Prevalence, socio-demographic determinants, and self-reported reasons for hysterectomy and choice of hospitalization in India

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Abstract

Background

There is limited evidence of hysterectomy in India because of a lack of data in large-scale, nationally representative health surveys. The fifth National Family Health Survey collected direct data on hysterectomy and self-reported reasons for the treatment among women of reproductive age in 2019–21 using the NFHS-5 dataset. This study evaluates the prevalence, determinants, and choice of hospitalization (Public vs. Private) for conducting hysterectomy in India among women aged 15–49 years in 29 states and seven union territories (UTs).

Methods

Cross-tabulations and percentage distributions were utilized to analyse the prevalence of hysterectomy and the choice of hospitalization (public vs. private) across different socioeconomic backgrounds and reasons for undergoing hysterectomy. A multivariate binary logistic regression model was also used to find statistically significant determinants of hysterectomy.

Results

In India as a whole, 3% of women aged 15–49 years had undergone a hysterectomy. The percentage of women who had undergone the procedure was found to vary considerably across the states and the UTs. A noticeable fact that emerged was that the majority of the hysterectomies were performed in the private sector in India. Age, place of residence, religion, caste, level of education, geographic region, wealth quintiles, parity, age at first cohabitation of women were found to be the socio-demographic determinants statistically associated with hysterectomy in India. The reasons frequently reported for hysterectomy were excessive menstrual bleeding/pain, followed by fibroids/cysts.

Conclusion

The percentage and likelihood of undergoing hysterectomy were relatively high among women, those who reside in rural areas, those without schooling, those who belonged to the richest wealth quintile, those with an early age at first cohabitation and those who reside in the eastern and southern parts of India. These findings have policy implications in that reproductive health programme managers should assure regular screening and treatment of issues that lead to hysterectomy.

Background

A hysterectomy is a surgical procedure in which a woman's uterus is removed. There are several varieties of hysterectomy, including partial, complete, and radical. In many parts of the world, hysterectomy, or the

surgical removal of the uterus, is the second most common non-obstetric surgery after caesarean section [1, 2, 3, 4]. Furthermore, prophylactic oophorectomy, which involves the removal of the ovaries, is sometimes suggested in conjunction with hysterectomy to lower the risk of ovarian cancer in the future [5].

Gynecological conditions such as fibroids, dysfunctional uterine hemorrhage, and uterine prolapse are common medical reasons for hysterectomy [6]. The surgical removal of a woman's uterus and ovaries can have major physical and psychological implications. According to research, there are both positive and negative consequences. On the one hand, hysterectomy has been shown to reduce anxiety and depression in women and thereby enhance their quality of life, particularly 6 to 12 months after surgery, by alleviating gynecological disorders such as irregular bleeding and pelvic pain [7, 8, 9].

Due to differences in uterine pathology, provider and patient characteristics, and socio-cultural factors, the frequency and prevalence of hysterectomy vary substantially across different geographic locations [3, 10, 11]. Because most hysterectomy research is conducted on inpatient hospitals and community-based studies, sample demographics and techniques might make worldwide comparisons of hysterectomy rates difficult. Nonetheless, research reveals that hysterectomy rates in developed countries are substantially greater than in low-income countries [10]. Hysterectomy rates are declining in many regions of the developed world, according to new research, as less invasive alternatives to hysterectomy, including as endometrial ablation and uterine artery embolization, become more commonly available. Hysterectomy rates have fallen in recent years in the United States and Canada, for example [2, 3]. Hysterectomy, on the other hand, appears to be on the rise in some developing countries [12, 13].

In recent years, hysterectomy has garnered more attention in India's health policy debates. A series of media reports have highlighted an unexpected jump in the number of women receiving hysterectomy in several parts of the country, with a considerable proportion of instances involving young and pre-menopausal women from poor households as the catalyst for heightened attention [14, 15, 16]. According to a study by Kameswari and Vinjamuri (2013), 60 percent of hysterectomies were performed on women under 30 in Andhra Pradesh between 2008 and 2010, and 95 percent of the operations were performed in private hospitals; the hospital discharge summaries for these operations were mostly blank, with no information regarding the procedure or follow-up instructions [17].

In many countries, including India, a number of research have looked at the socioeconomic, demographic, and residence-related factors of hysterectomy [18, 19, 20, 21]. The risk factors for peripartum hysterectomy were studied in a cohort research. The study showed that placenta praevia/accreta is linked to a higher incidence of peripartum hysterectomy, based on data from 193 hospitals in 21 countries across Africa, Asia, Europe, and the Americas. Asian women had a greater rate of hysterectomy (7%) than African women (5%). The study also discovered that advanced maternal age, caesarean section, and giving numerous births in Asia are all risk factors [18].

