Original Research Article

Prevalence and Risk Factors of Ovarian Cysts in Women Aged 18-45 Years in Bangladesh: A Prospective Study on Ovarian Cyst Development and Carcinoma Risk

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ABSTRACT

Background: Ovarian cysts, fluid-filled sacs in or on the surface of an ovary, are a common gynecological condition among women of reproductive age. This study aimed to determine the prevalence, risk factors, malignant potential, associated co-morbid conditions, and clinical presentation of ovarian cysts among Bangladeshi women aged 18-45 years.

Methods: A prospective study was conducted with a sample size of 1860 women from various regions in Bangladesh. Data collection encompassed medical history, family history, hormonal contraceptive usage, and clinical symptoms. Ovarian cyst presence and characteristics were determined through ultrasonography.

Results: The overall prevalence of ovarian cysts in the studied cohort was 17.6%. Identified risk factors included advanced age (35-45 years), use of certain hormonal contraceptives, and family history of ovarian cysts or cancer. Of the diagnosed cysts, 3.7% exhibited potential malignant features. Polycystic ovary syndrome (PCOS) emerged as the most prevalent co-morbid condition. Pain was the primary clinical presentation reported by 64.0% of the participants with ovarian cysts.

Conclusion: The study highlights a significant prevalence of ovarian cysts among Bangladeshi women aged 18-45 years. The findings underscore the importance of regular health screenings, awareness campaigns, and timely medical interventions for women, especially those with known risk factors or clinical symptoms, to improve health outcomes related to ovarian cysts.

Keywords: Ovarian cysts, prevalence, risk factors, Bangladeshi women, carcinoma risk

1. INTRODUCTION

Ovarian cysts, fluid-filled sacs that develop within or on the surface of the ovaries, represent a significant health concern for women of reproductive age, often resulting in diverse clinical presentations ranging from asymptomatic occurrences to severe pelvic pain and complications [1]. The potential of an ovarian cyst to become malignant, although rare, remains a critical concern in the clinical management of these cysts [2]. It is important to note that the majority of ovarian cysts are benign and resolve spontaneously. However, early identification of those at risk of developing malignancies is crucial, as ovarian cancer is notorious for being diagnosed in its advanced stages, and early detection can significantly improve prognosis [3]. The prevalence of ovarian cysts varies geographically and ethnically [4]. Bangladesh, with its distinct population characteristics and genetic diversity, has hitherto remained underrepresented in large-scale studies focusing on the prevalence and risk factors of ovarian cysts. Furthermore, epidemiological studies have indicated that socio-cultural, dietary, reproductive, and genetic factors may contribute to the variable prevalence of ovarian cysts across populations [5].

While age remains a significant predictor for the risk of ovarian cysts, the age group of 18-45 years, encompassing the majority of the reproductive age, presents a unique subset for

investigation [6]. In Bangladesh, socio-cultural practices, reproductive health norms, and lifestyle factors might contribute distinctively to the prevalence and risk associated with ovarian cyst development in this age group. This study seeks to address this gap in the literature, aiming to provide a comprehensive understanding of the prevalence of ovarian cysts in women aged 18-45 years in Bangladesh. Additionally, we aim to elucidate the specific risk factors in this cohort, offering a broader perspective on ovarian cyst development and the potential for malignancy. Such findings will not only contribute to the global understanding of ovarian cyst epidemiology but will also inform local healthcare strategies, aiding in the timely identification, intervention, and management of women at risk [7,8].

Objective

This research aimed to thoroughly investigate the prevalence of ovarian cysts among Bangladeshi women aged between 18 and 45 years, delving into the primary risk factors associated with the condition. The study further sought to determine the malignant potential of these cysts, elucidate any co-morbid conditions that may be prevalent among the affected individuals, and detail the common clinical presentations experienced by the participants. Through these objectives, we intended to paint a comprehensive picture of ovarian cyst occurrences in this particular demographic, providing valuable insights for healthcare professionals and policymakers.

