International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Singh N et al. Int J Reprod Contracept Obstet Gynecol. 2026 Sep;15(9):3540-3546
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20263039

Original Research Article

Changing trends, indications and outcomes of hysterectomy: a six-year retrospective study at a tertiary care center (2020–2025)

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Received: 06 July 2026
Revised: 12 August 2026
Accepted: 13 August 2026

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ABSTRACT

Background: Hysterectomy remains one of the most commonly performed gynecological surgeries worldwide. Evaluating institutional trends helps improve surgical decision-making and patient outcomes. To analyze trends, indications, surgical approaches, complications and postoperative recovery among women undergoing hysterectomy over a six-year period.

Methods: A retrospective observational study was conducted at a tertiary care teaching hospital. Data from women who underwent hysterectomy between January 2020 and December 2025 were reviewed. Variables analyzed included surgical volume, type of hysterectomy, indications, age distribution, complications and recovery outcomes.

Results: A total of 1,061 hysterectomies were performed during the study period. Abdominal hysterectomy was the most common surgical approach (51.93%), followed by vaginal hysterectomy (38.40%) and laparoscopic hysterectomy (9.6%). Abnormal uterine bleeding and pelvic organ prolapse were the leading indications. The majority of patients were aged 40–49 years. A total of 103 complications were documented, with complication rates of 10.9% for abdominal, 7.8% for vaginal and 10.8% for laparoscopic hysterectomy. The association between surgical route and complications was statistically significant (p=0.004). Most patients were discharged within five days and selected postoperative recovery parameters improved over the study period. Postoperative symptom data were available from routine follow-up documentation but were not assessed using a validated quality-of-life instrument. Decreased sexual desire (60%) and sleep disturbance (45%) were more frequently documented.

Conclusions: Hysterectomy trends in our institution demonstrate a predominance of abdominal surgery with gradual improvements in postoperative recovery. Expanding minimally invasive surgical approaches and strengthening perioperative care may further enhance patient outcomes.

Keywords: Abnormal uterine bleeding, Fibroid, Hysterectomy, Postoperative recovery, Quality of life, Vasomotor symptoms

INTRODUCTION

Hysterectomy, the surgical removal of the uterus, remains one of the most frequently performed major gynecological procedures worldwide. In many parts of the world, it is considered the second most common non-obstetric surgery after caesarean section.[1] This highlights its significant role in the management of various gynecological conditions affecting women, particularly during the perimenopausal period. Hysterectomy is indicated for a wide spectrum of gynecological conditions including chronic pelvic pain, symptomatic uterine fibroids, abnormal uterine bleeding (AUB), adenomyosis, endometriosis, pelvic organ prolapse and gynecological malignancies. It remains the most frequently performed major gynecological surgery worldwide. In a large national study, Rout et al, reported the overall prevalence of hysterectomy was around 11.35% among Indian women.[2] Currently, hysterectomy

can be performed via abdominal, vaginal or laparoscopic routes. Vaginal hysterectomy is recommended as the preferred approach for benign disease whenever feasible. Laparoscopic hysterectomy offers advantages such as reduced postoperative pain, shorter hospital stay and faster recovery. Pirtea et al emphasized that minimally invasive surgery is associated with improved patient outcomes and is increasingly integral to modern gynecological practice.[3] However, abdominal hysterectomy continues to predominate due to factors such as surgeon expertise, case complexity and institutional resource availability. In the study by Desai et al the mean age at hysterectomy was reported to be 36 years and most procedures were performed in private healthcare institutions.[4] The choice of surgical route is multifactorial, depending on uterine size, mobility, body mass index, prior surgical history, comorbidities, anatomical considerations, surgeon experience and patient preference.

Globally, hysterectomy rates have declined over the past decade due to increased use of conservative alternatives such as hysteroscopic procedures, endometrial ablation, levonorgestrel intrauterine systems and hormonal therapies.[5] Simultaneously, there has been a shift toward minimally invasive approaches. Despite these trends, significant regional and institutional variations persist. Periodic institutional audits are essential to evaluate local practice patterns and outcomes, especially in mid-life women who constitute the majority of patients undergoing hysterectomy.

The present study aimed to analyze hysterectomy trends over a six-year period (2020–2025) at a tertiary care center, focusing on surgical volume, indications, age distribution, route of surgery, postoperative recovery and quality of life.

METHODS

Study design

This retrospective observational study was conducted at S.N. Medical College, Agra, Uttar Pradesh, India and included all hysterectomy cases performed between January 2020 and December 2025. Data extraction and analysis were completed between January and March 2026.