Hysterectomy was more common in women over the age of 35, according to a study conducted in three villages in Haryana's Panchkula district. The most common reason for hysterectomy was excessive

monthly bleeding (52/70; 74 percent); other reasons were uterine prolapse and fibroids [22]. Uikey, Wankhede, and Tajne (2018) discovered that fibroid uterus (65.33 percent) was the most common reason for hysterectomy In Maharashtra state of India. They concluded that in a developing nation like India with limited healthcare resources, non-descent vaginal hysterectomy outperforms abdominal and laparoscopic aided vaginal hysterectomy and should be the treatment of choice for benign uterine diseases [23].

In India, knowledge on hysterectomies is limited, in part due to a paucity of data from large-scale national representative surveys. Women with poor income, those who are older, rural women, married women, and women with more surviving children were all found to be at a higher risk for hysterectomy in two mixed method studies conducted in Gujarat, India. The average age of hysterectomy was 36 years, and the majority of the women had their hysterectomies at private health institutions, according to this study [10, 19].Some researchers and activists have raised concerns about unnecessary hysterectomies being performed in some parts of India for commercial reasons rather than medical necessity, especially at a considerably younger age in places such as Andhra Pradesh [24, 25, 26]. There has also been a lot of debate concerning the effectiveness of elective hysterectomy, because women's reproductive health difficulties don't stop there [27]. Many health concerns arise after a hysterectomy, including: i) early menopause, ii) increased risk of cardiovascular disease, iii) increased risk of stroke, iv) urinary incontinence, v) loss of sexual desire, and vi) other health problems [19, 10].

The majority of the literature on hysterectomies comes from research conducted in developed countries or clinic samples. The scope and nature of the literature accessible about India are restricted. To our knowledge, no large-scale nationally representative dataset has been used to undertake a population-based study that can encompass India as a whole. Having noted the gaps in the previous literature on hysterectomy in India and the availability of a new large-scale population-based nationally representative dataset (NFHS 5) the current study explored the prevalence and predictors of hysterectomy in women aged 15–49 years in India.

The following questions are addressed in this paper:(i) to determine the national, state, UT, and regional prevalence of hysterectomy among women aged 15–49 years in India, (ii) to examine the socio-demographic determinants of hysterectomy, and (iii) to investigate the reasons reported by women for hysterectomy (iv)To assess the choice of hospitalization (Public vs Private) for conducting hysterectomy.

Methods

The data used this study came from the fifth round of the National Family Health Survey (NFHS-5), which took place between 2019 and 21 under the stewardship of the Ministry of Health and Family Welfare (MoHFW), Government of India, and was coordinated by the International Institute of Population Sciences (IIPS), Mumbai. The National Family Health Survey (NFHS) is a multi-round, large-scale survey conducted in a nationally representative sample of households. The survey collected data on infant and child mortality, fertility, reproductive health, maternal and child health, nutrition, anaemia, and family planning

services at the national and state levels in India. Each successive round of the NFHS has two specific goals. One is to provide required data on health and family welfare needed by the Ministry of Health and Family Welfare and other agencies for policy and program purposes, and the other is to give information on important emerging health and family welfare issues.

The NFHS-5 was based on a stratified two-stage sampling design that yielded state representative samples after applying sampling weights to control the complex survey design. This survey collected information from a nationally representative sample of 636,699 households, with 724,115 women aged 15–49 years and 101,839 men aged 15–54 years, with an overall response rate of 98 percent. All participants provided informed consent to sign to participate and to allow their data to be used for research. In this analysis, we included all the women of age 15-49.

Outcome and independent variables

Hysterectomy was utilized as the outcome variable in this study. The NFHS-5 posed a series of questions to women about hysterectomy. The first question asked was: *"When did your last menstrual period start?"* (*Question no 250 of NFHS 5 women's questionnaire*) [28].Among the several answers to this question, one of the options was *"Has had a hysterectomy"*. The direct question on hysterectomy canvassed was, *"Some women undergo an operation to remove the uterus. Have you undergone such an operation?"* (*Question no 253 of NFHS 5 women's questionnaire*)[28]. If the answer was yes, women were asked further questions about the timing and place of and the reason for the hysterectomy. Table 1 lists the independent variables, their category, and definitions.

