Major Correlates and Socioeconomic Inequalities in Hysterectomy among Ever-Married Women in India

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Abstract

Purpose: This article focuses at the prevalence of hysterectomy, its major correlates, and the socioeconomic inequalities in the prevalence of hysterectomy among women in India. Methods: It used data from 527,865 ever-married women interviewed in 2015–2016 National Family Health Survey-4 from 601,000 households across 640 districts in the country. The economic inequalities in the prevalence of hysterectomy have been analyzed using poor–rich ratio and the concentration index (CI) in addition to the adjusted effects of major correlates through multiple logistic regression. Results: Unadjusted (9.3%) and adjusted prevalence of hysterectomy (odds ratio [OR] = 7.3; P < 0.001) are significantly higher among women aged 40 and above. Women from rural areas (OR = 1.2; P < 0.001) and those who were formerly married (6%) were more likely to have undergone hysterectomy. Over two-thirds of hysterectomies were conducted in private health-care facilities, where 51% reported that excessive menstrual bleeding was the main reason for hysterectomy. The value of poor–rich ratio (0.79) and CI (0.121) clearly depicts that hysterectomy is more inclined to be concentrated among middle-to-richer class of women in India. Conclusions: Private health-care sector should have standard regulatory practices to deliver more efficient, accountable, and sustainable maternal health-care services.

Keywords: Economic inequalities, ever married, hysterectomy, India

Background

Hysterectomy is the second most common major surgical procedure performed on women all over the world next to cesarean section.[1,2] Facility-based data in the United States, the United Kingdom, and Germany shows that hysterectomy is the leading reason for women’s admission into inpatient facilities.[2]

Worldwide, women suffer from gynecologic and obstetric disorders that require hysterectomy as a treatment modality.[3] Hysterectomy is also the treatment of choice in women who have completed their family.[4] The prevalence of hysterectomy varies from place to place depending on patient- and clinician-related factors.[5] There is a marked international and regional variation in hysterectomy rates.

Reasons of hysterectomy

Medical indications for hysterectomy include fibroids, dysfunctional uterine bleeding, uterine prolapse, and chronic pelvic pain.[6] Other studies done by Gambone et al. and Reiter et al. have also found that uterine fibroids were the most frequent indication.[7,8] The five most common indications for hysterectomies were fibroids (47.6%), uterovaginal prolapse (13.4%), benign ovarian cysts (12%), malignancy (9%), and adenomyosis (6%) according to the study done by Ravindran and Kumaraguruparan.[9] Fear of cancer, failure of medical treatment, practical difficulties in living with reproductive health problems, fear mongering by the doctors, and belief in the hysterectomy as the best treatment were some of the reasons for which women accepted hysterectomy in Maharashtra.[10]

Hysterectomy in India

Despite a lower prevalence compared to industrialized countries, hysterectomy has been a subject of recent controversy in India, and its prevalence among young women as well as suspicion of unnecessary hysterectomies is being raised as

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a matter of concern by women’s health advocates regarding women’s health and rights.\textsuperscript{[11]}.

In India, it accounts for only 6% of major surgeries.\textsuperscript{[12]} A study conducted in a northern state of India (Haryana) revealed that the incidence of hysterectomy was 7% among married women above 15 years of age,\textsuperscript{[12]} but a study by Radha et al. (2015) showed higher rates, i.e., 32.5% among pilgrims of Tirumala in Andhra Pradesh.\textsuperscript{[13]} Another study from a western state (Gujarat) pointed out that 7%-8% of rural women and 5% of urban women had already undergone hysterectomy at an average age of 37 years.\textsuperscript{[14]}

Thus, this study on hysterectomy in India is needed to understand the prevalence and factors associated with hysterectomy among women in India. Thus, the main aim of this study is to find the prevalence of hysterectomy and the main causes behind it among women in India. This study also tries to capture the socioeconomic inequality in the prevalence of hysterectomy among the women of India.