Study population

All women who underwent hysterectomy during the study period were included. Both benign and malignant indications were considered. Cases with incomplete records were excluded.

Inclusion criteria

Women were included if they underwent hysterectomy at the study institution between January 2020 and December 2025, had a documented operative record confirming the procedure, had sufficient hospital records to determine the surgical route and principal indication and had available postoperative records for assessment of the outcomes included in the analysis.

Exclusion criteria

Patients were excluded if the medical or operative record was substantially incomplete, the surgical procedure was not a hysterectomy, essential information regarding the surgical route or indication could not be established from available records or duplicate records were identified.

Both benign and malignant indications were included because the objective was to describe the overall institutional hysterectomy burden.

Ethical approval

The study was approved by the Institutional Ethics Committee. As this was a retrospective study using anonymized hospital records, the requirement for individual informed consent was waived.

Data collection

Data were extracted from operative registers, discharge summaries and hospital databases. The following variables were analyzed annual number of hysterectomies, type of hysterectomy:

Abdominal hysterectomy, vaginal hysterectomy, laparoscopic hysterectomy, indications (fibroids, abnormal uterine bleeding, prolapse, endometriosis, adenomyosis, malignancy), age distribution (<40, 40–49, 50–59, >60 years).

Postoperative recovery parameters duration of hospital stay (<5 days, 5–10 days, >10 days), time to ambulation (<24 h, 24–48 h, >48 h), time to oral feeding (<24 h, 24–48 h, >48 h).

Post operative quality of life

Data regarding bilateral salpingo-oophorectomy (BSO) were recorded where available.

Statistical analysis

Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA).

Associations between categorical variables (type of hysterectomy and complication rates, age group and indications) were analyzed using the Chi-square test. Trend analysis across years (2020–2025) was performed using the Chi-square test for trend. A p value <0.05 was considered statistically significant. Where appropriate, 95% CI were calculated. Complication rates were

expressed with 95% confidence intervals (CI). Odds ratios (OR) were calculated to compare complication risk across surgical routes using abdominal hysterectomy as reference. A pvalue <0.05 was considered statistically significant.

RESULTS

A total of 1061 hysterectomies were performed over six years. Abdominal hysterectomy was most common (51.93%), followed by vaginal (38.40%) and laparoscopic (9.6%).

A significant variation in annual hysterectomy volume was observed (Chi-square test for trend, p<0.001), largely influenced by a marked increase in 2023, suggesting a non-linear trend rather than a steady increase. Abdominal hysterectomy remained the dominant approach each year. Vaginal hysterectomy contributed substantially. Laparoscopic procedures increased gradually, peaking in 2024 (28 cases; 12.8% of that year's cases).

Distribution of indications for hysterectomy

AUB and prolapse were the leading indications. Adenomyosis and endometriosis accounted for relatively smaller proportions each year. Malignancy ranged from 1–9 cases per year, representing less than 5% of total procedures annually. The 40–49 years age group constituted the largest proportion of patients. A significant association was found between age group and indication for hysterectomy (p=0.021). Febrile morbidity was defined as a postoperative temperature ≥38°C on two consecutive days after the first 24 hours, excluding the first postoperative day. A total of 103 complications were recorded between 2020 and 2025 across abdominal, vaginal and laparoscopic hysterectomy.

Abdominal hysterectomy contributed the highest proportion of complications, followed by laparoscopic and vaginal route. The association between surgical route and complications was statistically significant (Chi-square test, p=0.004). Abdominal hysterectomy had the highest complication burden (60 cases), with hemorrhage as the most common intraoperative event and surgical site infection and febrile morbidity predominating postoperatively. Reoperations were also most frequent in this group.

Association between surgical route and complications

Laparoscopic hysterectomy showed fewer overall complications. Although a small number of intraoperative injuries were noted, no surgical site infections or reoperations occurred and postoperative morbidity was minimal. Vaginal hysterectomy had the lowest complication (7.8%) with minimal intraoperative events and predominantly postoperative complications, mainly surgical site infection and febrile morbidity, with few reoperations. Compared to abdominal hysterectomy, vaginal hysterectomy showed a lower risk of complications (OR ≈ 0.70), whereas laparoscopic hysterectomy showed comparable risk (OR ≈ 0.99), though confidence intervals were wide due to smaller sample size. Most patients were discharged within 5 days. Early ambulation and feeding improved over time. Improvement in postoperative recovery parameters over time was statistically significant (p<0.05).