Table 1: Independent variables, their categorization and their definition

Independent variable	Definition	Categories
Age	Biological age of women respondent	15–29; 30–39; 40–49
Residence	Place where the respondent usually Lives	Urban; Rural
Religion	Religion in which the respondent believes	Hindu; Muslim (Islam); Christian; Others (Sikh; Buddhist/neo-Buddhist; Jain, Jewish,parsi/zorostrian, no religion & others)
Caste/Tribe	Scheduled Caste/Tribe, Other Backward Classes as defined in the Indian constitution for the socially and economically deprived sections of the Society	Scheduled caste; Scheduled tribe; Other Backward Class; Others (does not belong to any of the above three groups)
Women's education	Educational attainment of women depending on years of schooling	No Schooling (0 years of schooling); Primary complete (5 years of schooling); Secondary complete (6–12 years of schooling); Higher (13 years and above schooling)
Wealth Index	Household wealth index created by using scores of possessions of certain goods and assets and classified in quintiles. Score moving from lowest to highest means household moving from poor to rich category.	Lowest; Second; Middle; Fourth; Highest
Marital Status	Current marital status of women; Others includes divorce, separated, and living together without marriage	Currently Married; Widow; Others (Never married, divorced, separated)
Parity	Total no. of children ever born to Women	0; 1 child; 2 children; 3 and above Children
Age at first cohabitation	Age (in years) at which woman started living with spouse	Less than 15; 15–19; 20 and above
Region	Region comprising a group of states, depending upon the	North; Central; East;

| | geographical region and the sociocultural milieu these states fall in | Northeast; West; South |
| | North (Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Uttarakhand); Central (Chhattisgarh, Madhya Pradesh, and Uttar Pradesh); East (Bihar, Jharkhand, Odisha, West Bengal); Northeast (Arunachal Pradesh; Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura); West (Dadra & Nagar Haveli, Daman & Diu, Goa, Gujarat, Maharashtra); South (Andaman & Nicobar Island, Andhra Pradesh, Karnataka, Kerala, Lakshadweep, Puducherry, Tamil Nadu, Telangana) | |

STATA 16 was used to conduct univariate, bivariate, and multivariate analyses for this study. Univariate analyses were used to estimate the prevalence of hysterectomy. Bivariate analyses were performed to determine the prevalence of hysterectomy in various states and regions of India and to determine the unadjusted associations between the selected socio-economic, demographic, and biological factors with hysterectomy. Finally, multivariate analyses using binary logistic regression were conducted to determine the relations of various factors to the dependent variable, hysterectomy.

The dependent variable was dichotomous with mutually exclusive categories, i.e., had undergone a hysterectomy or had not undergone a hysterectomy. The independent variables were categorical; thus, performing binary logistic regression was the most appropriate approach. The parameters in the logistic regression models were estimated using the maximum likelihood method, and the model's goodness of fit was determined using pseudo-R2 statistics. Results are presented in the form of odds ratios (ORs) with 95% confidence intervals (CI). The analyses were conducted using appropriate sampling weights. A thematic map was also created using a geographic information system (GIS).

Results

Prevalence and regional distribution of hysterectomy in India

According to the most recent NFHS-5 empirical data, the percentage of women who have had a hysterectomy in India is not low. The percentage of women who have undergone a hysterectomy was 3% among women aged 15–49 (Table 2).

Socio-economic differentials in hysterectomy in India

Table 2 depicts the percentage of women aged 15–49 who have had a hysterectomy by socio-economic and demographic characteristics. A considerable variation in women's socio-economic and demographic characteristics was observed in the risk of hysterectomy. The level of hysterectomy increased with an increase in age. A smaller percentage of women (0.2%) aged 15–29 reported having undergone a

hysterectomy; this percentage increased to 3% among women aged 30–39, and 10% among women aged 40–49. Rural women (4%) were at a higher risk of hysterectomy than urban women (2%). The percentage of hysterectomized women was highest (3%) among Hindus, Christians, and other religious groups and lowest among Muslims (2%).

Women from other backward classes were found to have a higher percentage (4%) of hysterectomy than women from scheduled tribes (2%).Women with a higher education had a lower percentage of hysterectomy (0.7%) than women with no education (7%). As a result, hysterectomy was performed on 5% of women aged 15–49 with a "primary complete" level of education and 2% of women with a "secondary complete" level of education. There was no substantial difference in hysterectomy rates among women from different wealth quintiles.