2. METHODS

2.1 Study Design, Sampling Technique, and Sample Size

This research was conducted across four major urban centers in Bangladesh: Dhaka, Chittagong, Rajshahi, and Khulna. These regions were chosen based on their diverse socio-economic backgrounds, accessibility to health care, and representation of the general Bangladeshi population in the target age group.

A stratified random sampling method was used. Each city was considered a stratum, and within each city, random clusters (healthcare centers) were chosen. Participants were then selected randomly from these clusters to ensure a widespread representation of different urban settings.

A total of 1860 women aged 18-45 years participated in this study. The sample size distribution was roughly equal across the four regions to ensure uniform representation. The sample size was calculated based on the Cochran's formula for categorical data:

$$n = \frac{Z^2 \times P \times (1 \quad P)}{E^2}$$

Where:

- n is the sample size,
- Z is the z-value (1.96 for 95% confidence level)
- P is the estimated prevalence of ovarian cysts from previous studies (assumed to be 0.10 or 10% for this preliminary calculation), and
- E is the desired level of precision (0.03 or 3%).

Using this formula and adjusting for a design effect of 1.5 for clustering and an estimated response rate of 80%, the final sample size was approximated at 1860 participants.

2.2 Variables

Dependent Variable: Presence or absence of ovarian cysts.

Independent Variables: Age, reproductive history (e.g., parity, menstrual history, use of hormonal contraceptives), lifestyle factors (dietary habits, physical activity, smoking or

alcohol consumption), familial and genetic history, socio-economic status, education level, co-morbid conditions, and clinical presentations.

2.3 Statistical Analysis:
Descriptive statistics, including frequencies, means, and standard deviations, were computed for all demographic and clinical variables. The prevalence of ovarian cysts was determined by calculating the proportion of participants diagnosed with the condition.

Logistic regression was employed to identify risk factors associated with ovarian cysts. The formula for logistic regression is:

$$\log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_k X_k$$

Where:

- p is the probability of developing an ovarian cyst,
- $\beta 0$ is the intercept, and
- $\beta 1, \beta 2, ... \beta k$ are the coefficients of the predictors $X1, X2, ... Xk$.

Associations between the dependent and independent variables were presented as odds ratios (OR) with 95% confidence intervals (CI). A p-value <0.05 was considered statistically significant.

3. RESULTS AND DISCUSSION

3.1 Estimation of Prevalence
Of the 1860 women included in the study, 328 were diagnosed with ovarian cysts, resulting in an overall prevalence of 17.6%. (Table 1)

Table 1: Table 1: Prevalence of Ovarian Cysts in the Study Population

	Number	Percentage	p-value
Participants with ovarian cysts	328	17.60%	<0.001
Participants without ovarian cysts	1532	82.40%	
Total	1860	100%	

The chi-square test confirmed a significant difference in prevalence across the four cities ($p < 0.001$).

3.2 Identification of Risk Factors
Several risk factors showed significant associations with the presence of ovarian cysts.. (Table 2)

Table 2: Association of Risk Factors with Ovarian Cysts

Risk Factor	OR (95% CI)	p-value
Advanced age (35-45)	1.8 (1.4-2.3)	<0.01
Use of hormonal contraceptives	1.5 (1.2-1.9)	3.00%
Family history of ovarian cysts or cancer	2.3 (1.8-2.9)	<0.01

3.3 Determination of Malignant Potential
Of the 328 diagnosed ovarian cysts, 12 had potential signs of malignancy.

Table 3: Malignant Potential of Ovarian Cysts

Number	Percentage	p-value
Cysts with malignant features	12	3.70%
Cysts without malignant features	316	96.30%

The chi-square test revealed a significant association between larger cyst size and malignant potential ($p = 0.02$).

3.4 Analysis of Co-morbid Conditions

A significant portion of participants with ovarian cysts had co-morbid conditions. PCOS was the most frequently observed.

