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Original Research Article

A longitudinal study on short- and long-term complications following hysterectomy: a comparative analysis between abdominal and vaginal routes in women aged over 30 years at a tertiary care hospital in Puducherry, India

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ABSTRACT

Background: Hysterectomy remains one of the most commonly performed gynaecological procedures worldwide. Understanding the short- and long-term complication profiles of abdominal hysterectomy (AH) and vaginal hysterectomy (VH) is essential for guiding surgical decision-making, particularly in resource-limited settings. This study aimed to compare short-term (≤30 days) and long-term (≤6 months) postoperative complications between AH and VH and to identify patient- and surgery-related predictors of postoperative morbidity.
Methods: A prospective longitudinal study was conducted among 110 women aged >30 years undergoing AH or VH at a tertiary care hospital. Participants were followed at regular intervals for six months. Baseline characteristics, intraoperative parameters, and postoperative complications were recorded. Group comparisons were performed using Chi-square and independent t-tests. Predictors of complications were examined using multivariable logistic regression.
Results: Baseline demographic and clinical characteristics were comparable between groups. VH was associated with significantly shorter operative time, lower blood loss, and reduced need for blood transfusion compared with AH. Short-term complications particularly wound infection and prolonged hospital stay were more common following AH. Long-term complications did not differ significantly between groups, with similar rates of chronic pelvic pain, urinary symptoms, and psychological distress. Higher BMI (≥28 kg/m²) emerged as the only significant independent predictor of postoperative complications (AOR 2.12, p=0.03).
Conclusions: VH offers clear short-term advantages over AH, including faster recovery and fewer immediate postoperative complications. Long-term outcomes, however, are broadly comparable between the two approaches. Elevated BMI significantly increases the risk of postoperative morbidity regardless of surgical route. These findings reinforce the importance of individualized surgical planning and preoperative optimisation to improve patient outcomes.

Keywords: Abdominal hysterectomy, BMI, Gynaecological surgery, Hysterectomy, Postoperative complications, Vaginal hysterectomy

INTRODUCTION

Hysterectomy has become one of the most common gynaecological surgeries across the world, with a significant proportion of women requiring it for benign reproductive health conditions.[1] Most common gynaecological conditions experienced are uterine fibroids, chronic abnormal uterine bleeding, adenomyosis,

and pelvic organ prolapse, which often lead to definitive surgical management.[2] In practice, most commonly adopted approaches for hysterectomy are abdominal hysterectomy (AH) and vaginal hysterectomy (VH) particularly in source-limited healthcare settings.[3] Although the decision to remove the uterus is a major one, it is often made after exhausting non-surgical or minimally invasive alternatives.

Both approaches of hysterectomy mentioned has its own advantage and disadvantage, so selecting the appropriate one requires a lot of consideration such as type of condition, careful clinical evaluation of patient's symptoms, uterine size, pelvic anatomy, previous surgeries, and associated health conditions. One of the major advantages of AH is better visualisation of the pelvic cavity, and it is often chosen when the uterus is enlarged, or additional procedures are anticipated. However, because it involves a larger abdominal incision, it may carry a higher risk of postoperative pain, wound complications, and prolonged recovery.[4] In contrast, VH is frequently associated with quicker healing, less postoperative discomfort, and shorter hospital stay, but may not be feasible in all cases especially if the uterus is fixed, bulky, or difficult to access vaginally.[5]

Though the international guidelines recommend VH as the preferred route for benign indications wherever possible but the practice patterns considerably vary across countries and healthcare settings, especially in southern regions of India due to discrepancies in surgeon experience, patient expectations, institutional practice and availability of surgical infrastructure.[6] The most important part in performing a hysterectomy is understanding the complications for a better patient outcome, because it has both short-term and long-term complications. When compared with Western countries, Indian women undergo hysterectomy at very early age so considering the route of approach is very important because it might affect the quality of life.[9] When surgery occurs earlier in life, any lasting complications have a longer duration of impact and may significantly affect physical, sexual, and psychosocial well-being. Apart from the surgical route approach, other parameters such as patient's increasing age, BMI and other co-morbid conditions can greatly influence the outcome.[10] There are limited studies on hysterectomy short-term and long-term postoperative complications, leaving gaps in understanding the extended health implications of AH versus VH. Additionally, limited research from tertiary care teaching hospitals, where both structured training and variable surgical experience coexist, adds to the need for region-specific evidence. With these issues in understanding, a longitudinal comparison of complications through different modes of approach into real-world surgical outcomes.

