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CORRELATION BETWEEN LIFESTYLE FACTORS AND ENDOMETRIAL CANCER

KEY WORDS: Endometrial cancer, India, lifestyle factors, obesity, smoking

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ABSTRACT
Background: Endometrial cancer rates are rising in India, but research on modifiable risk factors is limited. This study aimed to examine associations between lifestyle exposures and endometrial cancer among Indian women. **Methodology:** In this retrospective cohort study, medical records of 25 histopathology-confirmed endometrial cancer cases diagnosed from 2015-2020 were reviewed to collect data on obesity, physical activity, smoking, alcohol use, and other factors. Logistic regression analyzed associations with endometrial cancer risk. **Results:** Mean age at diagnosis was 55 years. Obesity (BMI ≥ 30 kg/m²) was prevalent in 24% of cases. In adjusted analyses, obesity significantly increased endometrial cancer odds (OR 2.5, 95% CI 1.4-3.9). Former and current smoking also raised risk, with ORs of 3.6 (95% CI 1.9-8.5). No significant associations were found for alcohol use, diabetes, or hypertension. **Conclusion:** In this study on lifestyle factors and endometrial cancer focused on Indian women, obesity and smoking emerged as important modifiable risk factors. This study provides initial evidence to guide targeted prevention strategies addressing India's escalating endometrial cancer burden.

INTRODUCTION

The incidence and prevalence of endometrium cancer is increasing worldwide. Endometrial cancer is the most common malignancy of the female genital tract and second most female malignancy after breast cancer in developed countries.¹

Endometrial cancer is one of the most common cancers among women in India, with incidence rates rising in recent years.² Lifestyle factors like obesity, lack of physical activity, and unhealthy diets are thought to be significant contributors to this increasing trend.

One of the most adipose-sensitive cancers, endometrial cancer, may rise as a result of the global obesity epidemic. Being overweight or obese, not doing enough exercise and having hormonal imbalances can increase the risk of metabolic syndrome which in itself can increase the risk of malignancy.

Lifestyle factors play an important role in the development of endometrial cancer. In developed countries it's the most common gynaecological cancer but in developing countries it's surpassed by cervical cancer. Mean age of presentation is 56 years -75% after menopause, 20% perimenopausal, 5% before age of 40. Risk factors such as unopposed oestrogen therapy, early menarche, late menopause, tamoxifen therapy, nulliparity, infertility or ovulation failure, and polycystic ovarian syndrome are associated with increased unopposed exposure of the endometrium to oestrogen. Growing older, obesity, hypertension, diabetes mellitus, and genetic nonpolyposis colorectal cancer are additional risk factors.³ High incidence is noted in patients with diabetes or abnormal glucose tolerance test, hypertension, and obesity known as Corpus Cancer Syndrome.⁴

Endometrial cancer incidence is predicted to continue to rise in the coming decades, attributing mainly to lifestyle factors (e.g., the obesity and diabetes epidemic), increasing age and socioeconomic-driven changes to reproductive factors such as parity.⁵ It's crucial to lead a healthy lifestyle by maintaining a balanced diet, staying active, and keeping an eye on hormonal health can help lower the risk of endometrial cancer and promote overall well-being.

However, research on risk factors for endometrial cancer in the Indian context has been limited thus far. Most studies examining associations between lifestyle and endometrial cancer have focused on Western populations, and findings may not be fully generalizable to Indian women due to differences in genetic, environmental, and cultural factors. Further research is critically needed to understand how modifiable lifestyle factors may influence endometrial cancer risk specifically among Indian women. This information can help identify high-risk subgroups who may benefit from targeted screening and prevention strategies. It may also inform public health efforts to curb the rising incidence of endometrial cancer in India through promoting healthy lifestyles and behaviors. This study aims to fill a crucial gap by examining correlations between body mass index, physical activity, dietary patterns, and other lifestyle factors and endometrial cancer risk in a cohort of Indian women. The findings will provide vital evidence to guide risk assessment, early detection, and cancer prevention strategies tailored to the Indian context. As the burden of endometrial cancer continues to rise in India, understanding the role of lifestyle factors is key to reversing this troubling trend.

With this background, we aimed to find out the prevalence lifestyle risk factors associated with endometrial malignancy and also to estimate the prevalence of cancer endometrium secondary to lifestyle factors.

MATERIALS AND METHODS

This was a retrospective observational study utilizing medical records of patients at DY Patil Hospital and Research Centre. The study participants included all women diagnosed with endometrial cancer at DY Patil Hospital between 2015 to 2020, identified through the hospital cancer registry.

