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FREQUENCY OF EPITHELIAL OVARIAN TUMOR AND ITS RISK FACTORS AMONG THE PATIENTS PRESENTING WITH OVARIAN TUMOR AT TERTIARY CARE HOSPITAL, KARACHI.

Original Research

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ABSTRACT

Background: Epithelial ovarian tumors are among the most lethal gynecologic malignancies, often presenting at an advanced stage due to vague symptoms and lack of early detection strategies. These tumors account for the majority of ovarian cancer cases worldwide and pose a significant burden in low-resource settings. Identifying key risk factors in local populations is essential for improving diagnostic timing, shaping preventive strategies, and guiding targeted patient counseling and care.

Objective: To determine the frequency of epithelial ovarian tumors and assess the associated risk factors among patients presenting with ovarian tumors at a tertiary care hospital in Karachi.

Methods: This descriptive cross-sectional study was conducted at the Department of Obstetrics & Gynaecology, JPMC, Karachi, from February 19, 2022, to August 18, 2022. A total of 133 women aged 18–40 years presenting with ovarian tumors were enrolled through consecutive non-probability sampling. Informed consent was obtained. Demographic and clinical histories were recorded, including factors such as age, BMI, parity, reproductive history, hormone therapy use, and family history of malignancy. Data were analyzed using SPSS version 22. Frequencies, percentages, means, standard deviations, and chi-square tests were applied to assess associations, with $p < 0.05$ considered significant.

Results: The mean age was 43.02 ± 12.83 years. Epithelial ovarian tumors were observed in 106 (79.7%) participants. Risk factor distribution included: age ≥50 years in 46 (34.6%), BMI ≥30 in 30 (22.6%), nulliparity in 46 (34.6%), early menarche (<12 years) in 59 (44.4%), late menopause (>50 years) in 37 (27.8%), family or personal history of breast cancer in 4 (3.0%), ovarian cancer in 7 (5.3%), colon cancer in 2 (1.5%), hormone replacement therapy use in 8 (6.0%), and clomiphene use in 37 (27.8%).

Conclusion: Epithelial ovarian tumors are highly prevalent among women with ovarian masses. Early menarche, advancing age, and nulliparity emerged as the most frequent risk factors. These findings emphasize the need for awareness, early screening, and further studies to explore risk mitigation in high-risk groups.

Keywords: Epithelial Ovarian Neoplasms, Epidemiology, Menarche, Nulliparity, Obesity, Risk Factors, Tumor Prevalence.

INTRODUCTION

Epithelial ovarian cancer (EOC) is the most prevalent and lethal form of ovarian malignancy, comprising roughly 90 % of all ovarian cancers and ranking as the leading cause of death from gynaecologic tumours worldwide (1). Because early manifestations are vague and non-specific, more than 70 % of women first present with advanced-stage disease, a scenario reflected in the moniker “silent killer” (2,3). Once disseminated, the overall 5-year survival rarely exceeds 30 %, underscoring the inadequacy of current diagnostic and therapeutic strategies (4). EOC exhibits marked histopathological diversity, encompassing five principal subtypes—high-grade serous, low-grade serous, endometrioid, clear-cell and mucinous carcinoma (5). High-grade serous carcinoma (HGSC) alone accounts for over two-thirds of cases and is characterised by ubiquitous TP53 mutations, profound genomic instability and frequent loss of BRCA1/2 function (6). Mounting molecular and pathological evidence indicates that many HGSCs originate from serous tubal intraepithelial carcinoma in the distal fallopian tube rather than the ovarian surface epithelium, reshaping concepts of tumour initiation and opportunities for prevention (7).