**Data Source and Methodology**

The present study uses data from the fourth round of the National Family Health Survey (NFHS) conducted during 2015–2016 (NFHS-4). The NFHS-4 covered all 29 states and 7 union territories in India. The NFHS-4 was conducted under the stewardship of the Ministry of Health and Family Welfare, Government of India, and is the collaborative effort of a large number of organizations. Four survey instruments were used in NFHS-4, namely, household questionnaire, women’s questionnaire, men’s questionnaire, and biomarker questionnaire. Relevant to this study, women’s questionnaire was used to collect the information from all eligible women aged 15–49 years. The survey collected information from a nationally representative sample of 699,686 women aged 15–49 during the period 2015–2016. For the present study, only ever-married women were considered. Never-married and ever-married women whose gauna has not been performed were excluded from the study. Thus, 527,865 women were considered for the study. There are few questions those were asked to women about their history of hysterectomy, place for hysterectomy, and reasons for hysterectomy. The study has used hysterectomy as a dependent variable and socioeconomic characteristics, demographic variables, and geographical regions of the respondents as independent variables.

Bivariate and multivariate binary logistic regression analyses were used to understand the prevalence of hysterectomy and to determine the factors associated with hysterectomy. The poor–rich ratio (poorest quintile/richest quintile) and the concentration index (CI) were used to understand the economic inequalities in hysterectomy among women. The poor–rich ratio is defined as the ratio between the percentage of women who had undergone hysterectomy among the poorest to the percentage of women who had undergone hysterectomy among the richest wealth quintile. If the poor–rich ratio is >1, it indicates that the poorest quintile of women are more likely to go for hysterectomy and if the poor–rich ratio is 1, then, it indicates that women from the poorest quintile and women from richest quintile have equally experienced hysterectomy.

The concentration indices were used to measure the overall inequalities in hysterectomy among the wealth quintiles of women. The CI is defined as twice the area between the concentration curve and the line of equality (the 45° line) and the index is bounded between −1 and 1. Hence, in this case, if there is no socioeconomic-related inequality, the CI is 0. The convention is that the index takes a negative value when the curve lies above the line of equality, indicating disproportionate concentration of the health variable among the poor, and a positive value when it lies below the line of equality. If the health variable is “bad” such as ill health, a negative value of the CI refers that ill health is higher among the poor.\textsuperscript{[15]} The study has estimated the CI for the last rounds of NFHS, i.e., NFHS-4.

**Results and Discussion**

Table 1 presents the percentage of women in the age group of 15–49 who had undergone hysterectomy in India according to some selected background characteristics. Out of 527,865 ever-married women aged 15–49 years, only 21,493 ever-married women reported to experience hysterectomy. Overall, 4.1% of women stated that they had undergone hysterectomy prior to the survey. The prevalence of hysterectomy is significantly more among women aged 40 and above (9.3%). Binary logistic regression also confirms that women in the age group of 30–39 years (odds ratio [OR] = 11.7; \( P < 0.001 \)) and age group of 40 and above (\( OR = 7.3; P < 0.001 \)) were more likely to experience hysterectomy. It is observed that women with no education (6%) and <5 years of education (5.2%) have higher prevalence of hysterectomy compared to those who are more educated. One of the reasons given is that highly educated women are also offered alternative treatments than hysterectomy as it is difficult to pressurize the educated women for surgery. Women with less education and lower income are more likely to undergo hysterectomy than women with higher education and income.\textsuperscript{[16,17]}

In the case of place of residence, women from rural areas were more likely to have undergone hysterectomy (\( OR = 1.2; P < 0.001 \)) than the urban women. Karthikeyan et al. found that rural women seek medical care relatively later depending on socioeconomic factors and access to health care. Hence, conservative treatment cannot be offered to them. Most of the times, the best treatment option available is hysterectomy.\textsuperscript{[18]} While comparing the religions, it was found that Hindu women (4.3%) experienced more hysterectomy as compared to Muslim women and women of other religions. Caste-wise comparison reveals that other backward class and other castes of women were more prone to have hysterectomy than their counterparts. Findings of the table indicate that those women having two or more ever-born children were more likely to experience hysterectomy. In a study, Desai et al., 2011,
found strong evidence that the incidence of hysterectomy was independently associated with age, with the highest incidence among women between 25 and 54 years and having at least two surviving children.\textsuperscript{[14]}