Table 4: Co-morbid Conditions in Participants with Ovarian Cysts

Condition	Number	Percentage	p-value
PCOS	72	22.00%	<0.01
Endometriosis	38	11.60%	0.04
Pelvic Inflammatory Disease	28	8.50%	0.07
None	190	57.9%	

Using the chi-square test, the presence of PCOS showed a significant association with the development of ovarian cysts ($p < 0.01$).

3.5 Evaluation of Clinical Presentation

A majority of participants with ovarian cysts reported pain as their primary symptom.

Table 5: Clinical Presentation in Participants with Ovarian Cysts

Symptom	Number	Percentage	p-value
Pain	210	64.00%	<0.001
Menstrual irregularities	150	45.70%	0.002
Bloating	98	29.90%	0.02
Asymptomatic	52	15.90%	0.05

A chi-square test confirmed significant differences in the distribution of symptoms among the women diagnosed with ovarian cysts ($p < 0.01$).

The present study provides crucial insights into the prevalence and associated risk factors of ovarian cysts among Bangladeshi women aged 18-45 years. With an observed prevalence rate of 17.6%, the findings are slightly higher than those reported in some previous studies from other Asian countries, which documented rates ranging from 10% to 15%[9,10]. The disparity could be attributed to genetic, environmental, or lifestyle factors unique to the Bangladeshi population. Certain identified risk factors in this study, such as advanced age, usage of hormonal contraceptives, and a family history of ovarian cysts or cancer, align with those identified in the global literature[11]. The observed association between advanced age and the development of cysts could be a result of the prolonged exposure to endogenous and exogenous hormones over time. The use of certain hormonal contraceptives, although typically considered protective against ovarian cancer, has been controversially associated with the development of benign ovarian cysts in some studies[12]. The malignant potential of cysts remains a significant concern, and our observed rate of 3.7% for potential malignancy

reiterates the importance of early detection and monitoring, especially in high-risk populations. This percentage is somewhat consistent with findings from a study conducted in India, which reported a malignancy rate of 4.2% among women with ovarian cysts[13]. Early detection, in combination with effective clinical interventions, has the potential to reduce morbidity and mortality rates associated with malignant transformation[14].

Co-morbid conditions, particularly PCOS, were significantly associated with the presence of ovarian cysts in our study. This aligns with earlier research that has emphasized the association between PCOS and the increased likelihood of ovarian cyst development[15]. The intricate interplay between hormonal imbalances, insulin resistance, and inflammatory responses in PCOS patients could contribute to cystogenesis[16]. The clinical presentation, most notably pain, was a significant complaint among participants with cysts. Such clinical manifestations, while non-specific, emphasize the importance of regular health screenings in symptomatic individuals to enable early detection and management. While the majority of ovarian cysts remain asymptomatic and may resolve spontaneously, those causing symptoms might necessitate medical intervention and, in some instances, surgical management[17].

This study underscores the importance of understanding the epidemiology and associated risk factors of ovarian cysts in specific populations, such as Bangladeshi women aged 18-45 years. The findings also highlight the need for heightened awareness, regular screening, and timely medical intervention, especially for those with known risk factors or clinical symptoms. Further research in diverse populations and settings will be invaluable in creating comprehensive management and prevention strategies for ovarian cysts on a global scale.

4. CONCLUSION

This research has shed light on the significant prevalence of ovarian cysts among Bangladeshi women aged 18-45 years, emphasizing the necessity for heightened awareness and screening programs within this demographic. The identified risk factors, including advanced age, hormonal contraceptive use, and family history, reinforce the need for individualized risk assessments and tailored preventive measures. The study also accentuates the importance of monitoring for malignant potential and understanding associated co-morbid conditions, especially given the significant association with conditions like PCOS. Ultimately, prioritizing early detection, patient education, and timely interventions can pave the way for improved health outcomes for women at risk of developing ovarian cysts.

ETHICAL APPROVAL

The ethical approval for this study was considered by the Ministry of Health, Government of Peoples Republic of Bangladesh

CONSENT

As per international standard or university standards, Participants' written consent has been collected and preserved by the author(s).

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