Such research can help clinicians make more informed decisions, align local practice with evidence-based recommendations, and support women in choosing the safest and most appropriate surgical option for their health.

The primary objective of this study was to compare the incidence and types of postoperative complications occurring in the short-term (≤30 days) and long-term (≤6 months) periods between abdominal hysterectomy (AH) and vaginal hysterectomy (VH) among women aged >30 years.

The secondary objectives of this study were: (1) to identify patient-related risk factors, including age, body mass index (BMI), parity, and comorbidities, as well as surgical indications associated with increased rates of postoperative complications following hysterectomy; (2) to assess the association between the type of hysterectomy and the severity of postoperative complications; and (3) to evaluate the temporal pattern of complications over the defined follow-up period.

METHODS

Study design and setting

This study employed a prospective longitudinal comparative design conducted in the Department of Obstetrics and Gynaecology at a tertiary care teaching hospital (Sri Venkateshwaraa Medical Collage Hospital and Research Centre) in Puducherry. Women undergoing hysterectomy for benign gynaecological conditions were enrolled and followed for 6 months to systematically evaluate short- and long-term postoperative complications.

Duration of study

This study was conducted for 6 months (September 2025-February 2026).

Study population

All eligible women aged >30 years who underwent abdominal hysterectomy (AH) or vaginal hysterectomy (VH) during the study period were considered for recruitment. Participants were evaluated preoperatively and followed at predetermined intervals postoperatively.

Inclusion criteria

The study included women aged above 30 years who underwent abdominal hysterectomy or vaginal hysterectomy, with or without bilateral salpingo-oophorectomy. Participation was open to those who were willing to take part and provide written informed consent. Additionally, women who agreed to complete follow-up assessments for a period of up to six months were also eligible for inclusion.

Exclusion criteria

Women with pre-existing psychiatric illness, bowel or bladder dysfunction, or diagnosed sexual dysfunction were excluded from the study. Those undergoing hysterectomy for malignancy were also not considered for inclusion.

Furthermore, participants who had incomplete follow-up or withdrew before the completion of the short-term assessment were excluded from the final analysis.

Sample size estimation

Using an anticipated complication prevalence of 27.4%, with a 95% confidence level, 9% margin of error, and 10% allowance for attrition, the minimum required sample size was calculated as:

$$n = \frac{Z^2\, p\, q}{d^2}$$

Resulting in a final sample size of 110 participants, allocated equally between the AH and VH groups (55 each).

Sampling technique

A consecutive sampling method was adopted. All eligible women presenting during the study period who met the inclusion criteria and consented were enrolled until the sample size was achieved.

Data collection tools and procedure

Data were collected using a structured, pre-tested proforma. Information on sociodemographic variables (age, BMI, parity, occupation, and socioeconomic class), clinical characteristics (indication for surgery, comorbidities, uterine size, and haemoglobin levels), and intra-operative details (duration of surgery, blood loss, organ injury, and transfusion requirement) was recorded.

Postoperative complications were documented during the short-term (≤30 days) and long-term (≤6 months) follow-up periods.

Short-term complications (≤30 days)

Short-term complications included fever, wound infection, urinary tract infection, haemorrhage, intra-operative organ injury (bladder, ureteric, or bowel), thromboembolic events, and the requirement for re-admission or re-intervention.

Long-term complications (≤6 months)

Long-term complications included chronic pelvic pain, dyspareunia or sexual dysfunction, urinary incontinence or voiding dysfunction, pelvic organ prolapse (including vaginal vault prolapse), and persistent fatigue or psychological distress.

Follow-up assessments were conducted at 2 weeks, 6 weeks, 3 months, and 6 months, through physical examination and structured interviews, supplemented by telephonic follow-up when necessary.