Table 2 clearly reveals that widows had a higher proportion (7%) of hysterectomy than women in the others category (0.2%), followed by currently married women (4%).

In terms of parity, the percentage of hysterectomized women grew as a woman's parity increased, peaking at 7% among women with a third or higher order parity. The percentage of hysterectomized women was found to be high (9%) among women who began cohabitation at a younger age, notably under the age of 15.

Table 2 also provides regional variations in the level of hysterectomy in India. The South, west, and east (4%) regions showed a prevalence of hysterectomy above the national level (3%). The percentage of hysterectomy (2%) for the North regions turns out to be slightly lower than the national average (3%). In contrast, the least proportion of women undergoing hysterectomy was found in the North-east region (1%).

Table 2
Percentage of women age 15−49 who have had a hysterectomy, and among women with a hysterectomy according to background characteristics, India, 2019-21.

Background characteristics	Number of women	Number of women with hysterectomy	Percentage
Age			
15−29	359152	804	0.2
30−39	197936	6564	3.3
40−49	167050	16247	9.7
Place of residence			
Urban	235278	5988	2.3
Rural	488836	17627	3.6
Religion			
Hindu	589164	20233	3.4
Muslim	97595	2247	2.3
Christian	16995	553	3.3
Others (Sikh, Buddhist/neo-buddhist,jain,jewish,parsi/Zoroastrian,no religion & other)	20360	581	2.9
Caste			
Schedule caste (SC)	158482	4911	3.1
Schedule tribe(ST)	67262	1459	2.1
Other backward class(OBC)	310782	11284	3.6
Others	187586	5960	3.2
Education level			
No education	162450	11618	7.2
Primary	84922	3949	4.7
Secondary	363395	7206	2.0
Higher	113346	842	0.7
Wealth Index			

Note: # the 'N' is not additive to the total 'N' mainly because of flagged and missing cases

Background characteristics	Number of women	Number of women with hysterectomy	Percentage
Poorest	133973	3820	2.9
Poorer	144813	5049	3.5
Middle	148616	5483	3.7
Richer	150680	5205	3.5
Richest	146032	4056	2.8
Marital status			
Currently married	521352	21624	4.2
Widowed	22597	1677	7.4
Others (Never married/divorced/separated)	180165	314	0.2
Parity			
No children	223105	435	0.2
1 child	103185	1732	1.7
2 children	195458	8117	4.2
3 & above	202365	13332	6.6
Age at first cohabitation#			
< 15 years	65272	5569	8.5
15–19 years	340003	14703	4.3
20 & above years	146764	3279	2.2
Region			
North	102199	2322	2.3
Central	180228	4573	2.5
East	164828	6269	3.8
North-east	26745	319	1.2
West	71849	2591	3.6
South	178623	7541	4.2
Total	**724115**	**23616**	**3.3**
Note: # the 'N' is not additive to the total 'N' mainly because of flagged and missing cases			

Figure 1 reveals that Andhra Pradesh had the highest percentage of hysterectomies performed among women aged 15–49, at 9%, which is substantially higher than the national average of 3%. Telangana came in second, with 8% of women aged 15–49 having hysterectomies, followed by Bihar (6%) and Gujarat (4%). In India, the proportion of women aged 15–49 who get a hysterectomy varies significantly by geographical region.

Contrasts in the median age of hysterectomy in India

Figure 2 shows women's median age (in years) at hysterectomy in India and variations across the residence, education, and wealth quintiles. The median age at hysterectomy was about 2 years higher among urban women (36 years) than rural women (34 years). Women with no education had their hysterectomy at a younger median age (34 years) than women with higher education (37 years).

The median age of hysterectomy for women in the poorest wealth quintile was 4 years younger than for women in the richest wealth quintile, indicating a considerable distinction between the two groups of women. All the median ages for hysterectomy across the residence, educational level, and household wealth quintile categories, shown in Fig. 2.

Results from multivariate logistic regression analysis

Table 3 illustrates the odds ratio (OR) from a multivariate logistic regression that was used to look at the likelihood of a woman having a hysterectomy (dependent variable) belonging to given socio-demographic background characteristics (independent variables). A woman's age was found to be statistically associated with an increase in the risk for hysterectomy. For example, women aged 30–39 were 17.8 times more likely than women aged 15–29 to have undergone a hysterectomy. Likewise, women aged 40–49 were 7.9 times more likely than women aged 15–29 to have undergone a hysterectomy. Women in rural areas were 1.3 times more likely to have undergone a hysterectomy than women in urban areas. Muslim (OR: 0.7, 95% CI [0.70–0.79]) and Christian (OR: 0.8, 95%CI [0.76–0.92]) women were less likely to have had a hysterectomy compared with Hindu women. On the other hand, women who belonged to other religious groups (OR: 1.1, 95%CI [1.01–1.21]) were more likely to have undergone a hysterectomy than Hindu women. Hysterectomy was also found to be linked to caste. Women from scheduled tribes were less likely to have had a hysterectomy than women from scheduled castes.

