

Exploring the Association Between Diabetes and Hysterectomy Among Women in Kerala

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Abstract

The study examines the prevalence and association of diabetes and hysterectomy among women aged 45 years and above in Kerala using data from the first wave of the Longitudinal Ageing Study in India (LASI), which included 1310 women. Descriptive statistics, chi-square test, and binary logistic regression were used for the analysis. The findings show that the prevalence of diabetes was higher among women who had undergone hysterectomy (35.5%) compared to those who had not undergone the procedure (27.1%). Hysterectomy was significantly associated with diabetes in the unadjusted analysis, with 47.9 percent higher odds of diabetes among women who had undergone hysterectomy compared to those who had not. However, the association was not statistically significant after adjustment, with age and religion emerging as the significant predictors of diabetes. The findings highlight the higher burden of diabetes among women with a history of hysterectomy and the need to focus on regular screening and follow-up care.

Introduction

Hysterectomy is the surgical procedure of removing the uterus and is one of the most commonly performed surgeries for gynecological morbidities, and is the second most frequently performed major surgical procedure among women worldwide, after cesarean section. Hysterectomy is primarily undertaken to treat various health problems that affect the female reproductive system, including heavy periods, long-term pelvic pain, non-cancerous tumors or fibroids, ovarian cancer, womb cancer, cervical cancer, or cancer of the fallopian tubes (NHS, 2017). Hysterectomy has the highest satisfaction scores compared with other treatments as it improves quality of life and reduces anxiety and depression, but its adverse effects can include urinary tract infections, urinary incontinence, sexual dysfunction, depression, increased fatigue, obesity, osteoporosis, coronary heart disease, and loss of femininity (Singh and Govil, 2021). Studies have shown that women who undergo hysterectomy, even with ovarian conservation, may experience an increased risk of long-term cardiovascular and metabolic conditions, indicating that physical health consequences may extend beyond the immediate postoperative recovery period (Laughlin-Tommaso et al., 2018). According to LASI (Longitudinal Ageing Study in India) Wave 1 conducted during 2017-18, it was found that 11.4 percent of women aged 45 and above in India reported having undergone a hysterectomy, while that of Kerala was 12 percent.

Among women who have undergone hysterectomy, diabetes, a chronic metabolic condition characterized by high blood glucose levels, has emerged as an important health concern due to the hormonal shifts that can occur after the procedure. Previous studies suggest that hysterectomy may influence hormonal regulation and glucose metabolism, potentially increasing the risk of developing diabetes. The occurrence of diabetes tends to increase with age and varies across socio-demographic characteristics. When a hysterectomy leads to menopause, changes in estrogen and progesterone levels may affect the body's response to

insulin. Women in India who undergo hysterectomy at a younger age may experience elevated blood glucose levels for a long duration, which may increase their risk of developing diabetes (Halli et al., 2020). Understanding this association is important not only for clinical follow-up care but also for public health planning. Given the increasing burden of both hysterectomy and diabetes among women in Kerala, examining whether hysterectomy is associated with diabetes is important for improving women's health and taking appropriate measures for its prevention and management.

Objectives

- To examine the prevalence of diabetes and hysterectomy among women aged 45 years and above in Kerala.
- To investigate the association between hysterectomy and diabetes among women aged 45 years and above in Kerala

Data and Methodology

This study is based on the secondary data obtained from the first wave of the Longitudinal Ageing Study in India (LASI), conducted during 2017–18, which included 72,250 individuals aged 45 years and above, comprising 30,569 men and 41,681 women. For the present study, a total of 1310 women aged 45 years and above in Kerala were selected. Analyses were performed to investigate the association between diabetes and the demographic and socio-economic characteristics of women, as well as to examine the extent to which diabetes is associated with hysterectomy. The dependent variable is diabetes and the primary independent variable taken is hysterectomy. Socio-demographic variables such as age, place of residence, religion, caste, education, marital status, living arrangement, and Monthly Per Capita Expenditure (MPCE) quintile were included as the covariates.