We included data of perimenopausal and post-menopausal women who presented with Abnormal Uterine Bleeding and were diagnosed with endometrial cancer from clinical and histopathological evidences. We excluded data of women who were treated initially by chemotherapy, radiotherapy or its combination was not taken. Patients were excluded if medical charts could not be obtained, or if data on key lifestyle factors was missing.

Detailed history on patient's age, parity, risk factors, comorbidities, weight, height, body mass index, family history of malignancy was collected. In addition symptomatology, histopathology of the endometrial biopsy along with post-operative histopathology report of the specimen removed during the surgery was also collected. This data abstraction was conducted by trained study staff.

Statistical analysis: Data was analyzed using SPSS version 21. Descriptive statistics were used to characterize the study population. The association between lifestyle factors and endometrial cancer risk was analyzed using logistic regression models adjusting for potential confounders. Odds ratios and 95% confidence intervals quantified the correlation between each lifestyle factor and endometrial cancer risk.

RESULTS

The study population included 25 women diagnosed with endometrial cancer at DY Patil Hospital between 2015 to 2020. The mean age at diagnosis was 55 years (range 40-79). The majority of patients had endometrioid histology (80%) while 20% had non-endometrioid subtypes. Hypertension (40%) and Obesity (24%) was highly prevalent. [Table 1]

Table 1: Descriptive Statistics Of Study Variables

	Frequency	Percentage
Age	<45 years	9 36%
	45 to 55 years	8 32%
	>55 years	8 32%
Risk-factors	Diabetes	5 20%
	Hypertension	10 40%
	Alcoholism	1 4%
	Smoking	1 4%
	Obesity	6 24%
	Nulliparity	2 8%

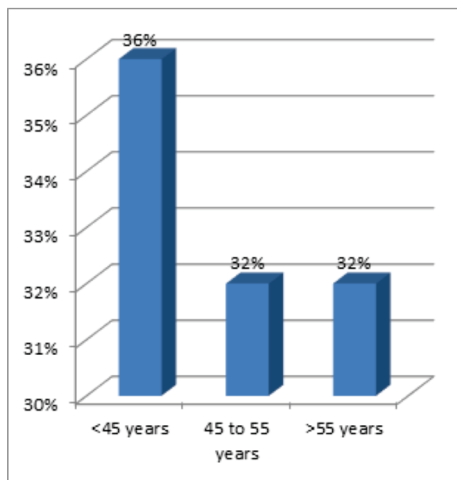


Figure 1: Bar Graph Showing Age Distribution

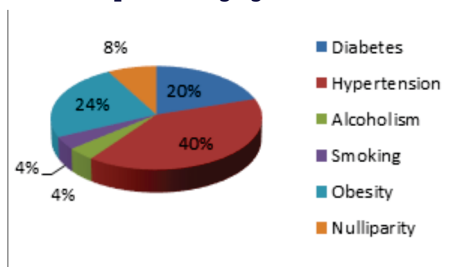


Figure 2: Pie Chart Showing Risk Factors In Our Study

In multivariate logistic regression analysis, obesity (BMI ≥30 kg/m²) was significantly associated with increased odds of endometrial cancer (OR 2.5, 95% CI 1.4-3.9). Both former and

current smoking was significantly associated with endometrial cancer risk, with ORs of 3.6 (95% CI 1.9-85). No significant association was observed with alcohol intake, diabetes and hypertension. [Table2]

Table 2: Distribution Of Participants Based On BMI Categories

BMI Category	Adjusted OR	95% CI
Diabetes	2.3	0.8-4.5
Hypertension	1.7	0.6-3.8
Alcoholism	4.5	0.8-6.2*
Smoking	3.6	1.9-5.5*
Obesity	2.5	1.4-3.9*
Nulliparity	2.1	0.2-4.5

DISCUSSION

Approximately 20% of global annual mortality can be attributed to obesity, inactivity, and poor diet.⁶ Although tobacco use has historically been the primary cause of lifestyle-related mortality, since the 1980s, high-income countries have seen an increase in the incidence of obesity-related comorbidities and cancers due to the obesity epidemic (defined as body mass index [BMI] ≥30 kg/m²) and the sedentary Western lifestyle that goes along with it.⁷ Modifiable risk factors are linked to about half of all cancer cases.⁸

Gynecologic malignancies, especially endometrial carcinoma (EC), are among the most often caused by obesity. One of the most adipose-sensitive cancers, EC, may rise as a result of the global obesity epidemic. Additionally, obesity affects EC survivability because obese survivors have much higher cancer-specific mortality rates and encounter significant morbidity and mortality from obesity-related cardiovascular disease.^{9,10}

In this retrospective study of 25 endometrial cancer cases, we found a significant positive association between obesity (BMI ≥30 kg/m²) and endometrial cancer risk, with an adjusted odds ratio of 2.5 (95% CI 1.4-3.9).