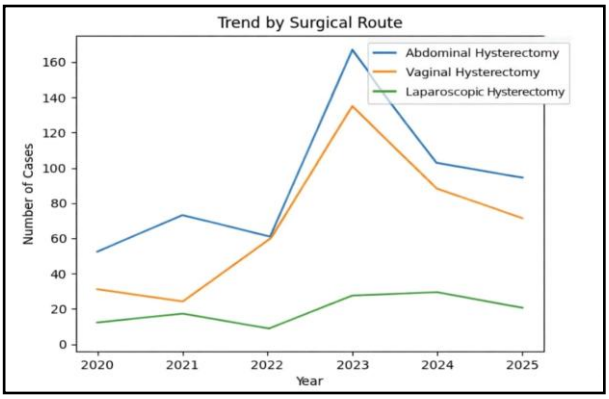

Figure 1: Trend by surgical route.

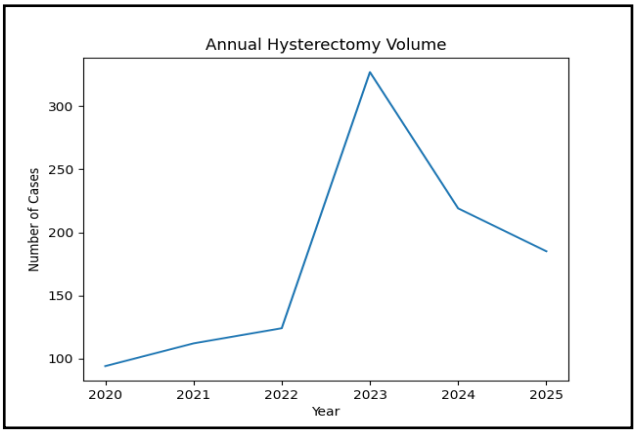

Figure 2: Annual hysterectomy volume.

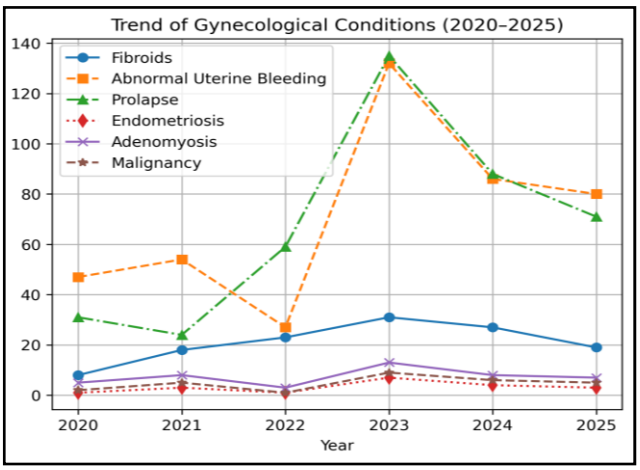

Figure 3: Distribution of indications for hysterectomy (2020–2025).

Postoperative quality of life

Postoperative quality-of-life–related symptoms were assessed retrospectively based on documentation in follow-up records. No validated instruments (e.g., MENQOL, SF-36, Greene scale) were used. Therefore, the reported figures represent frequency of documented symptoms rather than true prevalence and are subject to underreporting and documentation bias. Multiple symptoms could occur in the same patient; hence percentages are not additive.

Table 1: Annual distribution of hysterectomy procedures (2020–2025).

Year	Total hysterectomies	Abdominal hysterectomy	Vaginal hysterectomy	Laparoscopic hysterectomy
2020	94	52	31	11
2021	112	73	24	15
2022	124	61	59	04
2023	327	167	135	25
2024	219	103	88	28
2025	185	95	71	19
Total	1061	551	408	102

Table 2: Age distribution.

Year	<40 years	40-49 years	50-59 years	>60 years
2020	24	42	22	4
2021	44	47	26	7
2022	42	64	14	04
2023	126	147	40	14
2024	82	95	26	16
2025	56	73	49	07

Table 3: Complication trends over time.

