.6%. Key risk factors such as BMI and the nature of the diagnosis should be considered during preoperative evaluations to identify high-risk patients. This study provides valuable insights by focusing on postoperative complications in gynecologic surgeries. It underscores the need for improved surgical techniques and postoperative care, which could inform clinical practice and guide future research to enhance quality of care. Recommendations for improving outcomes include comprehensive preoperative assessments, structured postoperative monitoring, and further research on risk prediction. These measures may improve patient care and surgical outcomes in gynecologic surgery.

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Availability of Data and Materials

The datasets used and analyzed during this study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare no conflicts of interest.

Authors' Contributions

The principal investigators and authors were entirely responsible for the study design, conduct, and data analysis.

Corresponding author:

Binyam Esayas Abuye (naniesayas@gmail.com),
Esayas Berhanu: (esayasberhanu2012@gmail.com),
Yirgu Gebrehiwot (yirgug@yahoo.com),
Husnia Hussen (hanawiluelue@gmail.com), and
Dawit Dessalegn (mdawitd@gmail.com)

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