Women from other backward classes and other caste categories, on the other hand, were more likely than their scheduled caste counterparts to have undergone the procedure. Woman's education was negatively associated with hysterectomy. Compared to women with no education, those with more years of schooling were less likely to have had a hysterectomy. Those with higher education, for example, were 0.4 times less likely to have a hysterectomy than women with no education.

Women from the richest wealth quintile had a much higher likelihood of hysterectomy than women from the poorest wealth quintile. Women in the richest quintile, for example, were 2.6 times more likely than

women in the poorest quintile to have had a hysterectomy. Similarly, compared to women in the poorest quintile, women in the poorer, middle, and richer quintiles had a significantly higher risk of hysterectomy.

The findings demonstrated that marital status was negatively associated with hysterectomy. Widow women were 0.8 times, and women who belonged to other marital status (never married, divorced, and separated) were 0.2 times less likely to have had a hysterectomy than currently married women.

Women's parity was also found to be a major predictor of hysterectomy in our study. The study discovered that women with third and higher parities were 2.9 times more likely than nulliparous women to have had a hysterectomy. The odds of having had a hysterectomy were 3.4 times higher for women with second parity and 1.9 times higher for women with first parity than nulliparous women.

In the study population, age at first cohabitation (also known as age at consummation of marriage) indicated a negative and significant association with having undergone a hysterectomy. Women who had their first cohabitation between the ages of 15 and 20 had a 70% reduced likelihood of getting hysterectomy and women who had their first cohabitation at the age of 20 or older had a 40% lower chance of undergoing hysterectomy than women who had their first cohabitation at the age of 15 or younger.

Women in the south, west, and east of India were 1.6, 1.2, and 1.4 times more likely to have had a hysterectomy than women in the north. Women in the Central region, on the other hand, were around 0.9 times less likely than those in the North to have had a hysterectomy. Women in the Northeast region were about 50% less likely to report having undergone a hysterectomy than women from the North region.

Table 3
Odds ratios of the relation of background variables to hysterectomy: Adjusted results from logistic regression analysis, NFHS-5.

Background characteristics	Odds ratio	95% CI
Age		
15−29®		
30−39	17.8***	16.3−19.4
40−49	7.9***	7.33−8.65
Place of residence		
Urban®		
Rural	1.3***	1.23−1.35
Religion		
Hindu®		
Muslim	0.7***	0.70−0.79
Christian	0.8***	0.76−0.92
Others (Sikh,Buddhist/neo-buddhist,jain,jewish,parsi/Zoroastrian,no religion & other)	1.1*	1.01−1.21
Caste		
Schedule caste (SC)®		
Schedule tribe (ST)	0.7***	0.68−0.77
Other backward class(OBC)	1.2***	1.12−1.23
Others	1.1***	1.05−1.17
Level of Education		
No education ®		
® represents the reference category.		
*** represents 1% level of significance, ** represents 5% level of significance and * represents 10% level of significance.		

Background characteristics	Odds ratio	95% CI
Primary	0.9***	0.86–0.95
Secondary	0.8***	0.76–0.83
Higher	0.4***	0.35–0.42
Wealth Index		
Poorest®		
Poorer	1.5***	1.45–1.62
Middle	1.8***	1.67–1.87
Richer	2.1***	2.00–2.27
Richest	2.6***	2.37–2.76
Marital status		
Currently married®		
Widowed	0.8***	0.78–0.88
Others (Never married/divorced/separated)	0.2***	0.19–0.24
Parity		
No children®		
1 child	1.9***	1.71–2.19
2 children	3.4***	3.05–3.82
3 & above	2.9***	2.55–3.18
Age at first cohabitation		

® represents the reference category.

*** represents 1% level of significance, ** represents 5% level of significance and * represents 10% level of significance.

