

Overview on Screening and Prevalence of Ovarian Neoplasms in Saudi Arabia

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Abstract

One of the main health issues facing general practitioners in general and gynecologists in particular is ovarian tumors. Ovarian cancer is the second most prevalent malignancy of the female reproductive system and the fifth leading cause of cancer-related death in women. The majority of instances are discovered when the disease has already progressed even though the majority of early discovered neoplasms are benign which emphasizes the importance of early detection. The study aims to summarize current evidence regarding screening and the prevalence of ovarian neoplasms among Saudi women. For article selection, the PubMed database and EBSCO Information Services were used. All relevant articles relevant to our topic and other articles were used in our review. Other articles that were not related to this field were excluded. The data was extracted in a specific format that was reviewed by the group members. In the present study We found that a total of eight studies, which focused on the prevalence of ovarian cancers in various regions in Saudi Arabia. Malignant ovarian neoplasms are less frequent than benign ones. Serous cystadenoma and serous cystadenocarcinoma are the most prevalent benign and malignant ovarian neoplasms, respectively. Malignant ovarian neoplasms are more common as people get older. Most neoplastic ovarian tumors in children and adolescents are benign. The greatest rates of ASIR were found in Riyadh, Jouf, and Asir, whereas Jazan and Hail had the lowest rates.

Keywords: Ovarian cancers, Ovarian neoplasm, Malignant ovarian neoplasms, Screening for ovarian neoplasms, Saudi Arabia

INTRODUCTION

Ovarian tumors are a serious health concern for general practitioners in general and gynecologists in particular. Ovarian carcinoma is the second most prevalent cancer of the female reproductive system and the fifth leading cause of cancer-related death in women. Ovarian cancer is the sixth most frequent cancer in Saudi women, with a mean age at diagnosis of 54 years and a wide age range of 5 to 97 years [1]. Globally, the prevalence varies. With an age-adjusted incidence of 6.3-12.1/100,000, it is the sixth most common cancer diagnosis in women. According to statistics, it is the fourth cause of mortality for females. Ovarian cancer epidemiology varies according to geography and ethnicity. Neoplastic ovarian tumors in children and adolescents are rare, accounting for 0.9 to 2% of all tumor types in this age group. Furthermore, according to certain research, this age group has roughly 2.6 cases per 100,000 females each year [2-11].

The majority of instances are discovered when the disease has already progressed, which results in dismal consequences. The limited predictive value of the current screening tests adds to this agony. The basic early detection tools, which include a comprehensive gynecological examination, transvaginal ultrasound, and laboratory indicators such as the cancer antigen-125 (CA-125) assay,

have not appreciably decreased morbidity or mortality from this disease [12].

As the world's population ages, remarkable increase in the total number of ovarian cancer cases are expected [13]. The most frequent kind of ovarian cancer to be identified is high-grade serous carcinoma (HGSC), which often responds well to platinum-based treatment when discovered. However, HGSCs commonly recur and develop increased treatment resistance in addition to the other histologies. As a result, ovarian cancer research is actively focused on understanding the processes causing platinum resistance and developing

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strategies to combat it. Aside from an HGSC precursor lesion known as serous tubal intraepithelial carcinoma, which holds promise for identifying people at high risk of developing the disease and developing prevention strategies, significant progress has been made in identifying genes associated with an increased risk of developing ovarian cancer (such as BRCA1 and BRCA2) [14].

Traditional treatments include surgery and platinum-based chemotherapy; however, in the last ten years, anti-angiogenic bevacizumab and poly(ADP-ribose) polymerase (PARP) inhibitors have gained prominence in the treatment of this gynecological cancer [12].

In the previous four decades, Saudi Arabia's socioeconomic situation has changed significantly. People's lifestyles have changed as a result of this societal expansion and transformation, including the importance of elements like sedentary lifestyles, processed food intake, and other behaviors. The incidence of numerous illnesses, including cancer, is thought to have increased as a result of these lifestyle changes. In 2004, the age-standard incidence rate of cancer in Saudi Arabia was 57.2 per 100,000 individuals. More research should be conducted to determine the incidence and death rates of cancer in societies such as Saudi Arabia, where more than half of the population is under the age of 29, in order to create preventive methods [15].