It is observed that more women in the middle (4.6%) and richer quintile (4.5%) had undergone hysterectomy. Adjusted OR also shows that affluent class of women were more likely to experience hysterectomy than the poor. Regional variation in the prevalence of hysterectomy is also observed among women. Results show that women from western region (3.9%), southern region (5.9%), and eastern region (4.1%) reported more prevalence of hysterectomy. Multivariate binary logistic regression also reveals that women from eastern, western, and southern regions were 1.3 (\(P<0.001\)), 1.2 (\(P<0.01\)), and 1.1 (\(P<0.001\)) times, respectively, more likely to experience hysterectomy than the other regions of India.

Figure 1 shows the state-wise variation in the prevalence of hysterectomy among ever-married women aged 15–49 years. There is enormous variation in the prevalence of hysterectomy across the states in the country. Women from Andhra Pradesh reported the highest prevalence of hysterectomy in India (11%), whereas in Assam (1.2%) and the Lakshadweep (1.2%),

The table below shows the percentage of ever-married women aged 15-49 years (excluded gauna not performed) who had hysterectomy by some selected background characteristics in India:

| Background characteristics | Percentage | Number of women | OR (95% CI) | Number of women with hysterectomy |
|----------------------------|------------|-----------------|-------------|----------------------------------|
| Age (years)                |            |                 |             |                                  |
| 15-29\textsuperscript{a}   | 0.6        | 200,727         |             | 1246                             |
| 30-39                      | 3.7        | 179,717         | 11.7** (10.62-12.89) | 6569                             |
| 40 and above               | 9.3        | 147,421         | 7.27*** (6.61-7.99) | 13,678                           |
| Years of schooling         |            |                 |             |                                  |
| No education\textsuperscript{b} | 6.0    | 179,379         | 0.99 (0.9-1.09) | 10,777                           |
| <5                         | 5.2        | 35,807          | 0.92 (0.86-0.98) | 1852                             |
| 5-9                        | 3.5        | 161,074         |             | 5683                             |
| 10 and above               | 2.1        | 151,605         | 0.72** (0.66-0.78) | 3181                             |
| Residence                  |            |                 |             |                                  |
| Urban\textsuperscript{c}   | 3.6        | 177,408         |             | 6420                             |
| Rural                      | 4.3        | 350,457         | 1.23*** (1.16-1.32) | 15,073                          |
| Religion                   |            |                 |             |                                  |
| Hindu\textsuperscript{d}   | 4.3        | 429,724         |             | 18,417                           |
| Muslim                     | 3.0        | 69,216          | 0.66 (0.61-0.71) | 2039                             |
| Others                     | 3.6        | 28,925          | 1.1* (0.99-1.22) | 1037                             |
| Caste/Tribe                |            |                 |             |                                  |
| Schedule caste\textsuperscript{e} | 3.7   | 107,493          |             | 4073                             |
| Schedule tribe             | 2.9        | 48,499,77       | 0.71*** (0.65-0.78) | 1472                             |
| OBC                        | 4.6        | 229,684         | 1.24*** (1.16-1.33) | 10,860                          |
| Others                     | 4.0        | 121,700         | 1.19*** (1.1-1.29) | 5009                             |
| Children ever born         |            |                 |             |                                  |
| 0\textsuperscript{f}       | 0.7        | 53,183          |             | 396                              |
| 1                          | 1.6        | 96,601          | 1.41*** (1.22-1.64) | 1527                             |
| 2                          | 4.2        | 171,189         | 2.73*** (2.38-3.14) | 7149                             |
| 3                          | 6.0        | 104,049         | 3.18*** (2.77-3.66) | 6243                             |
| 4+                         | 6.0        | 102,843         | 2.01*** (1.75-2.31) | 6178                             |
| Wealth index               |            |                 |             |                                  |
| Poorest\textsuperscript{g} | 3.0        | 96,467          |             | 2930                             |
| Poorer                     | 3.9        | 104,621         | 1.52*** (1.41-1.65) | 4124                             |
| Middle                     | 4.6        | 108,904         | 2.05*** (1.89-2.23) | 5045                             |
| Richer                     | 4.5        | 110,842         | 2.68*** (2.44-2.93) | 5011                             |
| Richest                    | 4.1        | 107,031         | 3.27*** (2.94-3.65) | 4384                             |
| Region                     |            |                 |             |                                  |
| North\textsuperscript{h}   | 2.8        | 69,753          |             | 1968                             |
| Central                    | 3.3        | 117,628         | 0.87*** (0.8-0.94) | 3875                             |
| East                       | 4.1        | 120,776         | 1.30*** (1.19-1.41) | 4964                             |
| Northeast                  | 1.4        | 18,157          | 0.44*** (0.36-0.44) | 253                              |
| West                       | 3.9        | 76,922          | 1.22*** (1.09-1.36) | 3029                             |
| South                      | 5.9        | 124,630         | 1.15* (1-1.21) | 7404                             |
| Total                      | 4.1        | 527,865         | 0.01*** (0.01-0.01) | 21,493                           |