Descriptive statistics were used to summarize the socio-demographic characteristics and to estimate the prevalence of diabetes and hysterectomy among women aged 45 years and above in Kerala. Chi-square test was used to examine the association between diabetes and selected socio-demographic characteristics, as well as between hysterectomy status and diabetes. Binary logistic regression analysis was performed to estimate the strength of this association by calculating the unadjusted odds ratio (UOR) and adjusted odds ratio (AOR), with 95% confidence intervals. Two regression models were estimated. The first model examined the unadjusted association between hysterectomy and diabetes, while the second model estimated the adjusted association after controlling for socio-demographic variables significantly associated with diabetes. The results are presented as odds ratios (ORs) with 95% confidence intervals. A p-value of <0.05 was considered statistically significant.

Results and Analysis

The main aim of the study is to analyze the prevalence of diabetes among women aged 45 years and older in Kerala and to examine the association between hysterectomy and diabetes in this population.

The distribution of women aged 45 years and above who had undergone hysterectomy, by their background characteristics, in Kerala is presented in Table 1. The prevalence of hysterectomy increased with age, with women aged 70–79 years having a higher prevalence of about 13.6 percent. Higher prevalence was also observed among Christian women (14.4 percent), women with secondary education (15.1 percent), and women belonging to the

richest MPCE quintile (13.8 percent). Only the variables caste and education showed a statistically significant association with hysterectomy.

Table 1: Prevalence of Hysterectomy Among Women Aged 45 and above in Kerala According to their Background Characteristics

VARIABLES	CATEGORIES	PERCENTAGE	CHI SQUARE
AGE	45-59	10.8	2.329
	60-69	12.9	
	70-79	13.6	
	80+	9	
PLACE OF RESIDENCE	Urban	11.9	0.054
	Rural	11.5	
RELIGION	Hindu	11.5	3.34
	Muslim	9.4	
	Christian	14.4	
CASTE**	SC	3.9	10.876
	ST	0	
	OBC	11.7	
	Others	13.8	
EDUCATION**	Illiterate	6.4	11.998
	Primary	9.8	
	Secondary	15.1	
	Higher	13.8	
MARITAL STATUS	Currently married/with partner	11.9	4.253
	Widowed	12.4	
	Never married	0	
	Divorced/Seperated/Deserted	5.7	
MPCE QUINTILE	Poorest	11.2	2.052
	Poorer	10.6	
	Middle	11.7	
	Richer	10.6	
	Richest	13.8	
TOTAL		152	

**p < 0.05

Table 2: Prevalence of diabetes according to hysterectomy status

Hysterectomy	Diabetes	
	Yes	No
Yes	35.5	64.5
No	27.1	72.9

Table 2 shows that among women aged 45 years and above in Kerala, the prevalence of diabetes was higher among those who had undergone hysterectomy, 35.5 percent than among those who had not undergone the procedure, 27.1 percent.

Table 3: Prevalence of Diabetes Among Women Aged 45 and above in Kerala According to their Background Characteristics

VARIABLES	CATEGORIES	DIABETES	CHI SQUARE
AGE***	45-59	21.6	33.916
	60-69	32.2	
	70-79	41.5	
	80+	28.1	
PLACE OF RESIDENCE	Rural	27.6	0.288
	Urban	28.9	
RELIGION**	Hindu	24.7	12.406
	Muslim	32.3	
	Christian	34.4	
CASTE	SC	18.4	7.674
	ST	25	
	OBC	27.5	
	Others	31.4	
EDUCATION	Illiterate	29.1	2.618
	Primary	28.9	
	Secondary	29.2	
	Higher	23.2	
MARITAL STATUS**	Currently married/with partner	26.7	10.971
	Widowed	32.8	
	Never married	14.3	
	Divorced/Separated/Deserted	14.3	
MPCE QUINTILE	Poorest	28	2.417
	Poorer	25.6	
	Middle	26.4	
	Richer	29.5	
	Richest	30.7	
HYSTERECTOMY**	Yes	35.5	4.672
	No	27.1	
TOTAL		368 (28.2%)	

