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Surgical Outcomes and Factors Linked to Postoperative Complications in Patients with Genital Prolapse in North-Eastern Democratic Republic of the Congo

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Abstract

Introduction: Genital prolapse is a common condition affecting women, often requiring surgical intervention. In low-resource settings like the North-Eastern Democratic Republic of the Congo (DRC), understanding surgical outcomes and factors contributing to postoperative complications can help improve healthcare delivery and patient outcomes. This study aims to evaluate the surgical outcomes and identify factors linked to postoperative complications in patients undergoing surgery for genital prolapse in the North-Eastern Democratic Republic of the Congo (DRC). **Methods:** A prospective cohort study was conducted, involving patients who underwent surgery for genital prolapse in healthcare facilities in Butembo, North-Eastern DRC, from 1st January to 30th September, 2024. It included 112 women who underwent surgery for genital prolapse. Data were collected from patient records, including demographic information, surgical details, and postoperative complications. Complications were defined as any adverse event occurring within 3 months post-surgery. Patients were followed up to track immediate and short-term outcomes. Statistical analysis was performed to identify factors associated with adverse outcomes using R version 4.4.0 software. **Results:** Of the 112 patients included, 11.6% experienced postoperative complications. The most common complications were bladder injury (15.4%), the most common intraoperative complication, and urinary incontinence (30.7%), the most frequent postoperative

complication. Factors significantly associated with complications in the multivariate analysis included advanced age of 50 years or older (OR = [8.95], 95% CI: [1.51 - 174]), overweight or obese (OR = [4.97], 95% CI: [1.26 - 20.9]), comorbidities (OR = [8.84], 95% CI: [2.09 - 51.0]), promontofixation (OR = [38.8], 95% CI: [1.11 - 1,447]), and colpocleisis (OR = [17.4], 95% CI: [1.76 - 411]). **Conclusion:** Surgical intervention for genital prolapse in this region is generally effective; however, certain factors, such as advanced age (50 years or older), obesity, comorbidities, and specific surgical procedures (promontofixation and colpocleisis), increase the risk of postoperative complications. Targeted interventions to address these risk factors could improve patient outcomes and reduce complications. These findings underscore the importance of carefully considering these factors in surgical planning to mitigate complication risks. This study provides valuable data that can help refine surgical approaches and improve healthcare delivery in similar contexts.

Keywords

Genital Prolapse, Surgical Outcomes, Postoperative Complications, Democratic Republic of the Congo, Risk Factors

1. Introduction

Genital prolapse, commonly defined as the descent of pelvic organs into or through the vaginal canal, remains a prevalent issue affecting women globally [1]. In sub-Saharan Africa, including the Democratic Republic of the Congo (DRC), its prevalence is often underreported due to cultural stigmas, limited access to healthcare, and a lack of diagnostic facilities [2]. The condition significantly impacts the quality of life by causing discomfort, urinary and fecal incontinence, and sexual dysfunction [3]. Surgical intervention, commonly through vaginal, abdominal, or laparoscopic routes, is considered the most effective treatment for advanced stages of prolapse [4]. However, in low-resource settings such as North-Eastern DRC, outcomes can be suboptimal due to various contributing factors, including limited surgical expertise, lack of infrastructure, and poor preoperative and postoperative care [5].

Postoperative complications following pelvic organ prolapse surgeries include infection, hemorrhage, organ perforation, recurrence of prolapse, and prolonged hospital stays [6]. In low-income regions, these complications are exacerbated by factors such as malnutrition, anemia, comorbidities like HIV/AIDS, and delays in seeking medical attention [7]. Moreover, the scarcity of trained healthcare providers and inadequate follow-up care further complicate recovery [8]. For instance, recurrence rates of prolapse are higher in regions with limited access to skilled surgical interventions, and delayed identification of complications is common [9]. Autologous vaginal surgery, now much more commonly performed with the removal of vaginal mesh, yields the same results in terms of improved quality of life as the abdominal approach but remains associated (when sacrospinous fixation

alone is considered) with a higher recurrence rate than promontofixation. According to Schiavi [10], the cure rate was 97.3% with an improvement in women's quality of life.

Epidemiological studies have reported reintervention rates of around 30%. Although it is a benign condition, genital prolapse can be a source of major disability, especially when associated with urinary incontinence [11] [12].

The surgical treatment of recurrent genital prolapse is one of the challenges in gynecological surgery, and the solutions implemented vary considerably among patients [12]-[14]. Vaginal hysterectomy is the most commonly performed surgical procedure worldwide for uterine prolapse. However, the practice of hysterectomy for uterine prolapse is not evidence-based, and the question of whether or not the uterus should be removed is a subject of debate [13]. Despite these challenges, research on surgical outcomes and risk factors in this region remains scarce, emphasizing the need for more data-driven strategies to improve patient care.