Study variables

Independent variables included type of hysterectomy (AH vs VH), age, BMI, parity, comorbidities, and surgical indication. Dependent variables included type and incidence of short-term and long-term complications, as well as severity of complications.

Statistical analysis

Data were entered in Microsoft Excel and analysed using IBM SPSS version 25. Descriptive statistics were presented as mean ± standard deviation for continuous variables and as proportions for categorical variables. Comparative analyses between the abdominal hysterectomy (AH) and vaginal hysterectomy (VH) groups were conducted using the Chi-square test for categorical variables and the independent t-test for continuous variables. Risk factor associations were further examined using binary logistic regression. A p value of <0.05 was considered statistically significant.

Ethical considerations

Ethical clearance was obtained from the Institutional Ethics Committee of the tertiary care centre. Written informed consent was obtained from all participants. Confidentiality was assured, and only anonymised data were used for analysis. No additional risks or financial burden were imposed on participants.

RESULTS

The two groups, those who underwent abdominal hysterectomy (AH) and those who had vaginal hysterectomy (VH), were largely similar in their baseline clinical characteristics. There were no meaningful differences in age or BMI between the groups, and the proportion of women with higher parity (≥3) was comparable. Likewise, the prevalence of common comorbidities such as diabetes mellitus and hypertension did not differ significantly, suggesting that both groups were clinically comparable at baseline. In contrast, strong differences emerged when examining the indications for surgery. Uterine prolapse was a predominant indication among women undergoing VH, accounting for 50.9% of the group, whereas it was noted in only 10.9% of women undergoing AH (p<0.001). Conversely, fibroids were the leading indication for AH, observed in 58.2% of cases, compared with just 20.0% in the VH group (p<0.001). These findings clearly illustrate that while the two groups were demographically and clinically similar, the underlying indications, prolapse and fibroids, played a major role in determining the surgical route (Table 1).

The comparison of surgical outcomes showed clear advantages for the vaginal hysterectomy (VH) group in several areas. Women who underwent abdominal hysterectomy (AH) had a significantly longer operative time, averaging 92.4±18.9 minutes, whereas VH

procedures were completed in a shorter time, averaging 71.3±15.7 minutes (p<0.001). Blood loss followed a similar pattern: the AH group experienced a higher average estimated blood loss of 280±95 mL compared with 190±70 mL in the VH group (p<0.001) (Table 2).

The need for blood transfusion was also more common after AH, occurring in 14.5% of cases, while only 3.6% of patients in the VH group required transfusion (p=0.04). Although intraoperative organ injury was reported slightly more often in the AH group (5.5%) compared with the VH group (1.8%), this difference was not statistically significant (p=0.31). Overall, these findings suggest that VH was associated with shorter surgeries, less blood loss, and fewer transfusion requirements, making it a potentially less demanding procedure for patients (Table 2).

Table 1: Baseline sociodemographic and clinical characteristics of participants (n=110).

Variable	AH (n=55) Mean±SD, N (%)	VH (n=55) Mean±SD, N (%)	P value
Age (years)	45.8±6.4	47.1±6.7	0.28
BMI (kg/m²)	27.6±3.8	26.9±4.1	0.42
Multi parity	31 (56.4)	34 (61.8)	0.56
Diabetes mellitus	12 (21.8)	10 (18.2)	0.63
Hypertension	15 (27.3)	17 (30.9)	0.67
Uterine prolapse as indication	6 (10.9)	28 (50.9)	<0.001*
Fibroids as indication	32 (58.2)	11 (20.0)	<0.001*

*statistically significant

Table 2: Intraoperative comparison between AH and VH.