Risk is modified by a constellation of reproductive, hormonal and lifestyle factors. Advancing age, nulliparity, early menarche, late menopause, infertility and endometriosis each elevate susceptibility (8). Approximately 15–20 % of tumours arise on a background of inherited defects in homologous-recombination genes—most notably BRCA1, BRCA2, RAD51C, RAD51D and BRIP1—highlighting the importance of genetic counselling and targeted surveillance (9). In contrast, parity, use of combined oral contraceptives, tubal ligation and breastfeeding confer measurable protection, implying a role for ovulation suppression and altered pelvic inflammatory pathways in risk reduction (10). Despite incremental advances in cytoreductive surgery and platinum-based chemotherapy, relapse and chemoresistance remain formidable challenges, particularly in resource-constrained settings where delayed presentation and limited access to genetic testing aggravate outcomes (11). A paucity of local epidemiological data further hampers the development of context-appropriate preventive and therapeutic protocols. Accordingly, this study seeks to quantify the frequency of established aetiological factors for EOC within a representative cohort from a developing-country population, with the objective of informing locally relevant risk-stratification, early-detection and preventive strategies that could curtail disease-related morbidity and mortality.

METHODS

The present study was a descriptive cross-sectional investigation conducted in the Department of Obstetrics and Gynecology at Jinnah Postgraduate Medical Centre (JPMC), Karachi, following approval from the institutional ethical review committee (ERC). The objective was to determine the frequency of epithelial ovarian tumors and assess associated risk factors. A non-probability consecutive sampling technique was employed for participant recruitment. The calculated sample size was 133, based on an assumed 20% prevalence of positive family history (12), a 95% confidence level, and a 7% margin of error using the WHO sample size calculator. Eligible participants included women aged 18 to 40 years presenting with ovarian tumors at JPMC. Inclusion was based on the presence of symptoms such as abdominal pain, distension, ascites, anemia, fatigue, pleural effusion, or pressure symptoms like constipation, urinary tract infections, urinary retention, burning micturition, and menstrual irregularities. Exclusion criteria encompassed patients unwilling to consent, those diagnosed with primary peritoneal carcinoma or secondary metastatic ovarian tumors, and those with tubo-ovarian pathologies unrelated to epithelial tumors (e.g., ectopic pregnancy, tubo-ovarian abscess, endometriosis). Patients who failed to follow up or did not provide histopathology reports were also excluded.

Informed written consent was obtained from all participants. Upon admission, height and weight were measured using standardized equipment, and body mass index (BMI) was calculated (kg/m²). A structured proforma was used to document demographic and clinical data, including age, residence, parity, family income, education level, occupation, and marital status. Clinical history focused on identifying risk factors for epithelial ovarian tumors such as early menarche, late menopause, obesity, nulliparity, advancing age, personal or family history of breast, ovarian, or colon cancer, and use of hormone replacement therapy or clomiphene. Data were entered and analyzed using SPSS Version 22. Quantitative variables including age, height, weight, and BMI were expressed as means with standard deviations. Categorical variables such as sociodemographic characteristics and risk factors were summarized using frequencies and percentages. Effect modifiers including age, parity, residence, socioeconomic status, education, occupation, and marital status were

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controlled through stratification. Post-stratification, the chi-square test was applied to assess associations, and a p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 133 patients with ovarian tumors were evaluated to determine the frequency of epithelial ovarian tumors and associated risk factors. The mean age of the study population was 43.02 ± 12.83 years. The average weight was 68.08 ± 8.19 kg, while the mean height was recorded as 159.47 ± 9.39 cm. The calculated mean body mass index (BMI) was 26.01 ± 3.13 kg/m². Of the total participants, 106 (79.7%) were diagnosed with epithelial ovarian tumors, while 27 (20.3%) were found to have non-epithelial tumors. The majority of patients, 98 (73.7%), resided in rural areas, whereas 35 (26.3%) belonged to urban settings. In terms of parity, 47 (35.3%) were nulliparous, while 86 (64.7%) were multiparous. Monthly family income distribution showed that only 3 (2.3%) women belonged to the lower-income group (<15,000 PKR), 49 (36.8%) to the lower-middle-income group (16,000–25,000 PKR), 55 (41.4%) to the middle-income group (26,000–45,000 PKR), 24 (18.0%) to the upper-middle-income group (46,000–65,000 PKR), and 2 (1.5%) to the upper-income group (>65,000 PKR). Regarding educational status, 40 (30.1%) were illiterate, 50 (37.6%) had primary education, 39 (29.3%) had secondary education, and only 4 (3.0%) had higher education. Among all patients, 27 (20.3%) were employed, and 106 (79.7%) were unemployed. Marital status data indicated that 113 (85.0%) were married and 20 (15.0%) were unmarried.