Study Design

A comprehensive assessment of the available evidence on ovarian neoplasms and their prevalence in Saudi women across demographics and locations. is seen to be a strong method of locating and synthesizing peer-reviewed publications for evidence in this field in order to develop a coherent empirical research agenda that builds on existing knowledge. This review solely contained qualitative material to generate an interpretation. Furthermore, a qualitative data synthesis seeks to provide findings that are meaningful, relevant, and suitable to persons, in order to inform a study agenda and, eventually, to more effective practices on the link between ovarian neoplasm and other risk factors. The material from the included studies was combined, integrated, and interpreted using qualitative synthesis approaches where possible.

Study Eligibility Criteria

The review included qualitative peer-appraised studies. Qualitative data from mixed methods research were assessed for inclusion and included if they were relevant. The report comprised studies completed during the last twenty years. All peer-reviewed papers on ovarian neoplasm published in English were included.

To be included in the review, research must have been published between January 2002 and August 2022 to ensure

the work's currency while allowing a wide picture of developing challenges to be recognized.

Study Inclusion and Exclusion Criteria

The articles were chosen based on their relevance to the project, English, and a time limit of twenty years. All other papers that did not have one of these subjects as their major goal, as well as repeated research and reviews, were eliminated. Any papers that were not available in English, conference abstracts, books or grey literature, and editorial comments were all eliminated by the reviewers. Studies that solely reported qualitative data were removed.

Search Strategy

To discover peer-reviewed literature on ovarian neoplasm in Saudi Arabia, a systematic search technique was created utilizing a mix of Medical Subject Headings (MeSH) and controlled vocabulary. The databases were PubMed/MEDLINE, Scopus/Embase (Elsevier), EbscoHost, and Google Scholar.

Selection of Study

To show the selection methods and outcomes, the ENTREQ criteria for reporting qualitative systematic reviews were applied. To aid in the removal of duplication, all retrieved studies were originally imported into the Endnote library. Following the removal of duplicates, the Endnote library was shared by the two reviewers for them to separately screen the articles by title and abstract, guided by the eligibility criteria. The studies on which the two reviewers agreed were submitted to a full-text review. Any disagreements between the two reviewers were resolved by a third reviewer. The whole text of all qualifying papers was independently evaluated by two reviewers. When there were disagreements between the two reviewers, a consensus was reached through discussion with the third reviewer. Finally, for the final framework synthesis, the entire texts of all relevant papers deemed to match the inclusion criteria were maintained.

Data Extraction

Two reviewers will independently extract data from qualifying studies onto a customized data extraction form, which will be completed with characteristics related to the research population and phenomena of interest. The third review author double-checked and verified the retrieved articles. The initial author's name and year of publication were retrieved, as well as the data collecting time and area in which the study was performed. Specific research characteristics, such as study design, demographic, sample size, sampling techniques, and data-collecting procedures, will then be recorded.

Data Synthesis and Analysis

The data were analyzed without the use of any program. The data was classified by theme by the reviewers, who then presented the themes in the form of an analysis table (chart).

The table's columns and rows represent the research and associated topics, allowing you to compare study findings across multiple themes and subthemes.

RESULTS AND DISCUSSION

Figure 1 shows the selection and identification of the included studies. A total of 286 papers were included for title screening after a search of the aforementioned databases. Only 198 of them were chosen for abstract screening, resulting in the removal of 52 pieces. The remaining 146 full-text articles were examined. Due to differences in research aims, 137 papers were excluded from the full-text revision, and only eight were enrolled for final data extraction. (**Table 1**).

According to Abdullah, *et al.* study Malignant ovarian neoplasms are less frequent than benign ones (72.8%). Serous cystadenoma and serous cystadenocarcinoma are the most prevalent benign and malignant ovarian neoplasms, respectively. Malignant ovarian neoplasms are more common as people get older [1]. Another study in Riyadh indicated that most neoplastic ovarian tumors in children and adolescents are benign [2]. The third Study indicated that Ovarian tumor incidence was 4.1% national wide [16].