This study aims to evaluate the factors associated with postoperative complications in women undergoing surgery for genital prolapse in North-Eastern DRC, with a focus on the types of surgical interventions and their outcomes. Understanding these factors can lead to targeted interventions that reduce complications and improve recovery times in similar low-resource settings.

2. Objectives

The objective of this study is to assess the prevalence and predictors of postoperative complications in patients undergoing surgery for genital prolapse in North-Eastern DRC. We hypothesize that poor preoperative health conditions, the type of surgical approach, and limited postoperative care significantly contribute to adverse outcomes in this population.

3. Materials and Methods

3.1. Study Design

This was a prospective cohort study aimed at evaluating the surgical outcomes and identifying factors linked to postoperative complications (patient-related and procedure-related factors) in the North-Eastern Democratic Republic of the Congo (DRC). The study was conducted between 1st January and 30th September, 2024 at three major hospitals in North-Eastern DRC with a high volume of gynecological surgeries, a good organization of gynecology services, the presence of at least one gynecologist in each structure and with the existence of a technical platform adapted to the management of genital prolapse in the context of resource-limited countries, including Cliniques Universitaires du Graben (CUG), Matanda Teaching Hospital, Fistula program Clinic (FISPRO).

3.2. Study Population

The study included adult female patients who underwent surgical repair for gen-

ital prolapse at Cliniques Universitaires du Graben (CUG), Matanda Hospital, and Fistula program Clinic (FISPRO). Inclusion criteria consisted of women diagnosed with stage II or higher pelvic organ prolapse (according to the Pelvic Organ Prolapse Quantification [POP-Q] system) who underwent either vaginal or abdominal prolapse surgery and who signed the consent form. Pregnant women, women under 18 years of age, and those who declined to participate in the study were excluded.

3.3. Sample Size

Based on previous studies and a pilot review of medical records, a total of 112 adult female patients were included in the analysis. The sampling was exhaustive, and the sample size was calculated to provide sufficient statistical power (80%) to detect significant differences in postoperative complication rates, with a confidence level of 95%.

3.4. Surgical Procedure

Two main types of surgical approaches were performed:

1) Vaginal surgery: including anterior and/or posterior colporrhaphy, with or without vaginal hysterectomy.

2) Abdominal surgery: including sacrocolpopexy or sacrohysteropexy.

The choice of surgical technique was based on the patient's prolapse severity, surgeon preference, and availability of surgical materials. Surgeries were performed by experienced gynecological surgeons following standard operating protocols.

3.5. Data Collection

Data collection was prospective. A pre-prepared data collection form allowed us to gather relevant information from patients who underwent surgery for genital prolapse. During this study, patients with prolapse, after their eligibility was assessed and their written and informed consent obtained, were examined to determine the type of prolapse and then operated on according to the type of genital prolapse by a team consisting of a general surgeon, a urogynecologist, two obstetrician-gynecologists (all with five years of experience), and a member of the research team. All complications related to the procedure were investigated and recorded by the entire surgical team and a member of the research team during the perioperative period and/or in the immediate postoperative period (the first 48 hours), at hospital discharge (8-12 days), and three months later, looking for physical, sexual, digestive, and urinary signs related to the genital prolapse.

The variables for the study were collected on a data collection form. Age, origin, level of education, profession, socioeconomic level, gravidity, parity, history of cesarean section, perineal tear, hysterectomy, pelvic surgery, body mass index, menopausal status, notion of hypertension, type, degree of prolapse, pathologies associated with prolapse, approach, type of intervention or procedure performed,

evolution and types of complications in the immediate peri- and postoperative period and 3 months after and were categorized as minor or major based on severity. The patients underwent surgery under spinal anesthesia with intraoperative antibiotic prophylaxis consisting of two grams of ceftriaxone administered by slow intravenous injection. Resumption of sexual activity was recommended two and a half months post-surgery. The primary outcome measure was the absence of recurrence of genital prolapse symptoms three months after surgery.

3.6. Outcome Measures

The primary outcome was the rate of postoperative complications, including infection, hemorrhage, urinary retention, prolapse recurrence, and wound dehiscence. Secondary outcomes included failures, reoperation rates, and patient-reported satisfaction (using a standardized questionnaire administered postoperatively).