Risk factors associated with epithelial ovarian tumors revealed that 46 (34.6%) patients were aged 50 or above, while 30 (22.6%) had a BMI ≥30. Nulliparity was observed in 46 (34.6%) cases. Early menarche (<12 years) was noted in 59 (44.4%) women, and late menopause (>50 years) in 37 (27.8%) cases. A personal or family history of breast cancer was present in 4 (3.0%) participants, ovarian cancer in 7 (5.3%), and colon cancer in 2 (1.5%). Use of hormone replacement therapy was reported by 8 (6.0%) women, while 37 (27.8%) had used clomiphene. Stratified analysis showed statistically significant associations between age group and epithelial tumor status (p = 0.0001), and educational status (p = 0.0001). However, no significant associations were found with residential status (p = 0.219), parity (p = 0.836), occupational status (p = 0.416), marital status (p = 0.381), or family income (p = 0.052).

Table 1: Frequency of Ovarian Tumors (N=133)

OVARIAN TUMORS	FREQUENCY	PERCENTAGE
Epithelial	106	79.7%
Non epithelial	27	20.3%

Table 2: Frequency of Factors Leading to Development of Epithelial Ovarian Tumor (N=133)

FACTORS		FREQUENCY	PERCENTAGE
Age 50 or above	Yes	46	34.6%
	No	87	65.4%
BMI 30 or above	Yes	30	22.6%
	No	103	77.4%
Nulliparity	Yes	46	34.6%
	No	87	65.4%
Age of menarche <12 years	Yes	59	44.4%
	No	74	55.6%
Age of menopause >50 years	Yes	37	27.8%
	No	96	72.2%
Personal or family history of breast cancer	Yes	4	3.0%
	No	129	97.0%
Personal or family history ovarian cancer	Yes	7	5.3%
	No	126	94.7%

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Table 3: Stratification of Age Group, Residential Status, Parity, Occupational Status, Marital Status, Family Monthly Income and Educational Was Done in Respect to Epithelial Tumor

AGE (years)	OVARIAN TUMORS		P-VALUE
	Epithelial	Non-Epithelial	
20 – 40	42 (31.6%)	25 (18.8%)	0.0001
>40	64 (48.1%)	2 (1.5%)	
RESIDENTIAL STATUS	OVARIAN TUMORS		P-VALUE
	Epithelial	Non-Epithelial	
Urban	30 (22.6%)	5 (3.8%)	0.219
Rural	76 (57.1%)	22 (16.5%)	
PARITY	OVARIAN TUMORS		P-VALUE
	Epithelial	Non-Epithelial	
Nulliparous	37 (27.8%)	10 (7.5%)	0.836
Multiparous	69 (51.9%)	17 (12.8%)	
OCCUPATIONAL STATUS	OVARIAN TUMORS		P-VALUE
	Epithelial	Non-Epithelial	
Employed	20 (15.0%)	7 (5.3%)	0.416
Unemployed	86 (64.7%)	20 (15.0%)	
MARITAL STATUS	OVARIAN TUMORS		P-VALUE
	Epithelial	Non-Epithelial	
Married	91 (68.4%)	22 (16.5%)	0.381
Unmarried	15 (11.3%)	5 (3.8%)	
FAMILY MONTHLY INCOME	OVARIAN TUMORS		P-VALUE
	Epithelial	Non-Epithelial	
Lower income group < 15000	3 (2.3%)	0 (0.0%)	0.052
Lower middle-income group 16000-25000	43 (32.3%)	6 (4.5%)	
Middle income group 26000-45000	37 (27.8%)	18 (13.5%)	
Upper middle-income group 46000-65000	21 (15.8%)	3 (2.3%)	
Upper income group > 65000	2 (1.5%)	0 (0.0%)	
EDUCATIONAL STATUS	OVARIAN TUMORS		P-VALUE
	Epithelial	Non-Epithelial	
Illiterate	38 (28.6%)	2 (1.5%)	0.0001
Primary	43 (32.3%)	7 (5.3%)	
Secondary	21 (15.8%)	18 (13.5%)	
Higher	4 (3.0%)	0 (0.0%)	