From 2001 to 2008, a modest rise in Saudi Arabia's CIRs and ASIRs for ovarian cancer was seen according to a study that was conducted. Riyadh, Jouf, and Asir had the highest rates of ASIR, while Jazan and Hail had the lowest rates. The eastern half of Saudi Arabia, Makkah, and Riyadh had the highest incidence rate ratios for ovarian cancer cases [17].

The research was done to evaluate cancer trends within Saudi Arabia in 2018 and it found that in the preceding decade the incidence of ovarian cancer increased 4 folds [15].

A Dammam research that looked at the appearance of ovarian cancer patients discovered that 87% of the carcinogenic tumors were germ cell tumors, 73% of which were benign, and 13% of which were malignant [18]. It also empathizes on the importance of early detection.

A study done by Alhuqail, AJ, *et al.* 2018 [19] which has found that 10.2% of breast cancer patients and 30.7% of ovarian cancer patients had BRCA germline mutations. This indicates that there is a genetic factor that plays a role in the incidence of ovarian cancer among Saudi Women. The included studies had different study designs.

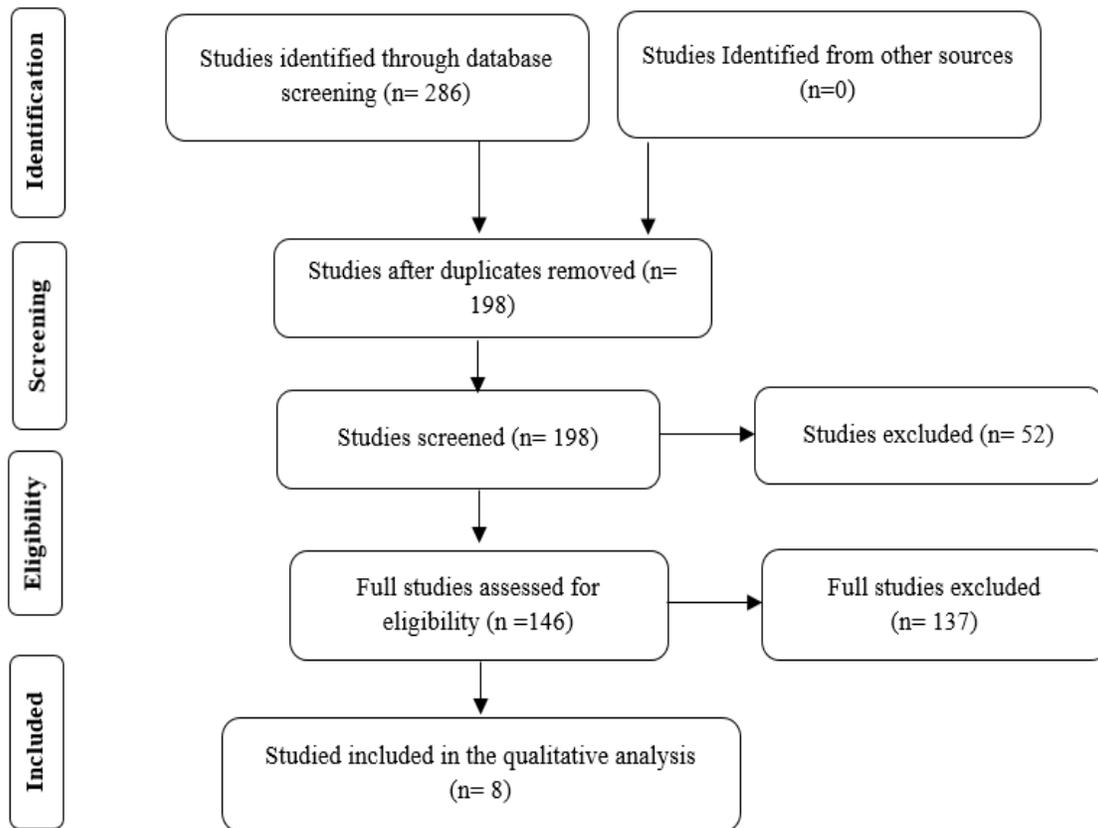


Figure 1. Flow chart illustrates the selection of the included studies

Table 1. Author, country, year of publication, methodology and outcome

Author, Publishing Year	Region	Methodology	Results	Conclusion
Yousif HM, <i>et al.</i> 2012 [1]	Almadinah Almunawwarah, K.S.A.	to discover the Almadinah Almunawwarah area's distribution of ovarian malignant transformation in diverse ages, with such a focus on AGCT	There were 301 ovary samples acquired in all. 217 (72%) of the tissues were neoplastic, while 84 (28%) were non-neoplastic. In total, 135 neoplasia tissues (63%) were benign, 16 (7%) were borderline malignancies, and 66 (30%) were malignant tumours. Furthermore, superficial epithelial malignant tumors made up 41 (62%) of the malignant tumours, sex cord-stromal tumours made up 17 (26%), and germ cell tumours made up 8 (12%). AGCT had an exceptionally high prevalence, accounting for 26% (16/66) of all aggressive ovarian malignant tumors. Just samples provided have altered BRCA-1 overexpression.	Cancer ovary represented 30% of all oncogenic ovary samples, and AGCT was common. BRCA-1 expression in these malignancies was not substantially changed. Deeper research into the molecular basis origins of this syndrome is required.
AIDakhil, Lateefa, <i>et al.</i> 2022 [2]	Riyadh	Retrospective chart reviews were done on teenage females diagnosed with adnexal masses during an 8-year period who were hospitalized at two referral hospitals in Riyadh, Saudi Arabia; patients older than 19 were excluded. The WHO developmental stages of early adolescence (10-13 years old), middle adolescence (10-13 years old), late adolescence (10-13 years old) (14–16 years old), and late adolescence (16–17 years old) were used to group patients based on their age.	164 patients between the ages of 10 and 19 who were hospitalized to two hospitals were examined. We discovered that 90.2% of these patients