3.7. Statistical Analysis

Data were entered into Microsoft Office LTSC 2021 using R version 4.4.0 for statistical analysis. Descriptive statistics were calculated for baseline characteristics and postoperative outcomes. Continuous variables were expressed as means ± standard deviations, and categorical variables were presented as frequencies and percentages. Chi-square tests and independent t-tests were used to compare baseline characteristics between groups with and without complications. For all variables significant in bivariate analysis, a multivariate model of logistic regression was performed to identify independent predictors of postoperative complications, adjusting for potential confounders. A p-value < 0.05 was considered statistically significant. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to quantify the strength of associations.

3.8. Ethical Considerations

The study protocol was reviewed and approved by the Institutional Review Board (IRB) of Catholic University of Graben, in compliance with the ethical standards for research involving human subjects (IRB number: PMS. 02/24/UCG/CERM). Informed consent was obtained, and patient confidentiality was strictly maintained throughout data collection and analysis.

4. Results

4.1. Profile of Genital Prolapse Operations

4.1.1. Sociodemographic Characteristics of Women Who Underwent Surgery for Genital Prolapse

The sociodemographic characteristics of the respondents are presented in Table 1. Indeed, the majority of the respondents had an average age of 55.5 years, came from rural areas (85.7%), were illiterate (56.3%), farmers (85.7%), and poor and very poor (58.9%).

Table 1. Distribution of cases according to sociodemographic characteristics.

Variables	N	N = 112[1]
Age (Year)		
Average age	112	55.5 (13.9)
Age Ranges (Year)		
<50		35 (31.3%)
≥50		77 (68.8%)
Place of Origin	112	
Rural		96 (85.7%)
Urban		16 (14.3%)
Level of Education	112	
Illiterate		63 (56.3%)
Primary		32 (28.6%)
Secondary		16 (14.3%)
Superior		1 (0.9%)
Occupation	112	
Farmer		96 (85.7%)
Housewife		14 (12.5%)
Teacher		2 (1.8%)
Socioeconomic Level	112	
Poor/very poor		66 (58.9%)
Average		25 (22.3%)
Rich		21 (18.8%)

[1]Mean (SD); n (%).

4.1.2. Gynecological and Obstetric Characteristics of Patients Operated on for Genital Prolapse

The characteristics of the gynecological and obstetrical history of the respondents are presented in Table 2. Indeed, the majority of respondents were multiparous and grand multiparous in 80.4% of cases, and had a history of perineal tear (35.7%). of pelvic surgery (20.5%) and cesarean section (10.7%).

4.1.3. Environmental Characteristics

Table 3 distributes the cases according to the patient's background. Indeed, the patients who underwent prolapse surgery had a normal BMI (80.4%), were menopausal (74.1%), and had hypertension in 9.8% of cases.

Table 2. Distribution of cases according to gynecological and obstetric characteristics.

Variables	N	N = 112[1]
Gesture		
Average	112	8.3 (3.3)
Category		
Multi-gesture and large-scale multi-gesture		83 (74.1%)
Paucigete		27 (24.1%)
Primigest		2 (1.8%)
Parity	112	
Average		8.0 (3.2)
Category		
First-time mother		2 (1.8%)
Paucipare		20 (17.9%)
Multiparous and Grand Multiparous		90 (80.4%)
History of Cesarean Section	112	
Yes		12 (10.7%)
No		100 (89.3%)
History of Perineal Tear	112	
Yes		40 (35.7%)
No		72 (64.3%)
History of Hysterectomy	112	
Yes		2 (1.8%)
No		110 (98.2%)
History of Pelvic Surgery	112	
Yes		23 (20.5%)
No		89 (79.5%)

[1]Mean (SD); n (%).

Table 3. Distribution of cases according to environmental characteristics.

Variables	N	N = 112
BMI	112	
Thinness		14 (12.5%)
Normal		75 (67.0%)
Overweight/Obesity		23 (20.5%)

Continued

Average BMI	112	22.2 (3.9)
Menopause	112	
Yes		83 (74.1%)
Under 20 years old		55 (66.3%)
20 years old or above		28 (33.7%)
No		29 (25.9%)
HTA	112	
Yes		11 (9.8%)
No		101 (90.2%)

4.1.4. Clinical Profile of Operated Patients (Type, Degree, and Pathologies Associated with Genital Prolapse)

The type, degree, and associated pathologies of genital prolapse are presented in Table 4. Indeed, the patients who underwent surgery more frequently had cystocele (44.4%) and prolapse involving all three levels of the pelvis (33%). Third- and fourth-degree prolapse were predominant, occurring in 77.7% and 14.3% of cases, respectively. Vesicovaginal fistula was the associated pathology in 18.8% of cases.

Table 4. Distribution of cases according to type, degree of prolapse, and associated pathologies.

