

## **The Effect of Cessation of Menstruation on Physical Health: A study of Indian Women**

---

### **Background**

Hysterectomy is the second most frequently performed major surgical procedures on women all over the world, next only to cesarean section. Women who undergo hysterectomy face a multitude of physical and psychosocial problems both before and after the hysterectomy. The present study explores the effects of hysterectomy on the quality of life of women on selected morbidities. It was seen that all women, regardless of the circumstances that lead to the hysterectomy and the type of surgery, faced varying degrees of physical and psychosocial problems. All of them suffered hot flushes and night sweats. They also gained weight although some were able to control the weight gain through diet and exercise. Other physical distresses reported included insomnia, breathlessness, tiredness, fatigue, muscular ache, joint pain and skin problems like dryness, loss of elasticity, etc. The psychological problems included mood swings, irritability, depression, tendency to cry easily, short-tempered behavior and lessened self-confidence. The post-hysterectomy sexual life differed from woman to woman. Some reported improved sex life since the hysterectomy put an end to heavy bleeding and pain. Since hysterectomy resulted in sterilization, they could also enjoy sex without contraception. However, in some cases, hysterectomy resulted in the loss of libido and lack of interest in sex. Physical problems like vaginal dryness, soreness, etc. were reported. Hysterectomy with ovarian conservation is associated with cardiovascular risk factors, particularly obesity. Obesity may contribute to the underlying gynecologic conditions leading to hysterectomy; however, surgical selection may also play a role [1]. Hysterectomy has been associated with a higher frequency of cardiovascular risk factors, such as hypertension, hyperlipidemia, and obesity at the time of the surgery [2-6]

Menopause onset marks the end of a women's reproductive stage in life and the start of a time of permanently lowered estrogen exposure that is increasingly recognized as having significant health implications. Earlier age at onset of natural menopause (ANM) has been shown to be associated with reduced risk of breast cancer [7] ovarian cancer [8] and, by contrast, with an increased risk of cardiovascular disease [9] atherosclerosis [10] stroke [11] and osteoporosis [12]. Overall, all-cause mortality has been found to be reduced by 2% with each increasing year of ANM [13, 14].

ANM appears to vary across different regions, countries and ethnic groups, this may be due to genetic variation [15,16]. However, ANM may also reflect differences in socioeconomic position and environmental, lifestyle, reproductive or early childhood factors [17]. Socio-economic position and lifestyle factors that may affect the timing of menopause include education, occupation, income, smoking, physical activity and body mass index (BMI) [18]. Of these, smoking has been consistently recognized to have an association with earlier menopause [19].

## **Objectives**

1. To find the factors associated with morbidities in hysterectomies and menopausal women.
2. To analyze the relationship between menstrual statuses of women with selected morbidities.

## **Data source and methodology: -**

**Data source:** - National Family Health Survey (NFHS-IV) has been used to assess the objectives. NFHS IV was conducted in 2015-16. NFHS is conducted by International Institute for Population Sciences, under the auspices of Ministry of Health and Family Welfare (MoHFW), Government of India (GOI). NFHS is similar to DHS survey. NFHS-4 provides information on population, health, and nutrition for India and each state /union territory and District. In all, 28,586 Primary Sampling Units (PSUs) were selected across the country in NFHS-4, of which fieldwork completed in 28,522 clusters. A total of 601,509 households were successfully interviewed, with a response rate of 98%. From the interviewed households, 723,875 eligible women age 15-49 were identified for interview. Interviews with 699,686 women were completed with a 97% response rate.

## **Variable Description: -**

### **Dependent variables**

Women were classified into three groups: currently menstruating, menopausal and hysterectomies. NFHS IV, for the first time, has provided information on hysterectomy across the country. We have used Hysterectomy as an outcome variable in the present study. The survey asked the following questions related to hysterectomy to women age (15-49).

1. Some women undergo an operation to remove the uterus. Have you undergone such operation?
2. How many years ago this operation (Hysterectomy) was performed?
3. Where this operation was performed?
4. Why this operation performed? Any other reason?

The outcome variable has made dichotomous having categories “having a hysterectomy” and “not having a hysterectomy.”

For menopause there, the question asked for female “When did your last menstrual period start?” from this question I have defined that women who are not menstruating more than 6 six months they are in menopause except pregnant women, hysterectomy women, never menstruating women and before last birth. The outcome variable has made dichotomous having categories “having a hysterectomy” and “not having a hysterectomy” similar for menopause “in menopause” “not in menopause.” Some other dependent variables were BMI, Obesity, Diabetes, Asthma, High blood pressure, Heart diseases, Thyroid, Cancer.

## Independent variable

To examine the association of hysterectomy and menopause with various socio-economic, demographic factors, the covariates used in the analysis were age, education completed, occupation, marital status, place of residence, religion, caste, wealth index, age at marriage, age at first cohabitation, age at first birth, parity, occurrence of sterilization, age at sterilization, insurance status and empowerment status

## Methodology

### 1. Chi-square

Chi-square statistics has been used to calculate

- 1.) The association between women with hysterectomy and morbidities by background characteristics women.
- 2.) The association between women with menopause and morbidities by background characteristics of women.

The formula of Chi-square test

O<sub>i</sub> – Observed frequency

E<sub>i</sub> – Expected frequency

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

### 2. Logistic regression

The study used logistic regression to find the probability of occurrence of morbidities among hysterectomies women, menopausal women and menstruating or other women

The logistic regression equation is –

$$\text{Logit}(p) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_kX_k$$

The logit transformation defined as the logged odds:

$$\text{Odds} = (p / 1-p)$$

$$\text{Logit}(p) = \text{Ln}(p/1-p)$$

Where,

p: the probability of the presence of the characteristic of interest (Dependent variable).

1-p: the probability of non-occurrence of the characteristic of interest.

X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>.....X<sub>k</sub> are predictor variables

b<sub>0</sub>: intercept when there is no effect of any predictor variable on the dependent variable.

b<sub>1</sub>, b<sub>2</sub>, b<sub>3</sub>.....b<sub>k</sub> are co-efficient of predictor variables.

### 3. Propensity score matching

The propensity score-matching technique was used for finding the actual prevalence of morbidities, among (i) Hysterectomies and non- hysterectomies and (ii) Women with menopause and women without menopause by adjusted all other background characteristics.

PSM is the statistical technique that estimates the effect of a treatment or intervention by adjusting for covariates that predict receiving the treatment or intervention. In this case, PSM reduces the bias due to confounding variable that could be found in estimates for hysterectomy and menopause obtained from simply comparing outcomes for hysterectomies

and not hysterectomies women and also women with menopause and women without menopause.

PSM based on the counterfactual modeling. For computing the average treatment effect (i.e., an estimate of hysterectomy and menopause), a counterfactual model is estimated. Counterfactual is the potential outcome that we would have obtained in case the women had a hysterectomy or go in menopause. With the help of the counterfactual model, the average treatment effect on treated (ATT) is estimated as

$$\mathbf{ATT = E (Y1/D = 1) - E (Y0/D = 1)}$$

Where  $E (Y1/D=1)$  gives the outcome for women who had hysterectomy and  $E (Y0/D=1)$  is the expected outcome if hysterectomies women become non- hysterectomies.

Similarly for menopause, where  $E (Y1/D=1)$  gives the outcome for women who are in menopause and  $E (Y0/D=1)$  is the expected outcome if menopausal women become not in menopause.

Similarly, the average treatment effect on the untreated (ATU) is defined mathematically as

$$\mathbf{ATU = E (Y1/D=0) - E (Y0/D=0)}$$

Where  $E(Y1/D=0)$  is the expected outcome if non- hysterectomies women become hysterectomies and  $E(Y0/D=0)$  is the outcome for non- hysterectomies.