Background characteristics	Odds ratio	95% CI
< 15 years®		
15–20 years	0.7***	0.63–0.69
> 20 years	0.4***	0.38–0.42
Region		
North®		
Central	0.9**	0.85–0.96
East	1.4***	1.30–1.48
North-east	0.5***	0.47–0.56
West	1.2***	1.14–1.31
South	1.6***	1.47–1.66
® represents the reference category.		
*** represents 1% level of significance, ** represents 5% level of significance and * represents 10% level of significance.		

Reasons for which hysterectomy was performed

The literature suggests that hysterectomy treats several conditions and diseases. These include chronic pain, excessive bleeding, endometriosis, pelvic floor prolapses, uterine and cervical cancers, uterine disorders, etc. The NFHS-5 posed the following question to all women who had undergone a hysterectomy: "Why was this operation (hysterectomy) performed?" [28]. It was a multiple response category questions as there may be more than one reason for resorting to hysterectomy.

Table 4 is generated by tabulating these responses from the dataset. According to Table 4, the most common reason for hysterectomy at the national level was excessive menstrual bleeding/pain (52%), followed by fibroid/cyst (25 percent), and uterine disease (11.1%).

Table 4
Reasons (percentages) for hysterectomy in India, NFHS-5(2019-21)

Reasons	Percentage (%)	Number (%)
Excessive menstrual bleeding/pain	51.8	12233
Fibroids/cysts	25.0	5891
Uterine disorder (rupture)	11.1	2616
Cancer	4.3	1005
Uterine prolapse	7.1	1687
Severe post-partum haemorrhage	3.2	765
Cervical discharge	7.0	1647
Others	7.6	1783

Sources of hysterectomy by socio-economic characteristics of the women in India, 2019-21

Women who had hysterectomies were further asked, "Where was this operation performed?" [28]. Out of all hysterectomies performed in India, more than two-thirds (69.6%) were performed in private health-care centers, whereas only 30% were performed in public health-care centers (Table 5).

It's worth noting that non-governmental organizations (NGOs) and not-for-profit trusts make up a relatively small percentage of private health facilities (almost 1%). Surprisingly, 70% of women in the rural area chose private health care for the hysterectomy, which was greater than the urban area (69%). The Hindu (70%) and the Christian (73%) women were also opted for a private health care facility for hysterectomy.

65% of women of the schedule caste chose private health care facility for hysterectomy as compared to 57% of women of the scheduled tribe. 81% of women with higher education went to private health-care facilities for hysterectomy, followed by women of secondary level education (71%) and women with no education (70%). Interestingly, 65% of women from poorest wealth quintile went to private health care facility for the hysterectomy. A higher percentage of women from richest wealth quintile (72%) went to private health facilities to undertake the hysterectomy.70% of the currently married women and women with 3 or more children chose private health facilities for the hysterectomy.

The pattern in the utilization of hospitalisation (public vs private) for hysterectomy in northeast regions was quite different from the rest of the country. The utilization of the public sector was highest in the northeast region (73%), followed by the north (43%). 77% of hysterectomies in the southern region were done in private institutions, followed by 72% in the east.

Table 5
Percent distribution of women who had hysterectomy by place the hysterectomy was performed, according to background characteristics, India, 2019-21.

Background characteristics	Public	Private
Age		
15–29	35.4	64.6
30–39	25	75
40–49	32	68
Place of residence		
Urban	31	68.7
Rural	30	70
Religion		
Hindu	30	70
Muslim	32.5	67.5
Christian	27.3	72.7
Others (Sikh,Buddhist/neo-buddhist,jain,jewish,parsi/Zoroastrian,no religion & other)	40.8	59.2
Caste		
Schedule caste (SC)	35	65
Schedule tribe(ST)	42.9	57.1
Other backward class(OBC)	25	75
Others	31.8	68.2
Education		
No education	30.5	69.5
Primary	33.7	66.3
Secondary	29.4	70.6
Higher	18.6	81.4
Wealth Index		
Poorest	35	65
Poorer	34	66
Middle	30	70

Background characteristics	Public	Private
Richer	28.5	71.5
Richest	23.9	76.1
Marital status		
Currently married	29.8	70.2
Widowed	37	63
Others (Never married/divorced/separated)	32.5	67.5
Parity		
No children	43.8	56.2
1 child	36	64
2 children	29.3	70.7
3 & above	29.9	70.1
Age at first cohabitation		
< 15 years	29.9	70.1
15–20 years	29.4	70.6
> 20 years	35.7	64.3
Region		
North	42.9	57.1
Central	30.9	69.1
East	27.6	72.4
North-east	73	26.7
West	41.3	58.7
South	23.0	77
Total	**30.4**	**69.6**