Variables	N	N = 112
Types of Prolapse	112	
Cystocele		50 (44.4%)
Hysterocele		11 (9.8%)
Rectocele		14 (12.5%)
Mixed		37 (33%)
Degree of Prolapse	112	
Two		9 (8.0%)
Four		16 (14.3%)
Three		87 (77.7%)
Associated Pathologies	112	
Cervical cancer		3 (2.6%)
Uterine fibroids		6 (5.4%)
Vesicovaginal fistula		21 (18.8%)
Urinary incontinence persistant		4 (3.6%)
None		78 (69.6%)

4.1.5. Types of Surgical Intervention

Table 5 categorizes the cases according to the type of surgical intervention. Indeed, patients with genital prolapse underwent vaginal surgery (95.5%). Anterior colporrhaphy was the most frequently performed procedure (44.6%), followed by triple perineal surgery with hysterectomy in 22% of cases.

Table 5. Distribution of cases according to the type of surgical intervention.

Variables	N	N = 112
Surgical Approach	112	
Vaginal		107 (95.5%)
Abdominal		5 (4.5%)
Types of Intervention	112	
CA*		50 (44.6%)
TOP*+ Hysterectomy		26 (23.2%)
CPP		14 (12.5%)
CA + Hysterectomy		10 (8.9%)
Promontofixation		4 (3.6%)
CPP* + Hysterectomy		2 (1.8%)
Hysterectomy		2 (1.8%)
Manchester intervention		2 (1.8%)
Hysterectomy + Colpocleisis		1 (0.9%)
Richardson's intervention		1 (0.9%)

*CA: anterior colporrhaphy, TOP: triple perineal operation, CPP: posterior and perineal colporrhaphy.

4.1.6. Evolution and Types of Complications

Table 6 distributes the cases according to the evolution and types of complications. Indeed, the evolution of the operated patients was marked by complications in 11.6% of cases, and the major intraoperative complication was bladder injury in 15.4% of cases, and in the middle or late postoperative period, urinary incontinence in 30.7% of cases.

Table 6. Distribution of cases according to progression and types of complications.

Variables	N	N = 112
Evolution	**112**	
No complications		99 (88.4%)
With complications		13 (11.6%)
Types of Complications	**13**	

Continued

Early	**5** (38.4%)
Bladder injury	2 (15.4%)
Rectal lesion	1 (7.6%)
Bleeding	2 (15.4%)
Medium/Late	8 (61.6%)
Urinary incontinence	4 (30.7%)
Surgical wound infection	1 (7.6%)
Urinary tract infection	1 (7.6%)
Chronic pelvic pain	1 (7.6%)
Recidivism	1 (7.6%)

4.2. Analysis of Factors Associated with the Occurrence of Postoperative Complications

1) Sociodemographic Factors

The sociodemographic factors associated with the occurrence of postoperative complications are presented in Table 7. Indeed, age over 50 years (p-value = 0.002) and low socioeconomic level (poor or very poor) [p-value = 0.024] were factors associated with the occurrence of operative complications.

Table 7. Distribution of cases according to sociodemographic factors.

Variables	With Complications N = 13[1]	No Complications N = 99[1]	Total N = 112[1]	p-Value[2]
Age (In Years)				
Average (ET)	65.2 (9.8)	54.3 (13.9)	55.5 (13.9)	**0.002**
Age ranges				0.060
<50	1 (7.7%)	34 (34.3%)	35 (31.3%)	
≥50	12 (92.3%)	65 (65.7%)	77 (68.8%)	
Level of Education				0.2
Illiterate	5 (38.5%)	58 (58.6%)	63 (56.3%)	
Primary	4 (30.8%)	28 (28.3%)	32 (28.6%)	
Secondary	4 (30.8%)	12 (12.1%)	16 (14.3%)	
Higher education/university	0 (0.0%)	1 (1.0%)	1 (0.9%)	
Occupation				0.5
Farmer	10 (76.9%)	86 (86.9%)	96 (85.7%)	
Teacher	0 (0.0%)	2 (2.0%)	2 (1.8%)	
Housewife	3 (23.1%)	11 (11.1%)	14 (12.5%)	

Continued

Socioeconomic Level				**0.024**
Average	1 (7.7%)	24 (24.2%)	25 (22.3%)	
Poor/very poor	11 (84.6%)	55 (55.6%)	66 (58.9%)	
Rich	1 (7.7%)	20 (20.2%)	21 (18.8%)	

[1]Mean (SD); n (%); [2]Student's t-test; Fisher's exact test.