\textsuperscript{a}Reference. ***\(P<0.001\), **\(P<0.01\) and *\(P<0.05\). CI: Confidence interval, OR: Odds ratio
hysterectomy was least prevalent. The results show that the prevalence of hysterectomy is low in the northeastern states. It was observed that women from the northern region of India, Jammu and Kashmir (3.9%) and Punjab (3.5%), reported higher prevalence than the other states in this region. Further, in central region, Madhya Pradesh (3.8%), Bihar (6.7%) in eastern, Dadra and Nagar Haveli (4.6%) and Gujarat (5.4%) in western, and Andhra Pradesh (10.5%) and Telangana (9.4%) in southern regions reported more number of women who had undergone hysterectomy prior to the survey.

It can be observed from Table 2 that approximately 67% women preferred private health sector for hysterectomy, while one-third of the women preferred public health sector for hysterectomy in India. Desai et al. (2011) found that slightly more than half of the women in low-income settings of Gujarat used private hospitals, whereas the remaining used government and trust facilities. Results depict that more women below the age of 40 years (66%) and having education up to 10 years or more (73%) preferred private health sector for hysterectomy. It is observed that the percentage of women preferring public health sector for hysterectomy is high among women belonging to other religion (32%) (including Christianity, Sikhism, and Buddhism) as compared to Hindu and Muslim women. Findings from the table reveal that women of richest wealth quintile (76%) were more likely to prefer private health sector for hysterectomy as compared to 63% women from poorest quintile. Further, it was observed that women who had undergone hysterectomy at age 35 and above years (72%) were more likely to prefer private health sector rather than public health sector in India.

Table 3 reports the reasons for hysterectomy by selected background characteristics among women aged 15–49 years. Only 6261 women have reported the reasons for hysterectomy. It is observed that half of the women (51%) reported that excessive menstrual bleeding/pain was the main reason for hysterectomy, whether other women reported fibroids/cysts (15%), uterine disorder/prolapse (20%), severe postpartum hemorrhage (16%), and cancer (6%) as the main reasons for their hysterectomy. Results depict that due to excessive menstrual bleeding/pain, the number of women who have undergone hysterectomy was highest in the age group of 40 years and above (52%), had 10 and above years of schooling (53%), residing in urban areas (56%), and belonging