Similarly for menopause, where  $E (Y1/D=0)$  is the expected outcome if women not in menopause become in menopause and  $E (Y0/D=0)$  is the outcome for women not in menopause.

The Average treatment effect (ATE) is the difference between the expected outcome for hysterectomies women and not hysterectomies women.

In case of menopause, Average treatment effect (ATE) is the difference between the expected outcome for women in menopause and women who are not in menopause.

$$\mathbf{ATE = E (Y|D = 1) - E (Y|D = 0) = \Delta}$$

$$\mathbf{We\ can\ \Delta = ATT + E (Y_0|D = 1) + E (Y_0 |D = 0)}$$

The other issues that are important in PSM are “common support,” “balancing property,” and “quality of matching.” Common support ensures that hysterectomies and menopausal women with the same “X” values have a positive probability of being both hysterectomies and non-hysterectomies, and with menopause and without menopause (Heckman, Lalonde and Smith 1999). Common support improves the quality of estimates by excluding hysterectomy and menopause for which there is no matched sample. Balancing property tests whether the matching procedure can balance the distribution of relevant covariates. The quality of matching examines whether the distribution of propensity score of hysterectomies and non-hysterectomies, also with menopause and without menopause overlap. Sianesi (2004) suggest comparing the pseudo – R2 before and after matching. The pseudo -R2

indicates how well the repressors “X” explain the participation probability (Caliendo and Kopeinig 2005). The pseudo-R2 should be fairly low after matching because after matching there should be no systematic differences in the distribution of covariates between hysterectomies and non-hysterectomies, and with menopause and without menopause population. Additionally, an “F” test may be performed. The test should not be rejected before and should be rejected after matching (Caliendo and Koeing, 2005). Notably, PSM does not account for potential hidden bias due to unobserved factors that might the estimates of key relationship of interest. More information about the PSM methods used in this study can be found in Rosenbaum and Rubin (1983). Statistical estimation was done using STATA 14

### 3.1 Assumptions

Matching relies on the assumption of conditional independence of potential outcomes and treatment assignment given observables. This is the so-called Conditional Independence Assumption and is known as “un-confoundedness” in the program evaluation literature.

### 3.2 Conditional Independence Assumption

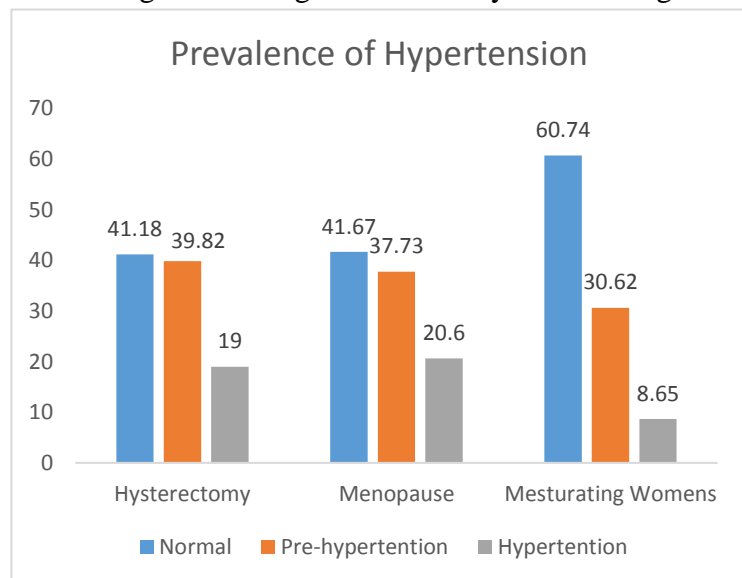
For a given set of observable  $X$ , which is not affected by treatment, potential outcomes are independent of treatment assignment:

$$(Un-confoundedness) Y(0), Y(1) \perp\!\!\!\perp X, \text{ for every } X$$

The practical meaning of this condition for matching is the availability of characteristics observed before the intervention takes place, as the variables observed after the intervention could themselves be influenced by the intervention.

## Results

Table-1a, Portrays that prevalence of hypertension and pre-hypertension among hysterectomies, menopausal and menstruating women age 15 to 49 by their background characteristics. The women who have undergone hysterectomy, 19 percent of those women had hypertension and 40 percent of women had prehypertension. In the case of menopausal women, the prevalence of hypertension is 20.6 percent, and the prevalence of pre-hypertension is 38 percent. In the case of menstruating women, the prevalence of hypertension is 8.7 percent and prevalence of pre-hypertension is 30.6 percent. As age increases the prevalence of hypertension and pre-hypertension were also increases in all groups. Prevalence of hypertension was high in an urban area compared to a rural area in all group. In the case of urban hysterectomies, women prevalence of hypertension were 22.1%, and pre-hypertension



hypertension and pre-prehypertension were also increases in all groups. Prevalence of hypertension was high in an urban area compared to a rural area in all group. In the case of urban hysterectomies, women prevalence of hypertension were 22.1%, and pre-hypertension

was 42.2%, and in rural hysterectomies, women prevalence of hypertension was 39%, and pre-hypertension was 18%. Prevalence of hypertension and pre-hypertension, among urban menopausal women, were 23% and 39% respectively and among urban menstruating women 9% and 30% respectively. Prevalence of hypertension and pre-hypertension, among rural menopausal women, were 19% and 37% respectively and among rural menstruating women 8% and 31% respectively. Hysterectomies women with higher level of education had 21% prevalence of hypertension, which higher compare to their counterparts. Hindus, Muslims and Other religion hysterectomies women had 18%, 24% and 31% prevalence of hypertension. A wealth of women were positively associated prevalence of hypertension in all cases.

Table-1b, Reveals the prevalence of diabetes and obesity among hysterectomies, menopausal and menstruating women (15 -49) by their background characteristics. Prevalence of diabetes among hysterectomies women (6%), among menopausal women (4.2%) and among menstruating women (1.37%) which reveals that prevalence of diabetes was more in hysterectomies women. Prevalence of diabetes was higher in the older age group. In urban is the prevalence of diabetes was approximately double in groups compared to a rural area. Prevalence of diabetes among hysterectomies women in the urban area were 10.2% and in a rural area 4.2%. A professional and clerical worker in hysterectomies group shows the very high prevalence of diabetes that is 32.2% and 13.5%. Prevalence of diabetes was positively related to a wealth of women and is higher in hysterectomies group compare their counterparts. In case of obesity, Prevalence of obesity among hysterectomies women (11%), among menopausal women (7%) and among menstruating women (5%) which reveals that prevalence of obesity was more in hysterectomies women. Prevalence of obesity was higher in older ages, and among hysterectomies women in age group, 40 to 49 prevalence of obesity were 13.2%. Prevalence of obesity in urban was approximately three times higher compared to a rural area. Among hysterectomies, women from urban area prevalence of obesity were 20% and in a rural area 7.2%. Level of education was positively correlated with obesity in all groups. Hysterectomies women who had the higher education they had 25.1% prevalence of obesity. In case of richest women prevalence of obesity were 24% in hysterectomies group, 18.2% in the menopausal group and 10.2% in the menstruating group.