2) Gynecological and Obstetric Factors

The gynecological and obstetric factors associated with the occurrence of post-operative complications are presented in Table 8. Indeed, no factor was significantly associated with the occurrence of complications, although they were found in multi- and grand multiparous women, women with a history of perineal tearing, and menopausal women.

Table 8. Distribution of cases according to gynecological and obstetric factors.

Variables	With Complications N = 13[1]	No Complications N = 99[1]	Total N = 112[1]	p-Value[2]
Parity				
Average (ET)	8.8 (2.9)	7.9 (3.3)	8.0 (3.2)	0.3
Category				0.8
Multi/large multiparous	10 (76.9%)	80 (80.8%)	90 (80.4%)	
Paucipare	3 (23.1%)	17 (17.2%)	20 (17.9%)	
First-time mother	0 (0.0%)	2 (2.0%)	2 (1.8%)	
Perineal Tear				0.062
Yes	8 (61.5%)	32 (32.3%)	40 (35.7%)	
No	5 (38.5%)	67 (67.7%)	72 (64.3%)	
Hysterectomy				>0.9
Yes	0 (0.0%)	2 (2.0%)	2 (1.8%)	
No	13 (100.0%)	97 (98.0%)	110 (98.2%)	
History of Pelvic Surgery				0.14
Yes	5 (38.5%)	18 (18.2%)	23 (20.5%)	
No	8 (61.5%)	81 (81.8%)	89 (79.5%)	
Menopause				>0.9
Yes	10 (76.9%)	73 (73.7%)	83 (74.1%)	
No	3 (23.1%)	26 (26.3%)	29 (25.9%)	

[1]Mean (SD); n (%); [2]Student's t-test; Fisher's exact test.

3) Environmental Factors

Environmental factors associated with the occurrence of postoperative complications are presented in Table 9. Indeed, overweight/obesity (p-value = 0.041) was significantly associated with the occurrence of peri- or postoperative complications.

Table 9. Distribution of cases according to environmental factors.

Variables	With Complications N = 13[1]	No Complications N = 99[1]	Total N = 112[1]	p-Value[2]
BMI				**0.041**
Thinness	0 (0.0%)	14 (14.1%)	14 (12.5%)	
Normal	7 (53.8%)	68 (68.7%)	75 (67.0%)	
Overweight/Obesity	6 (46.2%)	17 (17.2%)	23 (20.5%)	
HTA				0.12
Yes	3 (23.1%)	8 (8.1%)	11 (9.8%)	
No	10 (76.9%)	91 (91.9%)	101 (90.2%)	

[1]n (%); [2]Fisher's exact test.

4) Clinical Factors

Clinical factors associated with the occurrence of postoperative complications are presented in Table 10. Indeed, the mixed type, *i.e.*, prolapse involving all three levels of the pelvis (p-value = 0.014), and the existence of pathologies associated with genital prolapse (p-value = 0.003), especially vesicovaginal fistula and cervical cancer (p-value < 0.001). were clinical factors significantly associated with the occurrence of peri- or postoperative complications.

Table 10. Distribution of cases according to clinical factors.

Variables	With Complications N = 131[1]	Without Complications N = 99[1]	Total N = 112[1]	p-Value[2]
Type of Prolapse				0.014
Cystocele	1 (7.7%)	49 (49.5%)	50 (44.6%)	
Hysterocele	2 (15.4%)	9 (9.1%)	11 (9.8%)	
Rectocele	3 (23.1%)	11 (11.1%)	14 (12.5%)	
Mixed	7 (53.8%)	30 (30.3%)	37 (33.0%)	
Degree of Prolapse				>0.9
Second	1 (7.7%)	8 (8.1%)	9 (8.0%)	
Third	10 (76.9%)	77 (77.8%)	87 (77.7%)	
Fourth	2 (15.4%)	14 (14.1%)	16 (14.3%)	

Continued

Associated Pathologies				0.003
Yes	9 (69.2%)	25 (25.3%)	34 (30.4%)	
No	4 (30.8%)	74 (74.7%)	78 (69.6%)	
Types of Pathologies				<0.001
Cervical cancer	2 (15.4%)	1 (1.0%)	3 (2.7%)	
Fibroid	2 (15.4%)	4 (4.0%)	6 (5.4%)	
Vesicovaginal fistula	3 (23.1%)	18 (18.2%)	21 (18.8%)	
Urinary incontinence	2 (15.4%)	2 (2.0%)	4 (3.6%)	

[1]n (%); [2]Fisher's exact test.