P < 0.05, *P < 0.001

The prevalence of diabetes among women aged 45 years and above in Kerala by socio-demographic characteristics is presented in Table 3. Diabetes prevalence increased with age, reaching 41.5 percent among women aged 70–79 years. Women who had undergone a hysterectomy had a higher prevalence of diabetes of 35.5 percent, compared with 27.1 percent among those who had not undergone a hysterectomy. Higher prevalence was also observed among Christian women with 34.4 percent, urban residents with 28.9 percent, and women belonging to the richest MPCE quintile, 30.7 percent. Chi-square analysis revealed that age, religion, marital status, and hysterectomy were significantly associated with diabetes among women aged 45 years and above.

Table 4: Logistic Regression Analysis Examining the Impact of Hysterectomy Among Women who have Diabetes

Outcome: Diabetes	Model 1		Model 2	
	UOR	95% CI	AOR	95% CI
Main Model Hysterectomy	1.479**	1.035-2.114	1.403*	0.973-2.023
Age (Ref: 45-59 years)				
60-69 **	-	-	1.663	1.239-2.233
70-79 ***	-	-	2.525	1.720-3.705
80+	-	-	1.35	0.775-2.352
Religion (Ref: Hindu)				
Muslim **	-	-	1.557	1.136-2.136
Christian **	-	-	1.534	1.129-2.084
Marital Status (Ref: Currently married/with partner)				
Widowed	-	-	1.038	0.767-1.405
Never married	-	-	0.446	0.128-1.560
Divorced/Seperated/Deserted	-	-	0.496	0.188-1.307

*P<0.10, **P<0.05, ***P < 0.001. Model 1: Unadjusted model, Model 2: Adjusted for age, religion, and marital status. UOR: Unadjusted odds ratio, AOR: Adjusted odds ratio, CI: Confidence Interval.

Binary logistic regression analysis examining the association between hysterectomy and diabetes among women aged 45 years and above in Kerala is shown in the table 4. In the unadjusted model, hysterectomy was significantly associated with diabetes, with women who had undergone hysterectomy exhibiting 47.9 percent higher odds of diabetes than those who had not undergone hysterectomy. Although the adjusted model showed 40.3 percent higher odds of diabetes among women who had undergone hysterectomy, the association was not statistically significant after controlling for socio-demographic characteristics. Among the covariates included, age and religion were significant predictors of diabetes, whereas marital status was not significantly associated with diabetes.

Discussions

This study provides important evidence on the association between diabetes and hysterectomy among women aged 45 and above in Kerala. Women with a history of hysterectomy had a higher prevalence of diabetes, and logistic regression analysis showed higher odds of diabetes than among women without a history of hysterectomy. However, the association was no longer statistically significant after adjusting for socio-demographic characteristics. This suggests that the relationship between hysterectomy and diabetes is influenced by socio-demographic characteristics, particularly age and religion, rather than by hysterectomy alone. Kerala is experiencing a growing burden of diabetes alongside a rapidly ageing female population, highlighting the need to better understand the factors associated with diabetes among women with a history of hysterectomy. These findings suggest that socio-demographic characteristics should be considered when examining the relationship between hysterectomy and diabetes among women aged 45 years and above.

Conclusion

This study found that diabetes prevalence among women aged 45 years and above in Kerala increased with age and varied significantly by religion, marital status, and living arrangement. Women who had undergone hysterectomy reported a higher prevalence of diabetes (35.5 percent) than those who had not (27.1 percent), with 47.9 percent higher odds of diabetes in the unadjusted model. However, after adjusting for socio-demographic characteristics, this association was no longer statistically significant, with age and religion emerging as the strongest predictors of diabetes. This suggests that the higher diabetes burden among women with hysterectomy is largely explained by age and other factors rather than the procedure itself. Regular screening and follow-up care should be strengthened for older women in general, with particular attention to those who have undergone hysterectomy, so that diabetes can be identified and managed at an early stage. Strengthening awareness, timely screening, and accessible healthcare services for this population can help reduce the long-term burden of diabetes and support the overall health of women in Kerala.

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