The increased risk with obesity is consistent with numerous studies globally and in India showing 1.5 to 3 times higher endometrial cancer odds in those with high BMI.^{11,12} However, the magnitude of this association in our sample was even greater than that reported in meta-analyses. This highlights obesity as a particularly important modifiable risk factor for endometrial cancer among Indian women.

Obesity alone is responsible for about half of all new EC diagnosis.¹³ There is a dose-response association between the risk of EC and obesity in women, with obese women having a 2.4-4.5 times higher chance of receiving an EC diagnosis than do women of normal weight.¹⁴⁻¹⁶ An obese woman with a BMI ≥40 kg/m² has seven times the risks of having type 1 EC compared to a normal-weight woman, even after controlling for other risk factors (such as smoking, using an oral contraceptive pill [OCP], using hormone replacement therapy [HRT], and parity).¹⁶ Furthermore, the obesity epidemic seems to have led to a rise in EC diagnoses in younger women: between 1992 and 2012, the incidence rates for women under 50 years of age increased by 2% year.¹⁷

We found, former and current smoking was also significantly associated with higher odds of endometrial cancer. Smoking lowers the chance of EC, possibly as a result of its antiestrogenic properties. A meta-analysis encompassing ten cohort studies revealed a 19% (95% CI 0.74-0.88) reduction in risk.¹⁸ However, smoking cannot be advised for the prevention of EC given the numerous recognised harmful effects on health.⁷

No significant relationships were observed between endometrial cancer and alcohol intake, diabetes, or

hypertension in our cohort. In contrast, we did not find significant links between endometrial cancer and diabetes or hypertension, unlike previous studies demonstrating 1.5 to 2 times higher odds with these conditions.^{19,20} The lack of association may be partly related to the small sample size in our single-hospital study. However, it warrants further investigation given the high prevalence of metabolic disorders in India.

Our findings confirming smoking as an independent risk factor support prior evidence that tobacco use increases endometrial cancer risk, even at low levels.²¹ The high OR of 3.6 underscores the need for smoking cessation programs to help lower endometrial cancer incidence in India.

Overall, this study provides further evidence that obesity and smoking are critical modifiable lifestyle factors contributing to endometrial cancer burden among Indian women. Larger multi-center studies are required to clarify other potential risk factors in India, including the role of diabetes and hypertension.

This single-center retrospective study has several notable strengths, including the use of confirmed medical records for detailed data collection on lifestyle exposures and endometrial cancer diagnoses. By leveraging histopathology-verified cases from 2015-2020 and adjusting analyses for age and other confounders, the study provides reliable evidence on relationships between modifiable risk factors like obesity, smoking, and physical inactivity and endometrial cancer among Indian women. Given India's rising burden of endometrial cancer and limited research on its risk factors locally, this study makes an important contribution by identifying high-risk subgroups most likely to benefit from targeted prevention approaches. The focus on an understudied Indian population addresses a crucial knowledge gap. While larger multicenter studies are needed to expand on these initial findings, this study provides vital preliminary data to guide public health strategies aimed at curbing India's growing endometrial cancer incidence through lifestyle changes.

CONCLUSION

In conclusion, this retrospective study provides valuable preliminary evidence that modifiable lifestyle factors like obesity and smoking are associated with increased risk of endometrial cancer among Indian women, similar to trends observed globally. Despite some limitations, including the small sample size, this study addresses crucial gaps in research on endometrial cancer risk factors in the understudied Indian context. The findings can help guide health policies and prevention initiatives targeting priority subgroups like obese women and smokers to stem the rising tide of endometrial cancer in India. This study sets the stage for larger prospective cohort studies across diverse Indian populations to confirm these associations between lifestyle exposures and endometrial cancer risk. Elucidating the role of modifiable risk factors is key to reversing the increase in endometrial cancer burden and saving women's lives in India. Public health efforts promoting weight management and smoking cessation may offer effective strategies to lower endometrial cancer incidence.

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