5) Factors Related to the Intervention

The intervention-related factors associated with the occurrence of postoperative complications are presented in Table 11. Indeed, the type of intervention, especially triple perineal surgery with hysterectomy, anterior colporrhaphy, and hysterectomy with posterior and perineal colporrhaphy (p-value = 0.032). was significantly associated with the occurrence of peri- or postoperative complications.

Table 11. Distribution of cases according to intervention-related factors.

Variables	With Complications N = 13[1]	No Complications N = 99[1]	Total N = 112[1]	p-Value[2]
Surgical Approach				0.5
Vaginal	12 (92.3%)	95 (96.0%)	107 (95.5%)	
Abdominal	1 (7.7%)	4 (4.0%)	5 (4.5%)	
Types of Interventions				**0.022**
CA	1 (7.7%)	49 (49.5%)	50 (44.6%)	
CA + Hysterectomy	3 (23.1%)	7 (7.1%)	10 (8.9%)	
CPP	3 (23.1%)	11 (11.1%)	14 (12.5%)	
CPP + Hysterectomy	0 (0.0%)	2 (2.0%)	2 (1.8%)	
Promontofixation	1 (7.7%)	3 (3.0%)	4 (3.6%)	
TOP + Hysterectomy	4 (30.8%)	22 (22.2%)	26 (23.2%)	
Others*	1 (7.7%)	5 (5.1%)	6 (5.4%)	

[1]n (%); [2]Fisher's exact test; Other*: Hysterectomy alone, Manchester procedure, Richardson procedure, and hysterectomy combined with colpocleisis.

4.3. Multivariate Analysis

4.3.1. Sociodemographic and Environmental Factors

Age and BMI were significantly associated with the occurrence of postoperative

complications (Table 12). Being 50 years of age or older increased the risk of postoperative complications 8.95-fold (p-value = 0.047). As for BMI, being overweight or obese increased this risk 4.97-fold (p-value = 0.022).

Table 12. Distribution of cases according to the multivariate analysis of sociodemographic and environmental factors.

Variables	Count[1]	cOR[2]	95% IC[2]	P	aOR[2]	95% IC[2]	P
Age (Years)							
<50	2.9% (1/35)	-	-		-	-	
≥50	15.6% (12/77)	6.28	1.16 - 117	0.084	8.95	1.51 - 174	**0.047**
Socioeconomic Level							
Average	4.0% (1/25)	-	-		-	-	
Poor/very poor	16.7% (11/66)	4.80	0.86 - 90.2	0.14	6.41	0.98 - 131	0.10
Rich	4.8% (1/21)	1.20	0.05 - 31.7	0.9	1.05	0.04 - 29.6	>0.9
BMI							
Normal	9.3% (7/75)	-	-		-	-	
Thinness	0.0% (0/14)	0.00		>0.9	0.00		>0.9
Overweight/Obesity	26.1% (6/23)	3.43	0.99 - 11.7	**0.047**	4.97	1.26 - 20.9	**0.022**

[1]% (n/N); [2]aOR = adjusted odds ratio, cOR = crude odds ratio, CI = confidence interval.

4.3.2. Clinical and Therapeutic Factors

The presence of associated pathologies and the specific types of procedures performed were significantly associated with the occurrence of postoperative complications (Table 13). The presence of associated pathologies increased the risk of postoperative complications 8.84-fold (p-value = 0.012). Regarding the types of procedures performed, sacrocolpopexy increased this risk 38.8-fold (p-value = 0.028), and percutaneous nephrolithotomy (PCN) increased it 17.4-fold (p-value = 0.025).

Table 13. Distribution of cases according to multivariate analysis of clinical and therapeutic factors.

Variables	Count[1]	cOR[2]	95% IC[2]	P	aOR[2]	95% IC[2]	p
Type Prolapse							
Unique	8.0% (6/75)	-	-		-	-	
Mixed	18.9% (7/37)	2.68	0.83 - 8.99	0.10	1.31	0.10 - 24.2	0.8
Associated Pathologies							
No	5.1% (4/78)	-	-		-	-	
Yes	26.5% (9/34)	6.66	1.99 - 26.4	**0.003**	8.84	2.09 - 51.0	**0.006**

Continued

Types of Interventions							
CA	2.0% (1/50)	-	-		-	-	
CA + Hysterect.	30.0% (3/10)	21.0	2.34 - 460	**0.013**	10.9	0.40 - 469	0.2
CPP	21.4% (3/14)	13.4	1.55 - 285	**0.031**	17.4	1.76 - 411	**0.025**
CPP + Hysterect.	0.0% (0/2)	0.00		>0.9	0.00		>0.9
TOP + Hysterect.	15.4% (4/26)	8.91	1.23 - 180	0.057	4.37	0.20 - 159	0.4
Promontofixation	25.0% (1/4)	16.3	0.56 - 494	0.069	38.8	1.11 - 1447	**0.028**
Others	16.7% (1/6)	9.80	0.35 - 276	0.13	8.42	0.27 - 270	0.2

[1]% (n/N); [2]aOR = adjusted odds ratio, cOR = crude odds ratio, CI = confidence interval; Other*: Hysterectomy alone, Manchester procedure, Richardson procedure, and hysterectomy associated with colpocleisis.