Table-1c, Portrays that prevalence of thyroid and heart disease among hysterectomies, menopausal and menstruating women (15-49) by their background characteristics. Prevalence of thyroid among hysterectomies women (4.6%), among menopausal women (3%) and among menstruating women (2.1%) which reveals that prevalence of thyroid was more in hysterectomies women. Prevalence of thyroid was higher in older ages in all groups, and among hysterectomies women in age group, 40 to 49 prevalence of thyroid were 5.3%. Prevalence of thyroid in urban was approximately two times higher compared to a rural area. Among hysterectomies, women from urban area prevalence of thyroid were 7.5% and in a rural area 3.3%. Level of education was positively correlated with the prevalence of thyroid in all groups. Hysterectomies women who had the higher education they had 10.4% prevalence of thyroid. A wealth of women's was positively correlated with the prevalence of thyroid. In case of richest women prevalence of thyroid were 8.4% in hysterectomies group, 6.7% in the menopausal group and 4% in the menstruating group. In case of heart diseases, Prevalence of

heart diseases among hysterectomies women (3.8%), among menopausal women (2.5%) and among menstruating women (1.2%) which reveals that prevalence of heart diseases was more in hysterectomies women. Prevalence of heart diseases was higher in older ages in all groups, and among hysterectomies women in age group, 40 to 49 prevalence of heart diseases were 4.2%.

Table- 2, Provide the information about the prevalence of different morbidities among the hysterectomies, menopausal and normal women. In this table, we see that hysterectomies women had more prevalence of diseases than their counterpart. Similarly, prevalence of asthma, thyroid, cancer, heart disease and diabetes are more in those women who had a hysterectomy.

Table-3, Shows the adjusted odds ratio of hypertension and heart disease for hysterectomies, menopausal and other or menstruating women (15 – 49) by their background characteristics. In case of hysterectomies women chances of hypertension were 2.38 times and 4.17 times more likely in age group (30-39) and (40 – 49) compare to age group (15-29) and in menopausal women chances of hypertension were 3.58 times and 6.42 times more likely in age group (30-39) and (40 – 49) compare to age group (15-29). In case of menstruating women, chances of hypertension were 2.8 times and five times more likely in age group (30-39) and (40 – 49) compare to age group (15-29). As the wealth of women increases chances of hypertension also increase. As in the case of hysterectomies women, compare to the poorest category chances of hypertension were 24%, 35%, 75%, and 74% higher in poorer, middle, richer and richest category respectively. In the case of heart diseases, chances of heart disease in hysterectomies women were 40% higher in age 40-49 compare to age group 15-29. In case of menopausal women, chances of heart diseases were 93% and 2.6 times higher in age group 30-39, and 40-49 compare to age group 15-29. In case of normal women, chances of heart diseases were two times and 2.8 times higher in age group 30-39, and 40-49 compare to age group 15-29.

Table-4, Reveal the adjusted odds ratio of obesity and diabetes in hysterectomy, menopausal and other or menstruating women (15-49) by their background characteristics. In case of hysterectomies women chances of obesity were 90% and 2.62 times more likely in age group (30-39) and (40 – 49) compare to age group (15-29) and in menopausal women chances of obesity were 3 times and 3.3 times more likely in age group (30-39) and (40 – 49) compare to age group (15-29). In case of menstruating women, chances of obesity were 2.6 times and 3.5 times more likely in age group (30-39) and (40 – 49) compare to age group (15-29). In rural area chances of obesity, in hysterectomies women (35%), in menopausal women (33%) and menstruating women (30%) less likely compared to an urban area. In case of religion, chances of obesity were more in Muslims, and Others compare to Hindus in all groups. Compare to SC/ST chances of obesity were more in OBC and Others in all women. A wealth of women were positively correlated with obesity. In the case of hysterectomies women, compare to the poorest category chances of obesity were 92%, 3.32 times, 5.22 times and 8.12 times more likely in poorer, middle, richer and richest category. In case of diabetes, women who had hysterectomy chances of diabetes were 28% and 2.63 times more likely in age group (30-39) and (40 – 49) compare to age group (15-29) and in menopausal women chances of diabetes were 82% and 5.34 times more likely in the age group (30-39) and (40 – 49) compare to age group (15-29). In case of menstruating women, chances of diabetes were 2.9 times and 7.27

times more likely in age group (30-39) and (40 – 49) compare to age group (15-29). In rural area chances of diabetes, in hysterectomies women (29%), in menopausal women (30%) and menstruating women (18%) less likely compared to an urban area. In case of religion, chances of diabetes were more in Muslims, and Others compare to Hindus in all groups. A wealth of women were positively correlated with diabetes. In the case of hysterectomies women, compare to the poorest category chances of diabetes were 19%, 61%, 2.23 times and 2.63 times more likely in poorer, middle, richer and richest category. Parity of women was negatively associated with diabetes. As in case of hysterectomies women, women with one child had 26%, women with one child had 39%, and women with three or more children had 48% less likely to have diabetes compare to women with no children.

Table-5, Shows the adjusted odds ratio of hypertension, heart diseases, obesity, and diabetes. The table revealed that the chances of getting hypertension are significantly associated with hysterectomy and menopause. Women with hysterectomy were found to be 24 percent more likely to have hypertension compare to menstruating women. Women who are in menopause have 36 percent more chances to have hypertension. In the case of heart diseases, women undergone hysterectomy are approximately two times more likely to have heart disease compare to menstruating women. Whereas in the case of menopausal women the likelihood of developing the heart disease is 3 percent more than the menstruating women. The hysterectomy is significantly associated with obesity and diabetes. Therefore, hysterectomies women have 38 percent more chances to get obesity compared to menstruating women. The chances of diabetes are approximately two times higher in hysterectomies women, and 57 percent higher in menopausal women compare to menstruating women.

Table-6, Portrays the actual effect of hysterectomy. In this table, we have used propensity score matching to control biases related to background characteristics and other confounders to see the actual impact of hysterectomy on different diseases. The comparative study between women undergone hysterectomy and non- hysterectomies shows that the risk of developing diseases like Asthma, heart disease, hypertension, cancer, diabetes and thyroid increases for those who went for hysterectomy. For instance, before matching, the prevalence of heart diseases among treated (women who had) group is 4.04%, and for control (women who not had a hysterectomy) group prevalence of heart disease is 1.43%. After matching, the value of ATT (average treatment effect) is 4.04 in the treatment group and 1.73 in control group, which means that if those women who had a hysterectomy if these would not have a hysterectomy, then the prevalence of heart diseases is 1.73 percent. The value ATU (average treatment effect among untreated) was 1.43 and 6.32, which shows that women who did not have undergone hysterectomy if they chose to have a hysterectomy then the prevalence of heart diseases among them were 6.3 percent. The average treatment effect (ATE) shows the difference between the treated and untreated women is 4.82 percent. The ATE reveal the actual impact of hysterectomy on heart diseases, which means because of hysterectomy prevalence of heart disease may increase by 4.82%.