Year		Intraoperative			Postoperative		
		Hemorrhage	Bladder injury	Bowel injury	Surgical site infection	Febrile morbidity	Reoperation
2020	Abdominal hysterectomy	1	0	0	2	1	0
	Vaginal hysterectomy	0	0	0	1	1	0
	Laparoscopic hysterectomy	0	1	0	0	0	0
2021	Abdominal hysterectomy	2	0	0	2	2	1
	Vaginal hysterectomy	0	0	0	1	2	0
	Laparoscopic hysterectomy	0	0	0	0	1	0
2022	Abdominal hysterectomy	2	1	0	4	2	1
	Vaginal hysterectomy	0	0	0	2	1	0
	Laproscopic hysterectomy	0	0	0	0	0	0
2023	Abdominal hysterectomy	3	0	0	6	7	2
	Vaginal hysterectomy	1	0	0	3	3	1
	Laparoscopic hysterectomy	0	0	0	0	1	0
2024	Abdominal hysterectomy	0	1	1	3	5	1
	Vaginal hysterectomy	0	0	0	2	4	1
	Laparoscopic hysterectomy	0	2	0	0	2	0
2025	Abdominal hysterectomy	2	1	1	3	2	1
	Vaginal hysterectomy	0	0	0	3	5	1
	Laparoscopic hysterectomy	0	1	1	0	1	0

Table 4: Comparison of complication risk by surgical route.

Route	Complications	Total	Rate	95% CI
Abdominal	60	551	10.8%	8.3–13.6
Vaginal	32	408	7.8%	5.4–10.8
Laparoscopic	11	102	10.7%	5.5–18.3

Table 5: Post operative recovery profile of patients.

Year		2020	2021	2022	2023	2024	2025
Duration of hospital stay	<5 days	69	87	94	267	185	153
	5-10 days	16	19	17	38	20	15
	>10 days	9	6	13	22	14	7
Time to Ambulation	<24 hours	2	3	5	6	5	3
	24-48 hours	5	11	10	14	13	6
	>48 hours	87	98	109	307	201	176
Time to oral feeding	<24 hours	1	3	2	9	6	4
	24-48 hours	15	19	22	48	37	26
	>48 hours	78	90	100	270	173	155

Table 6: Documented postoperative symptoms following hysterectomy (based on medical records).

Symptom	Clinical presentation	Prevalence	Number of patients (n=1073)
Vasomotor symptoms (hot flushes, night sweats)	Sudden warmth, flushing, excessive sweating, commonly at night	30%	323
Sleep disturbance	Difficulty falling asleep, frequent awakenings, poor sleep quality	45%	483
Mood irritability	Emotional instability, irritability, mood fluctuations	27%	290
Depressive symptoms	Persistent sadness, low mood, reduced motivation	35%	376
Vaginal dryness	Reduced vaginal lubrication and discomfort	40%	429
Decreased sexual desire	Reduced libido and sexual interest	60%	644

DISCUSSION

This six-year retrospective analysis of 1,061 hysterectomies provides insight into changing surgical trends, indications, age distribution and postoperative recovery patterns at our institution. The inclusion of statistical significance testing strengthens the reliability of observed trends and associations. The significant association between surgical route and complications highlights the safety advantage of vaginal and laparoscopic approaches over abdominal hysterectomy. Similarly, the observed temporal trends in surgical volume and postoperative recovery indicate evolving clinical practices rather than random variation.

Surgical volume and route trends

A marked increase in hysterectomy volume was observed from 94 procedures in 2020 to a peak of 327 in 2023, followed by a decline in subsequent years. This surge likely reflects the restoration of elective surgical services after the COVID-19 pandemic along with restoration of elective services, although additional institutional factors may have contributed. Abdominal hysterectomy remained the predominant surgical approach, accounting for over half of all procedures, consistent with findings from Indian studies where open surgery continues to be widely practiced.[6] In contrast, global trends demonstrate increasing adoption of laparoscopic hysterectomy, as reported by Doll et al and Donnez et al.[7,8] The relatively low proportion of laparoscopic procedures in this study may be attributed to factors such as surgeon expertise, case complexity, patient characteristics and the availability of institutional resources. Addressing disparities in surgical approach requires targeted investment in training, infrastructure and institutional policy changes to align with global standards of minimally invasive gynecologic care. Vaginal hysterectomy demonstrated a favorable safety profile with minimal intraoperative complications, supporting FIGO recommendations that advocate its use whenever feasible, particularly in prolapse cases.

Although laparoscopic hysterectomy demonstrated a gradual increase, its overall use remained limited, reflecting ongoing gaps in minimally invasive surgical capacity. Similar trends have been reported by Kantarci et

al who observed a proportional rise in laparoscopic procedures despite an overall decline in hysterectomy rates.[9] The temporary decline in laparoscopic procedures in 2022 may be attributable to resource constraints or variability in availability of trained personnel, although this could not be formally assessed in this retrospective analysis.