### Table 2: Percentage of ever-married women aged 15-49 years (excluded gauna not performed) by place for hysterectomy according to some selected background characteristics in India

| Background characteristics | Public health sector | Private health sector | Elsewhere or don’t know place |
|-----------------------------|----------------------|-----------------------|-------------------------------|
| Age 15-29                   | 33.5                 | 65.7                  | 0.9                           |
| 30-39                       | 28.5                 | 71.3                  | 0.2                           |
| 40 and above                | 33.9                 | 65.8                  | 0.3                           |

| Years of schooling          |                      |                      |                               |
| No education                | 33.7                 | 66.0                  | 0.3                           |
| <5 years                    | 35.8                 | 63.7                  | 0.6                           |
| 5-9                         | 31.5                 | 68.1                  | 0.4                           |
| 10 and above                | 26.7                 | 73.1                  | 0.2                           |

| Residence                   |                      |                      |                               |
| Urban                       | 33.5                 | 66.3                  | 0.2                           |
| Rural                       | 31.7                 | 67.9                  | 0.4                           |

| Religion                    |                      |                      |                               |
| Hindu                       | 32.5                 | 67.2                  | 0.3                           |
| Muslim                      | 29.8                 | 69.7                  | 0.6                           |
| Others                      | 32.2                 | 67.3                  | 0.6                           |

| Wealth index                |                      |                      |                               |
| Poorest                     | 35.6                 | 63.4                  | 1.0                           |
| Poorer                      | 37.2                 | 62.5                  | 0.4                           |
| Middle                      | 33.6                 | 66.3                  | 0.2                           |
| Richer                      | 31.9                 | 67.9                  | 0.2                           |
| Richest                     | 24.3                 | 75.6                  | 0.2                           |

| Age at hysterectomy         |                      |                      |                               |
| Below 30                    | 40.5                 | 59.1                  | 0.4                           |
| 30-35                       | 28.5                 | 71.1                  | 0.4                           |
| Above 35                    | 28.2                 | 71.5                  | 0.3                           |
| Total                       | 32.2                 | 67.4                  | 0.3                           |
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Table 3: Percentage of ever-married women aged 15-49 years (excluded gauna not performed) by reason for hysterectomy according to some selected background characteristics in India

| Background characteristics | Excessive menstrual bleeding/pain | Fibroids/cyst | Uterine disorder/prolapse | Cancer | Severe postpartum hemorrhage | n |
|---------------------------|----------------------------------|---------------|---------------------------|--------|----------------------------|---|
| Age                       |                                  |               |                           |        |                            |   |
| 15-29                     | 46.8                             | 11.5          | 16.9                      | 8.2    | 23.0                       | 474|
| 30-39                     | 50.6                             | 15.0          | 19.6                      | 6.5    | 17.2                       | 1800|
| 40 and above              | 52.2                             | 15.5          | 20.4                      | 5.3    | 15.3                       | 3988|
| Years of schooling        |                                  |               |                           |        |                            |   |
| No education              | 50.9                             | 15.3          | 21.1                      | 7.0    | 15.6                       | 3076|
| <5 years                  | 52.7                             | 16.4          | 15.4                      | 3.6    | 20.3                       | 536 |
| 5-9                       | 50.6                             | 15.0          | 19.5                      | 4.7    | 17.4                       | 1678|
| 10 and above              | 53.5                             | 13.6          | 19.3                      | 5.4    | 15.2                       | 971 |
| Residence                 |                                  |               |                           |        |                            |   |
| Urban                     | 56.3                             | 14.9          | 17.2                      | 4.7    | 14.2                       | 1810|
| Rural                     | 49.4                             | 15.2          | 21.0                      | 6.3    | 17.3                       | 4474|
| Religion                  |                                  |               |                           |        |                            |   |
| Hindu                     | 52.0                             | 14.3          | 19.6                      | 5.8    | 16.7                       | 5406|
| Muslim                    | 48.2                             | 17.0          | 20.2                      | 8.3    | 18.3                       | 602 |
| Others                    | 44.8                             | 26.0          | 25.4                      | 1.7    | 6.9                        | 253 |
| Wealth index              |                                  |               |                           |        |                            |   |
| Poorest                   | 44.5                             | 14.5          | 22.2                      | 8.1    | 21.4                       | 1043|
| Poorer                    | 47.9                             | 16.1          | 18.3                      | 6.6    | 21.1                       | 1363|
| Middle                    | 52.1                             | 15.6          | 19.5                      | 5.3    | 14.9                       | 1427|
| Richer                    | 56.0                             | 12.8          | 20.9                      | 5.3    | 13.7                       | 1299|
| Richest                   | 55.6                             | 16.2          | 19.1                      | 4.2    | 11.4                       | 1128|
| Age at hysterectomy       |                                  |               |                           |        |                            |   |
| Below 30                  | 48.6                             | 13.3          | 16.4                      | 5.1    | 23.4                       | 2331|
| 30-35                     | 55.2                             | 13.8          | 19.7                      | 5.6    | 16.0                       | 1548|
| Above 35                  | 51.6                             | 17.6          | 23.5                      | 6.7    | 9.9                        | 2382|
| Total                     | 51.4                             | 15.1          | 19.9                      | 5.9    | 16.4                       | 6261|