The prevalence of hypertension before matching was 19.6% among treated (hysterectomies) group and 10% among control (not hysterectomies) group. After matching



the value of ATE were 19.6% for treatment and 17.8% for control, which means those women who had a hysterectomy if they would not have a hysterectomy than the prevalence of hypertension among them were 17.8%. The value of ATU was 10% for treatment and 11.7% for control, which means those women who not had a hysterectomy, they would have a hysterectomy then the prevalence of hypertension among them was 11.7%. The value of ATE was 1.7%, which means because of hysterectomy prevalence of hypertension may increase by 1.7%. (Table-6)

The prevalence of diabetes before matching was 5% among treated (hysterectomies) group and 1.3% among control (not hysterectomies) group. After matching the value of ATE were 5% for treatment and 2.2% for control, which means those women who had a hysterectomy if they would not have a hysterectomy than the prevalence of diabetes among them were 2.2%. The value of ATU was 1.3% for treatment and 3.6% for control, which means those women who not had a hysterectomy, they would have a hysterectomy then the prevalence of diabetes among them was 3.6%. The value of ATE was 2.32%, which means because of hysterectomy prevalence of diabetes may increase by 2.32%. (Table-6)

The prevalence of thyroid before matching was 4.4% among treated (hysterectomies) group and 1.8% among control (not hysterectomies) group. After matching the value of ATE were 4.4% for treatment and 2.5% for control, which means those women who had a hysterectomy if they would not have a hysterectomy than the prevalence of thyroid among them were 2.5%. The value of ATU was 1.8% for treatment and 3.6% for control, which means those women who not had a hysterectomy, they would have a hysterectomy then the prevalence of thyroid among them were 3.6%. The value of ATE was 1.8%, which means because of hysterectomy prevalence of thyroid may increase by 1.8%. (Table-6)

The prevalence of cancer before matching was 0.57% among treated (hysterectomies) group and 0.13% among control (not hysterectomies) group. After matching the value of ATE were 0.57% for treatment and 0.21% for control, which means those women who had a hysterectomy if they would not have a hysterectomy than the prevalence of cancer among them were 0.21%. The value of ATU was 0.12% for treatment and 3.2% for control, which means those women who not had a hysterectomy, they would have a hysterectomy then the prevalence of cancer among them were 3.2%. The value of ATE was 3%, which means because of hysterectomy prevalence of cancer may increase by 3%. (Table-6)

The prevalence of asthma before matching was 3.4% among treated (hysterectomies) group and 1.6% among control (not hysterectomies) group. After matching the value of ATE were 3.4% for treatment and 2.8% for control, which means those women who had a hysterectomy if they would not have a hysterectomy than the prevalence of asthma among them were 2.8%. The value of ATU was 1.6% for treatment and 1.9% for control, which means those women who not had a hysterectomy, they would have a hysterectomy then the prevalence of asthma among them were 1.9%. The value of ATE was 1.9%, which means because of hysterectomy prevalence of asthma may increase by 1.9%. (Table-6)

#### 4.4 Summary and discussion

A plethora of literature suggests that some of the women reported improvement in their quality of life post hysterectomy. However, some of the women reported that they face more complication after hysterectomy. Through this research work, we have found that the women who have undergone hysterectomy, 19 percent of those women had hypertension and 40 percent of women had prehypertension. In the case of menopausal women, the prevalence of hypertension is 20.6 percent, and the prevalence of pre-hypertension is 38 percent. In the case of menstruating women, the prevalence of hypertension is 8.7 percent. In figure 4.1 the prevalence of different diseases such as asthma, thyroid, cancer, heart disease, and diabetes are

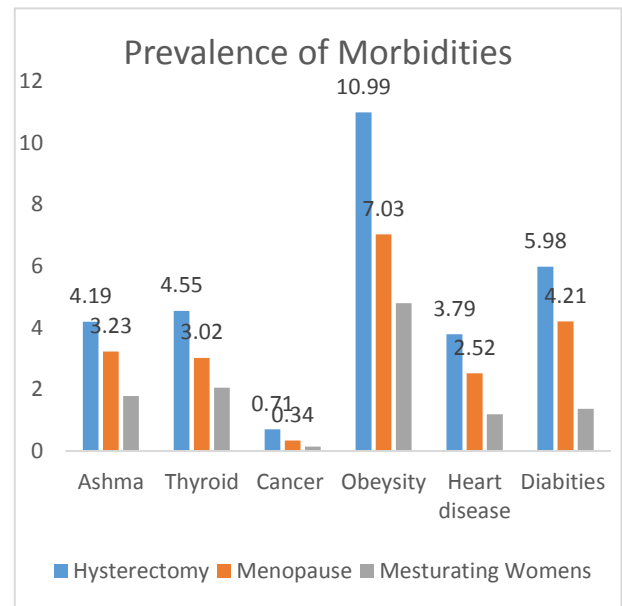


Figure 4.1 Prevalence of Morbidities among hysterectomies, menopausal and menstruating women (15-49)

highest in women who had undergone hysterectomy followed by menopausal and menstruating women. After adjusting the background characteristics of women, hypertension, heart diseases, obesity, and diabetes are significantly associated with hysterectomy and menopause. Women with hysterectomy were found to be 24 percent more likely to have hypertension compare to menstruating women. Women who are in menopause have 36 percent more chances to have hypertension. In the case of heart diseases, women undergone hysterectomy are approximately two times more likely to have heart disease compare to menstruating women. Whereas in the case of menopausal women the likelihood of developing the heart disease is 3 percent more than the menstruating women. The hysterectomy is significantly associated with obesity and diabetes. Therefore, hysterectomies women have 38 percent more chances to get obesity compared to menstruating women. The chances of diabetes are approximately two times higher in hysterectomies women, and 57 percent higher in menopausal women compare to menstruating women. We have found through propensity score matching, The comparative study between women undergone hysterectomy and non- hysterectomies shows that the risk for developing diseases like Asthma, heart disease, hypertension, cancer, diabetes and thyroid increases for those who went for hysterectomy. For instance, before matching, the prevalence of heart diseases among the treated group is 4.04%, and for control group prevalence of heart disease is 1.43%. After matching, the value of ATT is 4.04 in the treatment group and 1.73 in control group, which means that if these women would not have a hysterectomy, then the prevalence of heart diseases is 1.73 percent. The value ATU was 1.43 and 6.32, which shows that women who did not have undergone hysterectomy if they chose to have a hysterectomy then the prevalence of heart diseases among them were 6.3 percent. The value of ATE reveals the actual impact of hysterectomy on heart diseases, which means because of hysterectomy prevalence of heart disease may increase by 4.82%.

## **Conclusion:**

The study has highlighted the significant relationship between menstrual status and morbidities. Women who had hysterectomy they had more chances to be engaged with diseases compare to menstruating or menopausal women. The socio-economic and demographic factors also associated with hysterectomy, menopause and morbidities. The unnecessary hysterectomy in early ages may deteriorate the quality of life of the women. Women who had more facilities like money and insurance, they are more prone to had hysterectomy.

In India, health policies targeting women are mainly focused on the reproductive function of women. They do not take into account the fact that the women requires care beyond childbirth and has a function within the human body that is not only limited to reproduction. Women's health is not solely a physical condition, but it is also influenced by social factors, and an understanding of this is essential if one is to ensure complete treatment. If early hysterectomies are to be prevented, it is essential that medical practitioners are sensitive to the social environment in which the women are situated. Hysterectomy can cause physical as well as psychological and emotional damage to women. Therefore there is a need for regulation like in case of the Pre-Natal Diagnostic Techniques (PNDT) act that does not allow an ultrasound without proper documentation. Likewise, hysterectomy should not be done without proper and essential reason. Therefore, government can practice improvement in the provision of healthcare education and formation of multi-disciplinary teams in the healthcare facilities.