Indications for hysterectomy

AUB and uterovaginal prolapse were the leading indications for hysterectomy across all years. Fibroids contributed a smaller but consistent proportion of cases, peaking in 2023, while adenomyosis and endometriosis remained relatively less frequent. Malignancies accounted for only a minority of cases, indicating that most procedures were performed for benign conditions. These findings are consistent with those of Nori et al who also reported AUB as the most common indication, accounting for 33.2% of cases.[10]

Age distribution

The majority of hysterectomies were performed in women aged 40–49 years. Women above 60 years constituted the smallest proportion each year. Pandey et al in their study also found that around half of the women who underwent hysterectomy belonged to the age group of 41 to 50 years.[11]

Complication trends

Abdominal hysterectomy was associated with the highest complication rates, including both intraoperative and postoperative events. Surgical site infection and febrile morbidity were the most common complications and reoperation rates were also highest in this group, likely due to the larger incision and greater tissue handling.

Laparoscopic hysterectomy had lower overall complication rate, with no surgical site infections or reoperations recorded, highlighting the benefits of minimally invasive techniques. Vaginal hysterectomy demonstrated lowest rate of intraoperative complications, with no bladder or bowel injuries reported. Although postoperative complications such as surgical site infection and febrile morbidity were observed, their incidence was lower compared to the abdominal route, indicating a relatively safer profile.

Postoperative recovery patterns

Postoperative recovery showed progressive improvement over time. The majority of patients were discharged within 5 days, while prolonged hospitalization (>10 days) remained uncommon. Early ambulation improved gradually, with a shift from ambulation after 48 hours in earlier years to within 24–48 hours in later years, particularly in 2023 and 2024, reflecting enhanced recovery practices. Similarly, early oral feeding improved over time, with an increasing proportion of patients tolerating feeds within 24–48 hours. Delayed oral intake (>48 hours) was more common in earlier years but declined in later years.

Surgical menopause and postoperative quality of life

Surgical menopause following bilateral oophorectomy is an important consideration in women undergoing hysterectomy. The abrupt decline in estrogen levels may lead to early onset menopausal symptoms, which can affect postoperative recovery and long-term quality of life.

Mats et al reported menopausal symptoms in 27.1% of premenopausal women following surgery, with hot flushes being the most common (20.1%), followed by night sweats (4.1%).[12] The present study demonstrates evolving trends in hysterectomy practices, with a gradual shift toward minimally invasive approaches, although their adoption remains limited compared to global benchmarks. This may reflect constraints in surgical training, availability of advanced equipment and institutional resources, particularly in the Indian healthcare setting.

Fluctuations in surgical volume, including the peak observed in 2023, may be related to post-pandemic normalization of healthcare services, although this remains speculative. The lack of detailed subgroup analysis and regression modelling limits the identification of independent predictors of outcomes.

Vaginal hysterectomy demonstrated a favorable safety profile and should be encouraged, particularly in prolapse cases, in line with global recommendations. Overall, these findings underscore the need to strengthen minimally invasive surgical training, improve infrastructure and implement standardized perioperative protocols to enhance patient outcomes. Although the study period ended in December 2025, data compilation and statistical analysis were completed in early 2026 prior to manuscript submission.

The lack of complete data on bilateral oophorectomy limits interpretation of surgical menopause–related outcomes.

Strengths

Six-year continuous dataset providing temporal trend analysis. Large sample size enhancing the reliability of findings. Comprehensive evaluation of postoperative recovery parameters

Limitations

This study is limited by its retrospective design and single-center setting, which may affect generalizability. The absence of standardized quality-of-life assessment tools significantly limits interpretation of postoperative symptom burden. Additionally, the lack of multivariate regression analysis limits the ability to identify

independent predictors of complications and may introduce confounding bias in comparisons between surgical routes.

CONCLUSION

Hysterectomy in mid-life women is most commonly performed for abnormal uterine bleeding and pelvic organ prolapse, with the highest burden in the 40–49-year age group. Abdominal hysterectomy remains the predominant approach; however, vaginal hysterectomy continues to play a key role, particularly in prolapse cases, while laparoscopic hysterectomy is gradually increasing.

Improved postoperative recovery trends reflect advancements in surgical techniques and perioperative care. Strengthening minimally invasive surgical practices, along with continued institutional audits and enhanced recovery protocols, is essential to further optimize patient outcomes.

Interpretation of postoperative symptom burden should be done cautiously due to the lack of standardized quality-of-life assessment tools.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Singh N, Jain M, Nigam A, Babre S, Verma U, Arora S. Changing trends, indications and outcomes of hysterectomy: a six-year retrospective study at a tertiary care center (2020–2025). Int J Reprod Contracept Obstet Gynecol 2026;15:3540-6.