Discussion

The present study provides social, economic, and demographic determinants along with self-reported reasons for undergoing hysterectomy. The study also reveals the choice of hospitalization (Public vs Private) for conducting a hysterectomy. This paper comprehensively analyses all these critical aspects of hysterectomy in the Indian context. The findings of this study reveal that three in every 100 women aged

15–49 have had a hysterectomy in India. This study also discovered a hysterectomy prevalence in India ranging from 0.7 to 8.7 per 100 women in the age group 15–49 years, which is supported by Prusty et al's (2018) study, which discovered a hysterectomy prevalence ranging from 0.2 to 6.3 per 100 women in the age group 15–49 years in 21 of India's 36 states and union territories [29].According to our findings, the median age at hysterectomy for women residing in rural areas, without no education, and belonging to the poorest wealth quintile was 33–34 years. Desai et al (2016) found similar results in research in Gujarat, where the median age of hysterectomy was 36 years for women in a low-income context [19]. Because of the long-term repercussions of having a hysterectomy at a young age, this can have a significant impact on women's socio-psychological and physical health [30].

Women with no education, those living in rural areas, those in richest wealth quintiles, those with a young age at first cohabitation, and those from the eastern, western and southern regions were more likely to have hysterectomy, according to the study. Desai, Sinha, and Mahal's study also [19] shows that rural women are more likely to have hysterectomies. Women with no education and those from rural areas are more likely to have undergone a hysterectomy due to infection or uterus-related morbidities. Women from well-off households, on the other hand, may have had it since they were more likely to be able to afford the hysterectomy procedure [31].

In India, there are typical characteristics of reproduction among rural women and women without a formal education. Less-educated women are generally less informed about reproductive health and hygiene [32]. Uneducated women and those from low socio-economic origins had limited awareness of health check-ups and health-seeking behaviour. These factors may cause women to delay or avoid getting treatment in the early stages of a reproductive health problem [33]. Most women do not seek treatment for reproductive health problems in the early stages because they believe they are normal for women. In the women's reproductive health system, medical interventions are sometimes viewed as unneeded intervention [22].

The prevalence of hysterectomies in the states of Andhra Pradesh (9%), Telangana (8%), Bihar (6%), and Gujarat (4%) was found to be relatively higher than in the other states in India. Prusty, Choithani, and Gupta also found that Andhra Pradesh (6%), Telangana (5.5%), and Karnataka (3%) had a higher prevalence than the other 18 states of India [29]. The NFHS-5 shows that about two-thirds of women in the reproductive age group in Andhra Pradesh and about 30% in Telangana were overweight or obese [34]. The fact that hysterectomy is linked to obesity and overweight and that women in these two states confront early marriage and childbirth could explain why the prevalence of hysterectomy is higher in these two states. Bihar is one of the least developed states in terms of socio-economic development, and women in the state are generally unaware of reproductive health issues and treatment choices. It is also one of India's least urbanized states. The increased occurrence of hysterectomy in Bihar is likely due to low access to public health infrastructure in the state's rural areas, resulting in a delay in seeking treatment for reproductive health issues and the adoption of hysterectomy as a last resort. Gujarat is one of India's more developed states, with a large proportion of women in the high wealth quintile and a strong private health sector, which might partially lead to an increased risk for hysterectomy [31].

The present study revealed that the leading self-reported causes of hysterectomy were excessive menstrual bleeding/pain (52%), followed by the presence of fibroids/cysts (25%) and uterine ruptures (11%) among women in 15–49 years in India. However, Fibroids (73 percent in Hong Kong, 65 percent in India, 60 percent in the United States, 33 percent in Pakistan, and 23 percent in South Africa), followed by prolapse, remain the most common reasons for hysterectomy in other nations [35, 36, 37, 38].

It's worth noting that more than half (70%) of hysterectomies were performed in private health settings in India, where a woman's family has to bear nearly the whole financial burden associated with the treatment. It is further supported by the study of Desai et al that almost two-thirds of women undergoing hysterectomy utilized private hospitals, while the remainder used government or other non-profit facilities [10].

Conclusion

This study has attempted to analyse hysterectomy prevalence and its socio-economic determinants using the data covering 21 states and union territories of India. Another significant addition of this paper is the use of a population-based, nationally representative dataset to provide reasons for hysterectomy. It states that severe menstrual bleeding/pain was the most common reason for the hysterectomy, followed by the presence of fibroid/cyst. The conclusion emphasizes the need to raise public awareness about reproductive health issues, obtaining treatment, increasing the age of first marriage, and cohabitation. More targeted treatments are needed to address the reproductive health issues that women identify as causes of hysterectomy.