## **References:**

- 1 Whiteman, M. K., Hillis, S. D., Jamieson, D. J., Morrow, B., Podgornik, M. N., Brett, K. M., & Marchbanks, P. A. (2008). Inpatient hysterectomy surveillance in the United States, 2000-2004. *American journal of obstetrics and gynecology*, 198(1), 34-e1.
- 2 Parker, W. H. (2010). Bilateral oophorectomy versus ovarian conservation: effects on long-term women's health. *Journal of minimally invasive gynecology*, 17(2), 161-166.
- 3 Carlson, K. J., Nichols, D. H., & Schiff, I. (1993). Indications for hysterectomy. *New England Journal of Medicine*, 328(12), 856-860.
- 4 Broder, M. S., Kanouse, D. E., Mittman, B. S., & Bernstein, S. J. (2000). The appropriateness of recommendations for hysterectomy. *Obstetrics & Gynecology*, 95(2), 199-205.
- 5 Gimbel, H., Ottesen, B., & Tabor, A. (2002). Danish gynecologists' opinion about hysterectomy on benign indication: results of a survey. *Acta obstetrician et Gynecologica Scandinavica*, 81(12), 1123-1131.
- 6 Material, E., Rossi, L., Spadea, T., Cacciani, L., Baglio, G., Cesaroni, G., ... & Perucci, C. A. (2002). Hysterectomy and socioeconomic position in Rome, Italy. *Journal of Epidemiology & Community Health*, 56(6), 461-465.
- 7 Einarsson, J. I., Matteson, K. A., Schulkin, J., Chavan, N. R., & Sangi-Haghpeykar, H. (2010). Minimally invasive hysterectomies—a survey on attitudes and barriers among practicing gynecologists. *Journal of minimally invasive gynecology*, 17(2), 167-175.
- 8 Wilson, L. F., & Mishra, G. D. (2016). Age at Menarche, Level of Education, Parity and the Risk of Hysterectomy: A Systematic Review and Meta-Analyses of Population-Based Observational Studies. *PLoS one*, 11(3), e0151398.

- 9 Cooper, R., Hardy, R., & Kuh, D. (2008). Timing of menarche, childbearing and hysterectomy risk. *Maturitas*, 61(4), 317-322.
- 10 Cloutier-Steele, L. (2003). *Misinformed Consent: Women's Stories about Unnecessary Hysterectomy*. Next Decade, Inc..
- 11 Merrill, R. M. (2008). Hysterectomy surveillance in the United States, 1997 through 2005. *Medical Science Monitor*, 14(1), CR24-CR31
- 12 Whiteman, M. K., Hillis, S. D., Jamieson, D. J., Morrow, B., Podgornik, M. N., Brett, K. M., & Marchbanks, P. A. (2008). Inpatient hysterectomy surveillance in the United States, 2000-2004. *American journal of obstetrics and gynecology*, 198(1), 34-e1.
- 13 Hill, E. L., Graham, M. L., & Shelley, J. M. (2010). Hysterectomy trends in Australia—between 2000/01 and 2004/05. *Australian and New Zealand journal of obstetrics and gynaecology*, 50(2), 153-158.
- 14 Stang, A., Merrill, R. M., & Kuss, O. (2011). Hysterectomy in Germany: a DRG-based nationwide analysis, 2005–2006. *Deutsches Ärzteblatt International*, 108(30), 508.
- 15 Barghouti, F. F., Yasein, N. A., Jaber, R. M., Hatamleh, L. N., & Takruri, A. H. (2013). Prevalence and risk factors of urinary incontinence among Jordanian women: impact on their life. *Health care for women international*, 34(11), 1015-1023.
- 16 Sarna, A., Friedland, B. A., Srikrishnan, A. K., Katzen, L. L., Tun, W., Abbott, S. A., ... & Mensch, B. S. (2013). Sexually transmitted infections and reproductive health morbidity in a cohort of female sex workers screened for a microbicide feasibility study in Nellore, India. *Global journal of health science*, 5(3), 139.
- 17 Erekson, E. A., Weitzen, S., Sung, V. W., Raker, C. A., & Myers, D. L. (2009). Socioeconomic indicators and hysterectomy status in the United States, 2004. *The Journal of reproductive medicine*, 54(9), 553.
- 18 Hsieh, C. H., Lee, M. S., Lee, M. C., Kuo, T. C., Hsu, C. S., & Chang, S. T. (2008). Risk factors for urinary incontinence in Taiwanese women aged 20-59 years. *Taiwanese Journal of Obstetrics and Gynecology*, 47(2), 197-202.
- 19 Lam, J. S., Tay, W. T., Aung, T., Saw, S. M., & Wong, T. Y. (2014). Female reproductive factors and major eye diseases in Asian women—the Singapore Malay Eye Study. *Ophthalmic epidemiology*, 21(2), 92-98.

Table No. – (1.a) Prevalence of hypertension in Hysterectomies, Menopausal and Menstruating women (15-49) by their characteristics, India 2015-16.

Background Characteristics	Percentage of Hypertension					
	In Hysterectomy women		In menopausal women		In Menstruating women	
	Pre-hypertension	Hypertension	Pre-hypertension	Hypertension	Pre-hypertension	Hypertension
<b>Total</b>	39.82	19	37.73	20.6	30.62	8.65
<b>Age</b>						
15-29	27.5	5.3	24.1	4.7	23.7	4.0
30-39	36.7	14.7	35.5	15.9	37.4	11.4
40-49	42.5	22.3	41.4	25.2	41.8	19.4
<b>Residence</b>						
Urban	42.2	22.1	39.3	23.2	30.3	9.3
Rural	38.8	17.7	37.0	19.4	30.8	8.3
<b>Education Completed</b>						
No education	39.1	17.3	39.0	21.9	35.4	11.5
Primary	41.0	21.3	38.4	22.8	34.1	10.4
Secondary	40.5	20.3	35.4	18.7	27.9	7.4
Higher	39.4	21.7	36.6	12.5	28.0	6.3
<b>Marital status</b>						
Never Married	48.6	7.4	28.1	8.8	20.9	3.3
Ever Married	39.8	19.0	38.1	21.0	33.8	10.4
<b>Religion</b>						
Hindu	39.8	17.8	37.6	19.9	30.2	8.3
Muslim	40.2	23.7	38.2	23.8	31.6	9.6
Other	39.9	30.6	38.4	23.5	33.7	10.8
<b>Caste/Tribe</b>						
SC/ST	37.3	20.1	37.0	20.2	30.7	8.3
OBC	39.0	17.4	36.9	19.2	29.5	8.2
Other	43.5	21.3	39.7	23.2	31.7	9.5
<b>Employment Status</b>						
Not employed	39.6	18.8	34.5	19.3	28.5	7.8
Employed	40.5	14.2	36.7	20.3	30.6	9.2
<b>Occupation</b>						
No occupation	39.6	18.8	34.5	19.3	28.5	7.8
professional & clerical	59.4	13.6	37.7	13.3	30.7	7.7
sales worker	48.0	9.6	34.3	29.6	33.0	9.1
agricultural worker	34.5	15.3	36.9	19.4	30.4	9.4
service worker	55.1	10.6	34.6	20.3	31.3	10.2
production worker	42.2	14.8	38.5	22.7	30.2	9.0
<b>Wealth index</b>						
Poorest	37.6	12.4	36.2	17.9	31.0	7.8
Poorer	39.4	15.8	37.1	19.1	30.5	7.9
Middle	38.0	17.1	38.5	19.4	29.7	8.3
Richer	39.2	23.1	36.7	23.9	29.7	9.5
Richest	44.6	24.1	40.6	23.4	32.3	9.6
<b>Parity</b>						
First	38.6	28.0	32.0	18.7	22.5	4.0
Second	41.9	22.8	35.1	15.3	30.3	7.6
Third or More	40.5	18.4	37.4	19.3	34.4	10.5
<b>Total number</b>	8414	4015	15598	8515	183485	51822

Table no.-(1b), Prevalence of Diabetes, Obesity in Hysterectomies, Menopausal and Other or menstruating women (15 – 49) by their characteristics 2015-16.