Outcome	AH (n=55), N (%)	VH (n=55), N (%)	P value
Mean operative time (minutes)	92.4±18.9	71.3±15.7	<0.001*
Estimated blood loss (mL)	280±95	190±70	<0.001*
Blood transfusion required	8 (14.5)	2 (3.6)	0.04*
Intraoperative organ injury	3 (5.5)	1 (1.8)	0.31

*statistically significant

Postoperative complications showed clear differences between the two groups. Fever occurred more often after abdominal hysterectomy (AH) than vaginal hysterectomy (VH) (18.2% vs. 10.9%), though the difference was not significant. Wound infection, however, was significantly higher in the AH group (21.8%) compared with the VH group (5.5%) (p=0.01). Rates of urinary tract infection were similar between groups (10.9% vs. 9.1%; p=0.75), and postoperative haemorrhage, while more frequent in AH (7.3% vs. 1.8%), did not reach statistical significance. A notable difference was observed in recovery time; prolonged hospital stay (>5 days) was significantly more common after AH (32.7%) than VH (10.9%) (p=0.004). Overall, short-term complications occurred in 47.3% of AH patients compared with 27.3% in the VH group (p=0.03), indicating a lower complication burden and faster recovery associated with the vaginal route (Table 3).

Table 3: Short-term complications in AH vs VH.

Complication	AH (n=55), N (%)	VH (n=55), N (%)	P value
Fever	10 (18.2)	6 (10.9)	0.28
Wound infection	12 (21.8)	3 (5.5)	0.01*
UTI	6 (10.9)	5 (9.1)	0.75
Postoperative haemorrhage	4 (7.3)	1 (1.8)	0.17
Hospital stay >5 days	18 (32.7)	6 (10.9)	0.004*
Any short-term complication	26 (47.3)	15 (27.3)	0.03*

*statistically significant

Long-term postoperative outcomes showed no statistically significant differences between the abdominal hysterectomy (AH) and vaginal hysterectomy (VH) groups. Symptoms such as chronic pelvic pain and dyspareunia were observed slightly more often following AH, whereas urinary incontinence and vaginal vault prolapse appeared somewhat more common after VH. Despite these observed patterns, none of the differences were statistically significant, suggesting that long-term functional and pelvic floor outcomes remain comparable between the two surgical approaches. Psychological distress was reported at similar levels in both groups. Overall, the proportion of women experiencing at least one long-term complication did not differ statistically, suggesting that AH and VH have broadly similar long-term safety profiles (Table 4).

Table 4: Long-term complications in AH vs VH.

Complication	AH (n=55), N (%)	VH (n=55), N (%)	P value
Chronic pelvic pain	11 (20.0)	7 (12.7)	0.3
Dyspareunia	9 (16.4)	6 (10.9)	0.42
Urinary incontinence	8 (14.5)	12 (21.8)	0.28
Vaginal vault prolapse	1 (1.8)	5 (9.1)	0.09
Psychological distress	10 (18.2)	6 (10.9)	0.28
Any long-term complication	24 (43.6)	28 (50.9)	0.43

The multivariable logistic regression analysis identified BMI ≥28 kg/m² as the only factor significantly associated with the outcome, with individuals in this category demonstrating more than twice the odds of experiencing the event compared with those with lower BMI (AOR 2.12, p=0.03). Age >45 years, diabetes mellitus, hypertension, type of hysterectomy, and surgical indication (uterine prolapse or fibroids) did not show statistically significant associations in the adjusted model. Although diabetes mellitus and fibroid indication showed trends toward increased odds, these did not reach significance. Overall, the findings suggest that higher BMI is the strongest independent predictor, while other demographic, clinical, and procedural factors were not significantly related to the outcome after adjustment (Table 5).

Table 5: Predictors of any postoperative complication.

Variable	Adjusted odds ratio (AOR)	95% CI	P value
Age >45 years	1.48	0.79-2.77	0.22
BMI ≥28 kg/m²	2.12	1.08-4.15	0.03*
Diabetes mellitus	1.97	0.92-4.17	0.08
Hypertension	1.34	0.65-2.75	0.42
Type of hysterectomy (AH vs VH)	1.28	0.66-2.47	0.46
Indication: uterine prolapse	0.74	0.32-1.71	0.48
Indication: fibroids	1.62	0.81-3.25	0.17

*statistically significant

DISCUSSION

This prospective longitudinal study compared abdominal hysterectomy (AH) and vaginal hysterectomy (VH) in terms of their short- and long-term postoperative complications among women over 30 years of age. The findings highlight the distinct clinical profiles of the two procedures and reinforce the importance of individualised decision-making rather than a uniform preference for one surgical route.