5. Discussion

This study has contributed to improving the management of genital prolapse by determining the profile of operated patients and evaluating the factors associated with complications after surgical reduction of genital prolapse in Butembo, a resource-limited setting.

In this study, 112 patients underwent surgery for genital prolapse, of whom 13 experienced complications at the immediate postoperative evaluation or within three months, representing a complication rate of 11.6%. This result is lower than that found by Shannon *et al.* [15], who found 18.3% of cases of complications (12/63) 30 days after surgery, and by Somé *et al.* [16], who found 15.38%, but higher than the result found by Bui *et al.* [17], who found the intraoperative complication rate to be 7%.

Regarding the sociodemographic profile of the patients who underwent surgery, we found a mean age of 55.5 years. This result is close to that obtained by Kiemtoré *et al.* [18], who found a mean age of 58.5 years ± 9.6 years in their study conducted in Burkina Faso in 2017. In contrast, Somé *et al.* [16] found a mean age of 43 years among patients who underwent surgery for genital prolapse in Burkina Faso in 2012. In bivariate analysis, age was a factor in the occurrence of postoperative complications. Indeed, in this study, the mean age of patients who experienced postoperative complications was 65.2 years ± 9.8 years, compared to 54.3 years ± 13.9 years observed in patients without complications. This result corroborates that obtained by Shannon *et al.* [15], who found a mean age of 65.0 years. However, Diallo *et al.* [14] found a mean age of 58.63 years ± 13.5 years.

Regarding the gynecological and obstetric profile, we found that the majority of patients who underwent surgery were multiparous or grand multiparous (80.4% of cases); 35.7% had a history of perineal tear; 20.5% had a history of pelvic surgery; and 10.7% had a history of cesarean section. Concerning parity, our result is lower than that obtained by Kiemtoré *et al.* [18], who found that multiparous or

grand multiparous women represented 100.0% of the patients who underwent surgery. In bivariate analysis, multiparity was not a factor associated with postoperative complications.

Sixty-seven percent of the operated patients had a normal BMI, but in bivariate analysis, we found that 46.2% of patients were obese and/or overweight in the groups who developed postoperative complications, compared to only 17.2% among patients without complications (p-value = 0.041). This result corroborates that obtained by Shannon *et al*. [15], who found similar results with 32% of obese subjects experiencing postoperative complications (p-value < 0.001).

Patients who underwent prolapse surgery were more likely to have cystocele (44.4%) and mixed prolapse, meaning involving all three levels of the pelvis (33%). Somé *et al*. [16] found cystocele in 79.48% of cases, Diallo *et al*. [14] found 29% of cases of hysterocele and 27% of cases of cystocele. Regarding the types of prolapse, our results show that in bivariate analysis, 53.8% of patients with complications had the mixed type compared to 30.3% of those without complications (p-value = 0.014).

Third- and fourth-degree prolapses were predominant in 77.7% and 14.3% of cases, respectively. Mekeme Jr. *et al*. [19] found that third-degree prolapse was predominant in 32% of cases. Somé *et al*. [16] found that two-thirds of the interventions involved fourth-degree prolapse.

Vesicovaginal fistula was the associated pathology in 18.8% of cases. Mansoor *et al*. [20] found a high frequency of cancerous and precancerous lesions of the cervix and of uterine cancer discovered incidentally. Multivariate analysis of our study shows that the presence of pathologies associated with genital prolapse increased the risk of postoperative complications by 8.84 times (p-value = 0.012).

Patients with genital prolapse underwent vaginal surgery (95.5%). Anterior colporrhaphy was the most common procedure (44.6%), followed by triple perineal surgery with hysterectomy in 22% of cases. Somé *et al*. [16] found that the most frequent procedure was triple perineal surgery (51.28%), while Coulibaly *et al*. [21] found that triple perineal surgery with hysterectomy was performed in 56% of cases. Kapela *et al*. [22] reported 68.4% vaginal hysterectomy and one case of Richter sacrospinous fixation in their study on prolapse surgery in very elderly patients at the University Hospital of Limoges. Nayama *et al*. [23] performed conservative treatment in 65% of patients. The results of the bivariate analysis show that the triple perineal operation with hysterectomy, anterior colporrhaphy plus hysterectomy, and posterior and perineal colporrhaphy, as well as promontofixation, were significantly associated with the occurrence of peri- or postoperative complications. In multivariate analysis, promontofixation increased this risk 38.8 times (p-value = 0.028), and CPP increased it 17.4 times (p-value = 0.025).