Background Characteristics	Percentage of Diabetes			Percentage of Obesity		
	Hysterectomies	Menopausal	Menstruating	Hysterectomies	Menopausal	Menstruating
<b>Total</b>	5.98	4.21	1.37	10.99	7.03	4.8
<b>Age</b>						
15-29	3.1	1.0	0.5	4.1	2.5	2.2
30-39	3.3	2.2	1.6	7.8	6.3	7.1
40-49	7.6	5.3	3.9	13.2	8.3	9.4
<b>Residence</b>						
Urban	10.2	7.3	2.1	20.0	13.5	8.5
Rural	4.2	2.7	1.0	7.2	4.0	2.9
<b>Education Completed</b>						
No education	3.9	2.5	1.3	7.1	4.5	3.3
Primary	8.3	5.9	1.5	12.2	8.7	4.6
Secondary	7.7	5.7	1.4	15.2	9.2	5.2
Higher	9.3	6.9	1.4	25.1	14.2	6.3
<b>Marital status</b>						
Never Married	12.9	3.1	0.4	11.7	3.8	1.5
Ever Married	6.0	4.3	1.7	11.0	7.2	5.9
<b>Religion</b>						
Hindu	5.6	4.0	1.3	9.8	6.5	4.5
Muslim	7.6	4.8	1.7	15.5	9.7	6.1
Other	8.8	6.6	1.6	22.9	9.2	6.7
<b>Caste/Tribe</b>						
SC/ST	4.9	2.7	1.2	8.2	3.8	3.0
OBC	5.6	4.5	1.3	10.6	7.1	4.8
Other	7.0	5.5	1.5	14.8	11.7	6.9
<b>Employment Status</b>						
Not employed	8.2	4.9	1.3	14.2	9.2	5.4
Employed	5.9	3.2	1.5	7.6	4.0	4.6
<b>Occupation</b>						
No occupation	8.2	4.9	1.3	14.2	9.2	5.4
Professional & Clerical	32.2	7.6	2.5	11.1	9.7	7.9
Sales worker	13.5	6.5	1.8	7.6	8.9	11.1
Agricultural worker	2.1	1.6	0.9	5.9	1.9	2.1
Service worker	8.9	4.2	2.7	12.6	6.1	7.8
Production worker	4.6	5.5	1.3	8.7	5.9	5.2
<b>Wealth index</b>						
Poorest	2.4	1.2	0.7	2.2	1.4	0.7
Poorer	3.3	2.1	0.8	4.3	2.4	1.7
Middle	4.5	3.1	1.1	7.3	5.3	3.6
Richer	7.2	6.4	1.8	7.3	5.3	3.6
Richest	11.2	9.2	2.3	23.9	18.2	10.2
<b>Parity</b>						
No children	9.0	4.4	0.6	9.5	5.4	2.0
First	9.2	3.7	1.3	15.3	7.1	5.2
Second	7.0	5.3	1.8	13.2	9.0	7.3
Third or More	4.9	3.8	2.0	9.3	6.4	5.6
<b>Total number</b>	1302	1804	8551	2390	3024	29902

Table-(1c), Portrays that prevalence of thyroid and heart disease among hysterectomies, menopausal and menstruating women (15-49) by their background characteristics, India 2015-16.

Background Characteristics	Percentage of Thyroid			Percentage of Heart diseases		
	Hysterectomy	Menopause	Menstruating	Hysterectomy	Menopause	Menstruating
<b>Total</b>	4.6	3.0	2.1	3.8	2.5	1.2
<b>Age</b>						
15-29	2.3	1.5	1.2	3.4	1.1	0.7
30-39	3.5	3.2	3.0	3.0	2.3	1.6
40-49	5.3	3.4	3.4	4.2	2.9	2.4
<b>Residence</b>						
Urban	7.5	5.3	3.3	3.8	2.5	1.1
Rural	3.3	1.9	1.4	3.8	2.5	1.3
<b>Education Completed</b>						
No education	3.1	1.8	1.3	3.8	2.5	1.6
Primary	4.1	3.0	1.8	3.9	2.7	1.7
Secondary	6.5	4.4	2.1	3.7	2.5	1.0
Higher	10.4	6.8	3.4	3.9	2.4	0.7
<b>Marital status</b>						
Never Married	4.7	2.5	0.9	8.6	2.5	0.5
Ever Married	4.6	3.0	2.4	3.8	2.5	1.4
<b>Religion</b>						
Hindu	4.3	2.8	1.9	3.6	2.3	1.1
Muslim	5.4	3.9	2.4	5.5	3.8	1.6
Other	6.6	4.6	3.0	4.3	2.5	1.2
<b>Caste/Tribe</b>						
SC/ST	3.6	2.2	1.5	3.8	2.2	1.2
OBC	4.9	2.6	1.9	3.6	2.6	1.1
Other	4.4	4.7	2.7	3.9	2.6	1.2
<b>Employment Status</b>						
Not employed	4.4	3.2	2.0	5.1	2.6	1.0
Employed	3.5	2.0	1.9	3.4	2.3	1.5
<b>Occupation</b>						
No occupation	4.4	3.2	2.0	5.1	2.6	1.0
Professional & Clerical	5.8	5.9	3.9	2.7	1.7	2.4
Sales worker	2.7	3.7	3.3	2.7	1.7	2.4
Agricultural worker	3.4	1.0	1.1	2.7	2.1	1.4
Service worker	3.0	1.4	2.1	5.2	0.4	2.0
Production worker	3.7	4.1	2.1	4.8	4.6	1.4
<b>Wealth index</b>						
Poorest	2.0	0.9	0.7	4.4	1.9	1.3
Poorer	2.8	1.6	1.1	4.5	2.6	1.3
Middle	4.1	2.6	1.7	3.3	2.9	1.3
Richer	4.6	4.0	2.5	3.6	2.9	1.2
Richest	8.4	6.7	4.0	3.5	2.3	1.0
<b>Parity</b>						
No children	7.5	3.2	1.2	6.0	3.0	0.6
First	5.0	3.4	2.6	3.4	1.9	0.9
Second	5.4	4.0	3.0	3.4	2.3	1.3
Third or More	3.9	2.5	2.0	4.0	2.7	2.0
<b>Total number</b>	1,000	1,310	12,975	834	1,097	7,488

Table no.-2, Percent distribution of Diseases among the Women's who had Hysterectomy or In Menopause in India 2015-16

<b>Prevalence of diseases</b>	<b>Women with hysterectomy</b>	<b>Menopausal women</b>	<b>Menstruating Women</b>
<b>BMI status ***</b>			
Thin	13.4	20.6	23.5
Normal	48.9	52.9	56.9
Overweight	26.7	19.5	14.9
Obsess	11.0	7.0	4.8
<b>Hypertension ***</b>			
Normal	41.2	41.7	60.7
Pre-hypertension	39.8	37.7	30.6
Hypertension	19.0	20.6	8.7
<b>Anemia***</b>			
Sever	0.7	1.2	1.0
Moderate	8.0	11.2	12.7
Mild	35.0	39.6	39.8
Not anaemic	56.4	48.0	46.5
<b>Asthma</b>	4.2	3.2	1.8
<b>Thyroid</b>	4.6	3.0	2.1
<b>Cancer</b>	0.7	0.3	0.1
<b>Obesity</b>	11.0	7.0	4.8
<b>Heart disease</b>	3.8	2.5	1.2
<b>Diabetes</b>	6.0	4.2	1.4



Table-3, the Adjusted Odds ratio of Hypertension and Heart disease for Hysterectomy, Menopausal and other or menstruating women (15 – 49) by their background characteristics, India 2015-16.