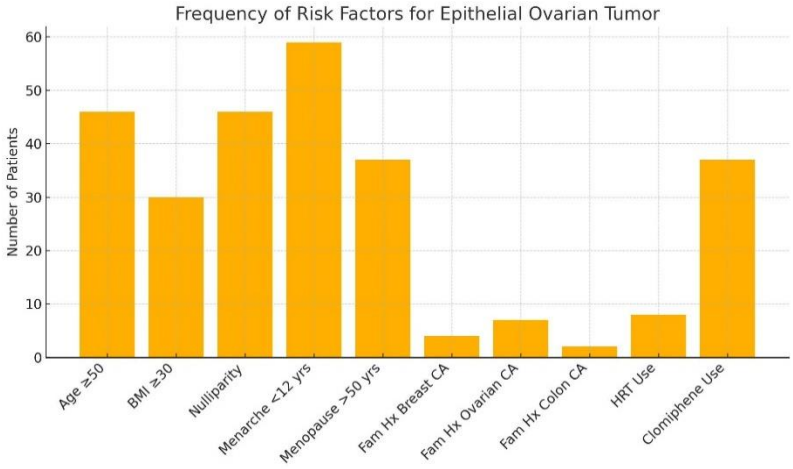

Figure 1 Frequency of Risk Factors for Epithelial Ovarian Tumor

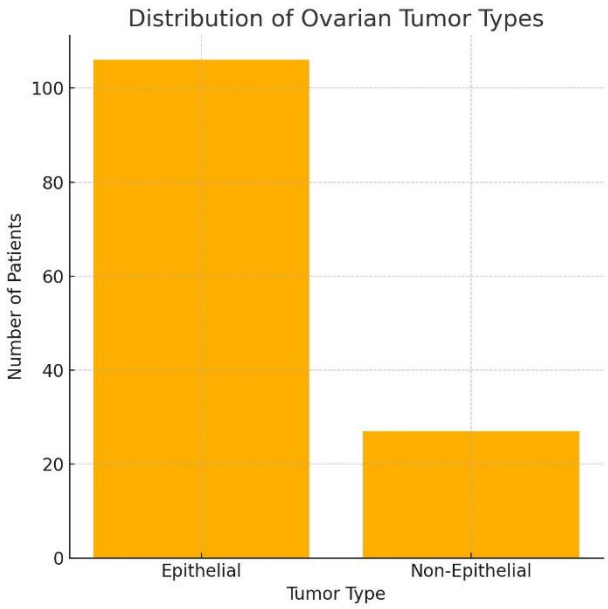

Figure 2 Distribution of Ovarian Tumor Types

DISCUSSION

The findings of the present study reaffirm the significant burden of epithelial ovarian tumors among women presenting with ovarian masses, particularly in low-resource settings. With 79.7% of the tumors diagnosed as epithelial in origin, this proportion aligns with global data reporting epithelial subtypes as the most frequent and aggressive variant of ovarian malignancies. The mean age of patients in this study was 43.02 ± 12.83 years, slightly younger compared to international studies where the average age typically extends into the late forties to early fifties. This age discrepancy may reflect earlier onset in South Asian populations or delayed healthcare access leading to late presentation (13,14). A notable proportion of the study population presented with risk factors long established in literature. These included age ≥50 years (34.6%), nulliparity (34.6%), obesity (22.6%), early menarche before 12 years of age (44.4%), and late menopause beyond 50 years (27.8%). The prevalence of these risk factors supports previous epidemiological models attributing increased lifetime estrogen exposure to elevated ovarian cancer risk. The presence of personal or family history of breast (3.0%), ovarian (5.3%), and colon (1.5%) cancer further underscores the multifactorial etiology of the disease, although these percentages were relatively lower than expected. This might indicate underreporting or unawareness of familial cancer history among the studied population (15,16).

Hormonal and reproductive interventions were also investigated. Clomiphene use was observed in 27.8% of participants, consistent with the hypothesis that ovulation-inducing agents may raise epithelial ovarian cancer risk in susceptible individuals. Hormone replacement therapy (HRT), though less prevalent (6.0%), remains an important risk consideration. These findings collectively point towards a modifiable risk profile, particularly in contexts where fertility treatments, hormonal therapies, and lifestyle factors are inadequately monitored (17). Comparison with regional studies revealed a similar pattern of risk factor distribution, though slight variations in magnitude were noted. Previous studies reported higher proportions of postmenopausal women with epithelial ovarian cancer, more frequent late menopause, and greater exposure to smoking and infertility treatments (18-21). The relative underrepresentation of postmenopausal women in the current cohort may reflect demographic differences in hospital catchment areas or earlier age of disease onset in this population.