Abbreviations

NFHS
National Family Health Survey
DHS
Demographic and Health Survey
OR
Odds ratio
CI
Confidence Interval

Declarations

Ethics approval & consent to participate

This research does not have an ethical code because this research work was performed based on secondary data which is freely available DHS measures website https://dhsprogram.com/data/new-user-

registration.cfm. Additionally, all methods were carried out in accordance with relevant guidelines and regulations and thus author does not require any ethical clearance and consent to participate.

Availability of data and materials

Disclosure of Conflicting Interests

Funding

Authors Contribution

All authors read and approved the final manuscript. **PK:** Study design, carried out the statistical analysis, interpretation and drafted the manuscript. **JK:** Provided support to the study design, statistical analysis and helped to draft the manuscript. All authors reviewed the manuscript. Both authors read and approved the final manuscript.

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Figures

Figure 1

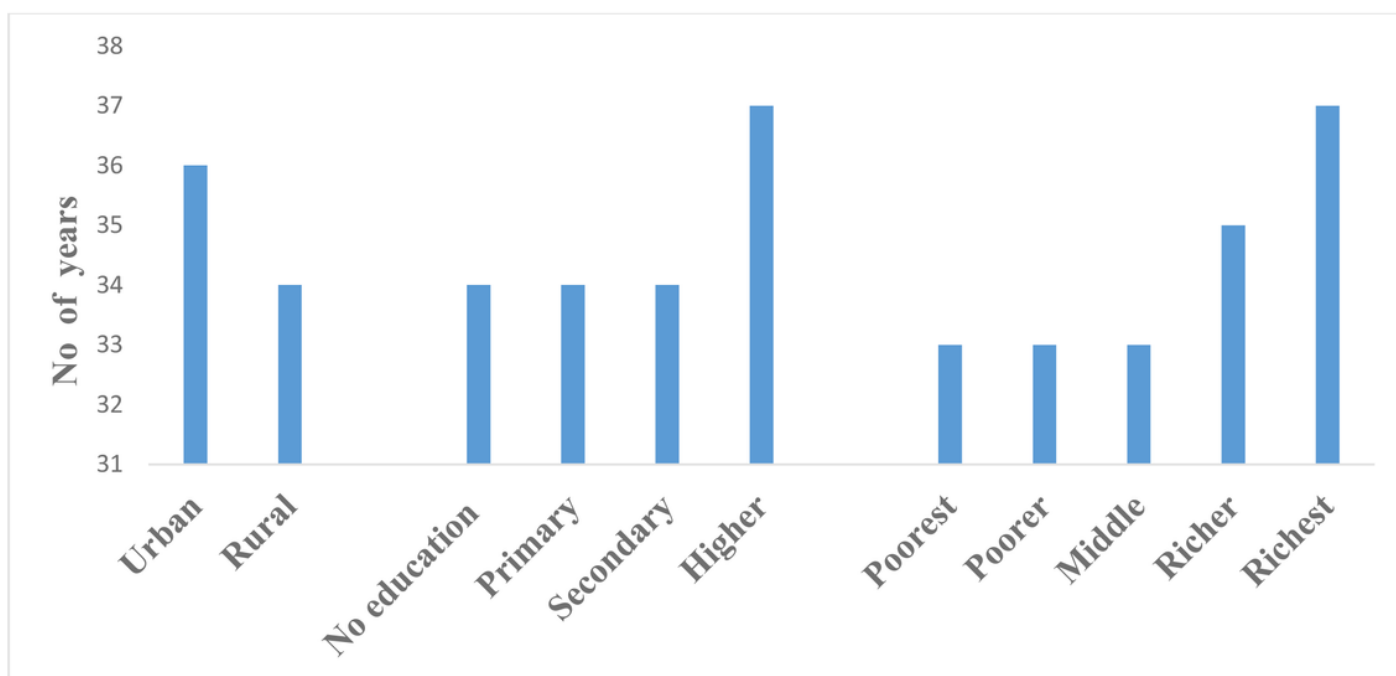Prevalence of hysterectomy by states/UTs, India, NFHS 5, 2019-2021.

Figure 2

Socioeconomic contrasts in median age of hysterectomy in India, NFHS 5, (2019–21)