Background characteristics	AOR for Hypertension			AOR for Heart disease		
	Hysterectomy	Menopausal	Other women	Hysterectomy	Menopausal	Other women
<b>Age</b>						
15-29						
30-39	2.38***(1.81 3.13)	3.58***(3.12 4.12)	2.75***(2.67 2.82)	1.09 (0.75 1.59)	1.93***(1.46 2.55)	1.96***(1.84 2.09)
40-49	4.17***(3.19 5.44)	6.42***(5.7 7.23)	4.96***(4.81 5.1)	1.4*(0.97 2.02)	2.45***(1.94 3.09)	2.8***(2.61 3)
<b>Residence</b>						
Urban						
Rural	0.99 (0.9 1.09)	0.93**(0.87 0.99)	0.99 (0.97 1.01)	1.06 (0.87 1.28)	1.03 (0.89 1.19)	1.07**(1.01 1.13)
<b>Education Completed</b>						
No education						
Primary	1.16***(1.04 1.29)	1.09**(1.01 1.17)	1.06***(1.03 1.09)	1.03 (0.82 1.28)	1.13 (0.95 1.34)	1.18***(1.1 1.26)
Secondary	1.06 (0.96 1.17)	1.04 (0.97 1.12)	0.95***(0.93 0.97)	1.23**(1.01 1.5)	1.2**(1.03 1.41)	1.07**(1.01 1.14)
Higher	1.01 (0.82 1.25)	0.73***(0.63 0.85)	0.85***(0.81 0.88)	1.78***(1.21 2.62)	1.27 (0.92 1.76)	0.88**(0.79 0.97)
<b>Religion</b>						
Hindu						
Muslim	1.39***(1.23 1.57)	1.28***(1.19 1.38)	1.28***(1.24 1.31)	1.81***(1.46 2.24)	1.96***(1.67 2.3)	1.82***(1.71 1.93)
Other	1.51***(1.32 1.73)	1.21***(1.11 1.31)	1.37***(1.34 1.41)	1.53***(1.18 1.98)	1.6***(1.34 1.9)	1.64***(1.54 1.74)
<b>Caste/Tribe</b>						
SC/ST						
OBC	0.79***(0.71 0.87)	0.86***(0.81 0.91)	0.88***(0.86 0.9)	0.93 (0.76 1.12)	0.84**(0.72 0.98)	0.86***(0.81 0.91)
Other	0.9*(0.81 1)	1.02 (0.95 1.1)	1.04***(1.01 1.07)	1.21*(0.97 1.5)	0.97 (0.82 1.14)	1.14***(1.07 1.21)
<b>Wealth index</b>						
Poorest						
Poorer	1.24***(1.07 1.44)	1.09**(1.01 1.18)	1.08***(1.05 1.11)	1.05 (0.81 1.35)	1.63***(1.34 1.97)	1.13***(1.05 1.21)
Middle	1.35***(1.17 1.57)	1.17***(1.08 1.27)	1.13***(1.1 1.17)	0.8*(0.62 1.04)	1.55***(1.26 1.9)	1.18***(1.1 1.27)
Richer	1.75***(1.51 2.04)	1.33***(1.22 1.45)	1.25***(1.21 1.29)	0.81 (0.61 1.07)	1.67***(1.34 2.08)	1.14***(1.05 1.23)
Richest	1.74***(1.48 2.05)	1.23***(1.11 1.37)	1.25***(1.21 1.3)	0.72**(0.53 0.98)	1.45***(1.12 1.87)	0.94 (0.86 1.03)
<b>Parity</b>						
No Children						
one children	0.64***(0.49 0.85)	0.81***(0.71 0.92)	1.23***(1.19 1.27)	0.59*(0.35 1.02)	0.64***(0.48 0.85)	1.09**(1 1.19)
two children	0.59***(0.46 0.75)	0.78***(0.7 0.88)	1.25***(1.21 1.29)	0.67*(0.42 1.07)	0.71***(0.55 0.91)	1.24***(1.15 1.34)
Third or More	0.58***(0.45 0.74)	0.77***(0.69 0.86)	1.18***(1.14 1.22)	0.78 (0.49 1.22)	0.8*(0.63 1)	1.45***(1.34 1.57)
<b>Constant</b>	0.0877613	0.0610531	0.0366987	0.0395156	0.0096939	0.0050647
<b>Number of Women</b>	17360	39,930	6,04,483	18,091	41,929	6,35,821
<b>Significance level</b>	If "P<0.1= * ", "P<0.05=**", "P<0.01=***"					
<b>Dependent Variable</b>	Hypertension (0 "normal or prehypertension") (1 "Hypertension)			Heart disease (0 "No") (1 "yes")		

Table-4, the Adjusted Odds ratio of Obesity and Diabetes in Hysterectomy, Menopausal and Other or Menstruating women (15-49) by their background characteristics, India 2015-16.

Background characteristics	AOR for Obesity			AOR for Diabetes		
	Hysterectomy	Menopausal	Normal	Hysterectomy	Menopausal	Normal
<b>Age</b>						
15-29						
30-39	1.9*** (1.3 2.8)	2.95*** (2.39 3.65)	2.58*** (2.48 2.68)	1.28 (0.8 2.04)	1.82*** (1.3 2.55)	2.9*** (2.69 3.14)
40-49	2.62*** (1.8 3.82)	3.28*** (2.74 3.94)	3.54*** (3.39 3.69)	2.63*** (1.68 4.11)	5.34*** (4.14 6.9)	7.27*** (6.71 7.87)
<b>Residence</b>						
Urban						
Rural	0.65*** (0.58 0.73)	0.67*** (0.61 0.74)	0.7*** (0.68 0.72)	0.71*** (0.61 0.83)	0.7*** (0.62 0.79)	0.82*** (0.78 0.87)
<b>Education Completed</b>						
No education						
Primary	1.22** (1.05 1.41)	1.24*** (1.09 1.41)	1.17*** (1.12 1.23)	1.41*** (1.16 1.72)	1.76*** (1.5 2.06)	1.24*** (1.15 1.35)
Secondary	1.22*** (1.07 1.39)	1.27*** (1.14 1.42)	1.21*** (1.16 1.25)	1.38*** (1.15 1.65)	1.71*** (1.48 1.97)	1.33*** (1.24 1.42)
Higher	1.35** (1.07 1.7)	1.44*** (1.21 1.72)	1.14*** (1.08 1.2)	1.11 (0.79 1.56)	1.53*** (1.19 1.97)	1.14*** (1.03 1.26)
<b>Religion</b>						
Hindu						
Muslim	1.65*** (1.42 1.92)	1.4*** (1.25 1.57)	1.47*** (1.42 1.52)	1.46*** (1.18 1.79)	1.44*** (1.24 1.67)	1.49*** (1.39 1.59)
Other	1.43*** (1.2 1.7)	1.05 (0.91 1.21)	1.04* (1 1.09)	1.17 (0.92 1.48)	0.97 (0.81 1.17)	0.89*** (0.83 0.97)
<b>Caste/Tribe</b>						
SC/ST						
OBC	1.19** (1.03 1.38)	1.37*** (1.22 1.55)	1.19*** (1.15 1.24)	1.01 (0.84 1.22)	1.05 (0.91 1.21)	0.99 (0.93 1.06)
Other	1.38*** (1.19 1.61)	1.63*** (1.45 1.85)	1.4*** (1.35 1.45)	1.04 (0.85 1.27)	1.03 (0.88 1.2)	1.06* (0.99 1.13)
<b>Wealth index</b>						
Poorest						
Poorer	1.92*** (1.36 2.7)	1.75*** (1.39 2.22)	2*** (1.84 2.17)	1.19 (0.84 1.69)	1.64*** (1.27 2.12)	1.06 (0.96 1.17)
Middle	3.32*** (2.41 4.56)	3.53*** (2.83 4.4)	3.85*** (3.57 4.15)	1.61*** (1.16 2.24)	2.3*** (1.79 2.95)	1.33*** (1.21 1.46)
Richer	5.22*** (3.8 7.16)	6.08*** (4.89 7.56)	6.54*** (6.07 7.06)	2.23*** (1.61 3.08)	3.54*** (2.76 4.53)	1.88*** (1.71 2.06)
Richest	8.12*** (5.88 11.22)	9.77*** (7.8 12.23)	9.43*** (8.73 10.19)	2.63*** (1.87 3.7)	4.5*** (3.47 5.84)	2.16*** (1.95 2.39)
<b>Parity</b>						
No Children						
one children	1.06 (0.69 1.63)	1.11 (0.89 1.38)	1.83*** (1.74 1.92)	0.74 (0.48 1.14)	0.73** (0.57 0.95)	1.58*** (1.44 1.74)
two children	1.22 (0.82 1.81)	1.1 (0.9 1.34)	1.92*** (1.83 2.01)	0.61** (0.41 0.9)	0.71*** (0.57 0.89)	1.52*** (1.39 1.66)
Third or More	1.19 (0.81 1.77)	1.07 (0.88 1.3)	1.88*** (1.79 1.98)	0.52*** (0.35 0.76)	0.63*** (0.51 0.78)	1.33*** (1.21 1.46)
<b>Constant</b>	0.0083459	0.0041953	0.0025091	0.0227821	0.0043364	0.0019922
<b>Number of Women</b>	17,874	41,438	6,28,563	17,939	41,262	6,29,762
<b>Significance level</b>	If "P<0.1= * ", "P<0.05=***", "P<0.01=****"					
<b>Dependent Variable</b>	Obsess (0 "No") (1 "Yes") from BMI Status			Diabetes (0 "No") (1 "Yes")		