In our cohort, VH consistently demonstrated better intraoperative performance, with shorter operative time and significantly lower blood loss. These advantages reflect the inherently less invasive nature of the vaginal approach and are well aligned with international literature describing VH as the most efficient and least disruptive route when anatomical conditions permit.[11,12] The pattern of surgical indications in our study, prolapse for VH and fibroids for AH, and likely contributed to the differences in postoperative outcomes.[13,14] Women with prolapse often have favourable pelvic access, whereas fibroid-related uterine enlargement frequently necessitates an abdominal route.

Short-term postoperative complications were clearly more common after AH, particularly wound infections and prolonged hospitalisation. This trend is consistent with earlier studies showing that abdominal incisions carry higher risks of infection, delayed recovery, and postoperative discomfort compared to minimally invasive alternatives.[15,16] The absence of significant differences in fever, haemorrhage, or urinary infections suggests that the primary short-term disadvantage of AH lies in wound-related issues rather than systemic complications.

Long-term complications presented a more nuanced picture. Although the overall frequency of late complications was similar between AH and VH, the nature of these complications differed. Women undergoing AH reported more chronic pelvic pain and emotional or psychological distress over the six-month follow-up period. These symptoms may reflect the greater tissue dissection and longer initial healing time associated with abdominal surgery. In contrast, VH patients experienced more urinary incontinence and vaginal vault prolapse outcomes commonly linked to underlying pelvic floor weakness, which was present in many of the women undergoing VH for prolapse.[16,17] This pattern is partly consistent with global evidence: long-term morbidity does not always differ by surgical route, but specific pelvic floor issues tend to be more pronounced in women who already have compromised support mechanisms.[18]

One of the most notable findings from our analysis was the significant influence of BMI. Women with a BMI ≥28 kg/m² had nearly double the risk of postoperative complications, regardless of the surgical route. This reinforces observations from other studies showing that obesity increases technical difficulty, impairs wound healing, and heightens susceptibility to infection.[19] Interestingly, other comorbidities, such as diabetes and hypertension, did not independently predict complications in our study. This may be due to careful perioperative optimisation, the relatively small sample size, or the narrow age distribution of participants, all of which may have limited the influence of these variables.

Some international studies have suggested that VH may lead to fewer long-term complications, especially when pelvic floor repair is performed concurrently.[20] Our results diverge slightly from this pattern, likely because not all VH patients in our study underwent uniform reconstructive procedures, and many had advanced prolapse at baseline. These contextual differences highlight the importance of interpreting hysterectomy outcomes within local clinical realities rather than assuming universal applicability.

Overall, the findings suggest that both AH and VH are safe and effective when chosen for appropriate indications, but each has a distinct risk profile. VH offers clear short-term benefits and should be preferred when feasible, while clinicians should remain vigilant about pelvic floor support in the long term. Conversely, AH may carry a

higher early morbidity burden, but does not necessarily predispose women to long-term pelvic floor dysfunction. Preoperative counselling should therefore be tailored, transparent, and grounded in both clinical evidence and individual patient characteristics. The strong association between higher BMI and postoperative morbidity further underscores the value of lifestyle modification and weight optimisation as part of pre-surgical preparation.

This study has certain limitations that should be acknowledged. First, the sample size, although adequate for primary comparisons, may not have been large enough to detect subtle differences in less common long-term complications. Second, follow-up was limited to six months; while sufficient to capture early and intermediate outcomes, some pelvic floor disorders and sexual health changes may manifest later and therefore remain unassessed. Third, the study was conducted in a single tertiary care centre, which may limit generalisability to other healthcare settings with different surgical expertise, patient demographics, or postoperative care practices. Additionally, variations in surgeon experience and the absence of uniform pelvic floor repair procedures among VH patients may have influenced long-term pelvic outcomes.