were symptomatic or emergency cases, and 85% of them required surgery to remove an adnexal tumor. The bulk of the patients, who ranged in age from 14 to 19, were post-menarche (96.95%). Laparoscopic cystectomy was the surgical technique used the most frequently (74.4%). The most frequent sign of malignancy is ultrasonography of an adnexal tumor with a solid component. The majority of tumors (32.3%) were benign. The majority (68.7%) of malignant tumors were germ cell tumors, and yolk sac tumors were the most prevalent subtype of germ cell cancers.	These data support the idea that the majority of neoplastic ovarian tumors in children and adolescents are benign, and that surgical surgery can be used to protect fertility, especially when managed by a gynaecologist.
Abu-Zaid, Ahmed, <i>et al.</i> 2014 [16]	National	a retrospective cross-sectional study was conducted using the Saudi Cancer Registry (SCR) From January 1999 to December 2008, the Saudi Arabian population was studied for epidemiological data on histopathological categories, case frequency, crude incidence rates (CIRs), and age-standardized incidence rates (ASIRs) of MOGCTs.	Ovarian tumor incidence was 4.1% among all female cancers identified throughout the 10 years under investigation (n = 30,720). MOGCTs in particular made up 13.8% of all ovarian tumours combined. The most prevalent histological type of MOGCTs, accounting for about 41.1% of all cases, Dysgerminoma was the diagnosis. followed by 14.3% mixed germ cell tumor, 25.1% malignant teratoma, 18.3% yolk sac tumor (n = 32/175) and 25.1% malignant teratoma.	According to this study, MOGCTs are a common kind of ovarian tumor in Saudi Arabian women, with incidence rates and histological types that are mainly comparable to those found in other populations throughout the world.
Alghamdi IG, <i>et al.</i> 2014 [17]	National	A retrospective descriptive epidemiological analysis was conducted on all ovarian cancer cases reported in the Saudi Cancer Registry (SCR) between January 2001 and December 2008. The data was examined using descriptive statistics, analysis of variance tests, Poisson regression, and simple linear modelling.	Between January 2001 and December 2008, the SCR reported 991 cases of ovarian cancer in total. The Jof and Asir areas came in second and third, with 3.13 and 2.96 cases per 100,000 women, respectively, and 3.3 instances per 100,000 women in the Riyadh region. The lowest rates, however, were in Hail and Jazan, with 1.4 and 0.6 incidents per 100,000 women, respectively. The Makkah region had an incidence rate ratio of 6.4, which was substantially higher than Jazan, Riyadh had an incidence rate ratio of 6.3, while the eastern part of Saudi Arabia had an incidence rate ratio of 4.52.	From 2001 to 2008, a modest rise in Saudi Arabia's CIRs and ASIRs for ovarian cancer was seen. The greatest rates of ASIR were found in Riyadh, Jof, and Asir, Jazan and Hail, on the other hand, had the lowest rates. The eastern half of Saudi Arabia, Makkah, and Riyadh had the highest ovarian cancer incidence rate ratios.