This study's strength lies in its focus on a tertiary care setting in a developing country, offering a valuable snapshot of ovarian cancer risk profiles in a population with unique demographic, nutritional, and environmental exposures. The prospective data collection, use of standardized definitions, and comprehensive demographic stratification also enhance its internal validity. However, several limitations merit consideration. The study employed a non-probability sampling technique, which may limit the generalizability of results.

Furthermore, lack of molecular profiling and staging data restricts interpretation of tumor biology and prognosis. The cross-sectional nature of the analysis precludes any assessment of causality, while potential recall bias in patient-reported risk factors such as age of menarche and family history cannot be ruled out. Additionally, the study did not explore protective factors such as parity duration, lactation history, or oral contraceptive use, which are known to influence ovarian cancer risk. Multivariate regression analysis was not performed, limiting the ability to identify independent predictors. Future studies should incorporate these variables and adopt longitudinal designs to elucidate causal relationships more effectively (22). Expanding the research to include genetic screening, serum biomarker profiling, and staging classification would provide a more comprehensive understanding of disease mechanisms and therapeutic responsiveness. Despite these limitations, the study adds meaningful insight into the epidemiology of epithelial ovarian tumors in a low-resource setting. The high frequency of modifiable risk factors supports the need for targeted awareness campaigns, early screening initiatives, and policy interventions aimed at lifestyle modification. Integrating community-level education with clinical surveillance strategies could significantly improve early detection, reduce surgical complications, and ultimately enhance survival outcomes for women at risk.

CONCLUSION

Epithelial ovarian tumors continue to pose a serious clinical burden, primarily due to their silent progression and delayed diagnosis. This study reaffirms that advancing age, early menarche, and the use of ovulation induction therapies are prominent risk factors contributing to their development. These findings underscore the importance of vigilant screening, particularly in women with prolonged exposure to uninterrupted ovulatory cycles or those undergoing fertility treatments. Recognizing these risk indicators can support clinicians in early identification, personalized counseling, and proactive risk-reduction strategies, ultimately contributing to improved outcomes and a reduction in disease-related morbidity.

AUTHOR CONTRIBUTION

Author	Contribution
Shazia Naseeb*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Haleema Shah	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published

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