Table 4: Poor-rich ratio and concentration index depicting socioeconomic inequality with respect to hysterectomy across geographic regions and states

| Poor-rich ratio | CI    | SE (CI) |
|-----------------|-------|---------|
| India           | 0.79  | 0.121   | 0.0062 |
| North           | 0.59  | 0.109   | 0.008  |
| Central         | 0.55  | 0.171   | 0.006  |
| East            | 0.99  | 0.085   | 0.007  |
| Northeast       | 0.25  | 0.282   | 0.005  |
| West            | 0.65  | 0.099   | 0.012  |
| South           | 0.84  | 0.048   | 0.009  |

CI: Concentration Index; SE: Standard error

to Hindu religion (52%). It is observed that as wealth index increases, the proportion of women who had undergone hysterectomy due to excessive menstrual bleeding/pain also increases.

Further, women belonging to “others” religion (26%) and whose age at hysterectomy was above 35 years (18%) reported that fibroid/cyst was the reason for their hysterectomy. Those women who said that uterine disorder/prolapse was the reason for hysterectomy, the proportion was higher among married (20%), residing in rural areas (21%), belonging to other religions (26%), and poorest wealth quintile (22%). It is also observed that approximately 24% women whose age at hysterectomy was above 35 years reported that uterine disorder was the reason for hysterectomy than their counterparts. Approximately one-fourth of women aged below 30 years reported that severe postpartum hemorrhage was the cause for their hysterectomy. Findings of the table also indicate that women from poorest (21%) and poorer wealth quintile (21%) and whose age at hysterectomy was below 30 years (23%) reported severe postpartum hemorrhage as the main cause for hysterectomy.

Economic inequalities with respect to hysterectomy refer to the degree to which hysterectomy rates differ between more and less economically advantaged groups. In this study, economic inequality with respect to hysterectomy was measured using the poor–rich ratio (poorest/richest wealth quintile) and CI for different geographic regions of India. The value of poor–rich ratio (0.79) and CI (0.121) clearly depicts that hysterectomy is more inclined to be concentrated among middle-to-richer class of women in India. Socioeconomic inequalities with respect to hysterectomy among women varied considerably across the different geographic regions in India [Table 4]. The lower value of poor–rich ratio <1 and positive value of CI in
every geographic regions indicate the existence of economic inequalities in hysterectomy and that hysterectomy is slightly concentrated among middle-to-richer class of women in India. Furthermore, the results indicate that the highest value of CI was observed in north-eastern regions (CI = 0.282) of India.

**Conclusions**

The study revealed that hysterectomy was much more prevalent in the southern region of India. Again, most of the women in India opted for hysterectomy at the age of 35 years or below, and the main cause of hysterectomy was excessive menstrual bleeding and pain. Having two or more ever-married children was significantly associated with opting for hysterectomy among the ever-married women. The preferred choice of the health sector for hysterectomy was private clinics but availing public health facilities were more common in the northeastern region. In India, hysterectomy was high among the middle and affluent class women as compared to the poorer quintiles, implying that in India, hysterectomy is concentrated among middle-to-richer section of women. Private health-care sector should have standard regulatory practices to deliver more efficient, accountable, and sustainable maternal health-care services.

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**Conflicts of interest**

There are no conflicts of interest.

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