Table-5, the Adjusted Odds ratio for Hypertension, Heart disease, Obesity and Diabetes by adjusting Hysterectomy, Menopausal, other women (15 -49) and their background characteristics, India 2015-16.

Background characteristics	AOR for Hypertension	AOR for Heart disease	AOR for Obesity	AOR for Diabetes
<b>Age</b>				
15-29				
30-39	2.82***(2.74 2.89)	1.99***(1.87 2.11)	2.6***(2.51 2.7)	2.95***(2.74 3.18)
40-49	5.1***(4.96 5.24)	2.77***(2.6 2.96)	3.54***(3.4 3.69)	7.32***(6.8 7.89)
<b>Residence</b>				
Urban				
Rural	0.98*(0.96 1)	1.06**(1.01 1.12)	0.69***(0.68 0.71)	0.79***(0.76 0.83)
<b>Education Completed</b>				
No education				
Primary	1.07***(1.05 1.1)	1.17***(1.1 1.24)	1.19***(1.14 1.24)	1.36***(1.28 1.46)
Secondary	0.96***(0.94 0.98)	1.1***(1.04 1.16)	1.22***(1.18 1.27)	1.4***(1.33 1.49)
Higher	0.84***(0.81 0.88)	0.92 (0.84 1.02)	1.16***(1.11 1.22)	1.18***(1.08 1.29)
<b>Religion</b>				
Hindu				
Muslim	1.28***(1.25 1.31)	1.83***(1.73 1.93)	1.47***(1.42 1.52)	1.47***(1.39 1.56)
Other	1.36***(1.32 1.39)	1.63***(1.54 1.73)	1.06***(1.02 1.1)	0.92**(0.86 0.99)
<b>Caste/Tribe</b>				
SC/ST				
OBC	0.88***(0.86 0.89)	0.86***(0.82 0.9)	1.21***(1.17 1.25)	1 (0.95 1.06)
Other	1.03***(1.01 1.06)	1.12***(1.06 1.19)	1.42***(1.37 1.47)	1.06*(1 1.12)
<b>Wealth index</b>				
Poorest				
Poorer	1.08***(1.06 1.11)	1.17***(1.1 1.24)	1.96***(1.82 2.12)	1.12**(1.03 1.22)
Middle	1.14***(1.11 1.17)	1.18***(1.1 1.26)	3.78***(3.52 4.05)	1.44***(1.32 1.56)
Richer	1.27***(1.24 1.31)	1.15***(1.07 1.23)	6.39***(5.96 6.85)	2.04***(1.88 2.23)
Richest	1.27***(1.22 1.31)	0.96 (0.88 1.04)	9.32***(8.68 10.01)	2.38***(2.18 2.61)
<b>Parity</b>				
No Children				
one children	1.2***(1.16 1.24)	1.07*(0.99 1.16)	1.8***(1.71 1.88)	1.48***(1.35 1.61)
two children	1.2***(1.16 1.23)	1.22***(1.14 1.31)	1.88***(1.8 1.97)	1.4***(1.29 1.52)
Third or More	1.14***(1.1 1.17)	1.41***(1.31 1.51)	1.84***(1.75 1.93)	1.21***(1.11 1.32)
<b>Menstrual status of a women</b>				
Other or Menstruating				
Menopausal women	1.36***(1.32 1.4)	1.31***(1.23 1.4)	1.03 (0.99 1.08)	1.57***(1.47 1.66)
Hysterectomy	1.24***(1.19 1.29)	1.95***(1.8 2.11)	1.38***(1.31 1.46)	2.08***(1.93 2.24)
<b>constant</b>	0.0370089	0.0050742	0.0025347	0.0019148
<b>Number of Women</b>	6,61,773	6,95,841	6,87,875	6,88,963
<b>Significance level</b>	If "P<0.1= * ", "P<0.05=**", "P<0.01=***"			

Table-6, the effect of Hysterectomy on women's morbidity analysis through propensity score matching.

Variable	Sample	Treated	Controls	Difference	S.E.	T stat
<b>Heart Disease</b>						
	Unmatched	4.0351556	1.4344293	2.6007263	0.000915796	28.4
	ATT	4.0351556	1.7301421	2.3050135	0.009158588	2.52
	ATU	1.4371338	6.3252374	4.8881037	.	.
	ATE			4.8202601	.	.
<b>Hypertension</b>						
	Unmatched	19.8502304	9.9093925	9.9408379	0.002321533	42.82
	ATT	19.8502304	17.7937788	2.0564516	0.027011874	0.76
	ATU	9.9591033	11.6535961	1.6944928	.	.
	ATE			1.7040816	.	.
<b>Diabetes</b>						
	Unmatched	4.9891298	1.2880969	3.7010329	0.000882873	41.92
	ATT	4.9891298	2.1740342	2.8150956	0.012609542	2.23
	ATU	1.2977197	3.6100969	2.3123772	.	.
	ATE			2.3255984	.	.
<b>Thyroid</b>						
	Unmatched	4.3855768	1.8431104	2.5424664	0.001030755	24.67
	ATT	4.3855768	2.5329057	1.8526712	0.012426812	1.49
	ATU	1.851291	3.6100846	1.7587936	.	.
	ATE			1.7612596	.	.
<b>Cancer</b>						
	Unmatched	0.5745222	0.1260104	0.4485118	0.000279199	16.06
	ATT	0.5745222	0.2154458	0.3590763	0.002539711	1.41
	ATU	0.1268349	3.2039598	3.0771249	.	.
	ATE			3.0057194	.	.
<b>Asthma</b>						
	Unmatched	3.4377936	1.559047	1.8787466	0.00094722	19.83
	ATT	3.4377936	2.7469187	0.6908749	0.010353022	0.67
	ATU	1.563762	1.8999395	0.3361775	.	.
	ATE			0.3454896	.	.