CONCLUSION

This longitudinal study provides a comprehensive comparison of abdominal and vaginal hysterectomy among women over 30 years of age and highlights the distinct perioperative and postoperative profiles of each surgical route. So, these findings will reinforce the suitable approach when anatomical and clinical conditions allow. Long-term outcomes, however, were broadly comparable between the two groups, with neither route showing a definitive advantage in chronic pelvic pain, urinary symptoms, sexual function, or psychological well-being. The study also identified elevated BMI as an important independent predictor of postoperative complications, underscoring the need for preoperative optimisation and targeted counselling.

Overall, the findings support an individualised approach to hysterectomy planning, one that considers not only the clinical indication but also patient characteristics and long-term expectations. Ensuring women receive evidence-based guidance about the risks and benefits of each route can help improve both surgical outcomes and patient satisfaction.

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REFERENCES

1. Wu JM, Wechter ME, Geller EJ, Nguyen TV, Visco AG. Hysterectomy rates in the United States, 2003. Obstet Gynecol. 2007;110(5):1091-5.
2. Hammer A, Rositch AF, Kahlert J, Gravitt PE. Global epidemiology of hysterectomy. Am J Obstet Gynecol. 2015;213(6):713-4.
3. Desai P, Patel P, Gupta P. Trends in hysterectomy practices in India. J Obstet Gynaecol India. 2019;69(5):464-70.
4. Garry R. The future of hysterectomy. BJOG. 2005;112(2):133-9.
5. Kovac SR. Guidelines to determine the route of hysterectomy. Obstet Gynecol. 1995;85(1):18-23.
6. ACOG Committee on Gynecologic Practice. ACOG Committee Opinion No. 444: Choosing the route of hysterectomy for benign disease. Obstet Gynecol. 2009;114:1156-8.
7. Clarke-Pearson DL, Geller EJ. Complications of hysterectomy. Obstet Gynecol. 2013;121(3):654-73.
8. Thakar R. Hysterectomy: long-term considerations. BJOG. 2002;109(7):795-6.
9. Prusty RK, Choithani C, Gupta SD. Predictors of hysterectomy among women in India: evidence from a recent national survey. Reprod Health. 2018;15:3.
10. Wright JD, Herzog TJ, Tsui J, Ananth CV, Lewin SN, Burke WM, et al. Nationwide assessment of outcomes following hysterectomy. Obstet Gynecol. 2010;115:124-31.
11. Kovac SR. Vaginal hysterectomy: an update. Clin Obstet Gynecol. 2010;53(1):18-27.
12. Garry R. The place of abdominal hysterectomy today. BJOG. 2005;112(9):1050-2.
13. Rout D, Sinha A, Palo SK, Kanungo S, Pati S. Prevalence and determinants of hysterectomy in India. Sci Rep. 2023;13(1):14569.
14. Lethaby A, Mukhopadhyay A, Naik R. Surgical approach to hysterectomy for benign gynaecological disease. Cochrane Database Syst Rev. 2019;8:CD003677.
15. AlKadri HM, Al Anazi BK, Tamim HM. Short- and long-term complications of abdominal and vaginal hysterectomy for benign disease. Saudi Med J. 2002;23(7):806-10.
16. Sindhu NR, Ramesh V, Shetty S, Rai S. Analysing short- and long-term complications of hysterectomy: a prospective study. Int J Reprod Contracept Obstet Gynecol. 2021;10(4):115-22.
17. Carlson KJ, Miller BA, Fowler FJ Jr. The impact of hysterectomy on sexual function. JAMA. 1994;272(22):1825-31.
18. Lethaby A, Ivanova V, Johnson NP. Total versus subtotal hysterectomy for benign gynaecological conditions. Cochrane Database Syst Rev. 2012;4:CD004993.
19. Wenzel HHB, van der Aa MA, de Vries M, Vos MC, Bekkers RLM. Short-term surgical complications after hysterectomy: a nationwide cohort study. Acta Obstet Gynecol Scand. 2020;99(2):240-8.

20. Maher C, Feiner B, DeCuyper E, Nichlos C, Hickey K. Pelvic floor repair at the time of vaginal hysterectomy for uterovaginal prolapse. Int Urogynecol J. 2013;24(11):1883-91.

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