The course of the operated patients was marked by complications in 11.6% of cases, with bladder injury being the major intraoperative complication in 15.4% of cases and urinary incontinence occurring in the mid- to late postoperative period in 30.7% of cases. Cortesse *et al*. [24] observed that treatment of prolapse

alone can often resolve preoperative stress urinary incontinence. Our results are similar to those found by Mekeme Jr. *et al*. [19] in their study, which found hemorrhage (14.7%) and lower urinary tract injury (5.9%) as the main intraoperative complications, while infection (8.8%) and hemorrhage were the most common postoperative complications (5.9%). Somé *et al*. [16] found one bladder injury, two rectal injuries, and three cases of hemorrhage both intraoperatively and postoperatively. Two retentions of acute urine (5.12%), 7 recurrences at 6 months postoperative follow-up (15.38%), Mellier *et al*. [25] reported six cases of failure out of 78 operated patients, two cases of recurrence, moderate dyspareunia in 13% of operated patients, and disabling dyspareunia in two patients. The same author reports three cases of minor hemorrhage without blood transfusion, one rectal injury, and two bladder injuries. Cravello *et al*. [26] reported nine bladder injuries, three rectal injuries, and eleven cases of hemorrhage during the perioperative period, and three cases of vesicovaginal fistula and thirty-six cases of urinary tract infections postoperatively. In the study by Coulibaly *et al*. [21], peri- and postoperative complications were dominated by urinary retention (4%) and surgical site infection (2%).

5.1. Implications for Practice

The study's findings have important implications for clinical practice, particularly in rural and resource-limited settings:

- Increased Focus on Preventive Care: Given the high prevalence of prolapse among older women with high parity, there is a need for more robust preventive care strategies. Education on pelvic floor exercises, early medical intervention, and reducing the physical strain associated with agricultural labor can be beneficial.
- Improved Access to Surgical Care: Early diagnosis and intervention are critical to preventing the advanced stages of prolapse observed in this study. Expanding access to gynecological services in rural areas and implementing mobile health units could help address this issue.
- Addressing Postoperative Complications: The high rate of complications among older, poorer women indicates a need for tailored postoperative care, including better follow-up, enhanced nutritional support, and management of comorbidities to improve recovery outcomes.

5.2. Research Implications

This study raises important questions regarding the role of social determinants in the development and management of genital prolapse, suggesting that further research is needed to explore these factors in more depth. Future studies should focus on interventions to reduce the burden of prolapse in rural and low-income populations, including strategies for early detection and nonsurgical management. Additionally, research is needed to investigate the long-term effectiveness of different surgical techniques, particularly in high-risk populations, and to as-

sess the impact of tailored postoperative care on reducing complications like urinary incontinence.

There is also a need for prospective studies to evaluate the efficacy of pelvic floor rehabilitation programs and their potential to prevent prolapse progression in multiparous and postmenopausal women.

5.3. Strengths and Limitations

5.3.1. Strengths

- This study provides a comprehensive analysis of sociodemographic, clinical, and surgical factors related to genital prolapse, offering valuable insights for clinical practice and public health interventions.
- The focus on rural, low-income women is a particular strength, as this population is often underrepresented in prolapse research.
- The study's large sample size provides robust data, enhancing the reliability of its findings.

5.3.2. Limitations

- One limitation is the prospective nature of the study, which may introduce bias in the reporting and analysis of clinical outcomes.
- The study does not account for other potential confounding variables, such as genetic predisposition or access to healthcare services, which may have influenced both the development of prolapse and the outcomes of surgery.
- Follow-up data on long-term outcomes after surgery, including the recurrence of prolapse or incontinence, were not included, limiting the ability to assess the durability of surgical interventions.

6. Conclusion

In conclusion, this study confirms many established risk factors for complications in pelvic organ prolapse surgery, such as advanced age, obesity, and comorbidities. It also underscores the importance of careful patient selection and the need for experienced surgical teams when performing high-risk procedures such as promontofixation and colpocleisis. While consistent with many international findings, the high rate of complications emphasizes the need for improved surgical care and postoperative management in resource-limited settings.

Ethical Approval

The study was approved by the Ethics Committee of the Faculty of Medicine at the Catholic University of Graben.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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