Althubiti MA, Nour Eldein MM. 2018. [15]

National

Data were collected using the University of Washington's Institute for Health Metrics and Evaluation's Global Burden of Disease (GBD, 2016) database (Viz Hub). Estimate trends in cancer incidence and death in Saudi Arabia

The incidence of cancer increased roughly 26 times in the case of thyroid cancer, about 10 times in the case of breast, colon, bladder, and uterine cancers, 8 times in the case of prostate cancer, 5 times in the case of renal cancer, 4 times in the case of pancreatic and ovarian cancer, 3.5 times in the case of lung cancer, 3 times in the case of liver cancer, and 2 times in the case of lymphoma, leukaemia, and gastric cancer. During this time, the percentage of deaths caused by cancer increased as well. However, researchers found that among Saudi Arabia's population above the age of 70, the percentage of cancer-related mortality declined.

the rise in the incidence of various cancers over the past ten years may be related to Saudi Arabia's radical change in socioeconomic position. In terms of mortality, the decline in death rates among the elderly may be caused by biological causes that require further study.

Al Jama, *et al.* 2011. [18]

Dammam

to examine how ovarian cancers have presented clinically in children and teenagers who have received treatment at King Fahad University Hospital and the University of Dammam. Retrospective notes on patient information, including age, presentation, diagnosis, treatment, and outcome, were made from hospital medical records. Between January 1985 and December 2009, the study was conducted in the Obstetrics and Gynecology department at King Fahad Hospital of Dammam University in Saudi Arabia. 52 individuals with ovarian tumors between the ages of 6 and 20 reported.

Stomach pain was the predominant presenting symptom in 30 (58%) of the participants. Germ cell tumors accounted for 87% of neoplastic tumors, 73% of which were benign and 13% of which were malignant. The surgical procedures included 48 (92%) exploratory laparotomies and 4 (8%) laparoscopic resections. Salpingoophorectomy was done on 28 (54%) patients, whereas ovarian cystectomy was performed on 23 (44%). Five of the seven (13) people with malignant tumors received postoperative chemotherapy. Three cancer patients died as a result of the research.

Early detection of ovarian masses in young girls is critical. Because the majority of these masses are benign, surgery should be planned to maximise future fertility, whereas malignant tumors would need full staging, tumor removal, and postoperative treatment as needed to provide the patient with the potential for future childbearing.

Makoha, F. W., *et al.* 2008 [20]

National

to ascertain if foreign immigration altered the prevalence of female genital cancers a retrospective review of histopathology reports from women who had treatment at a referral gynaecological institution from 1985 to 2004 for primary genital tract malignancies. The incidence rates among Saudi citizens and foreign migrants as a whole were contrasted with those among Saudi nationals only. Incidence rates and incidence rate ratios were used as outcome indicators.

The prevalence of cervical cancer among Saudi migrants and residents as a whole was 48.4%, compared to 33.5% among Saudi natives only. The incidence was 1.2% against 0.5% for vulvar cancer. The risk of endometrial cancer was lower overall than among Saudi nationals only (11.7% vs. 18.0%). There were no changes in the incidence of ovarian, vaginal, uterine corpus sarcoma, or gestational trophoblastic neoplasia.

There were changes in the incidence of ovarian Cancer. Women who presented with gynaecological malignancies saw a rise in the incidence of cervical and vulvar malignancy

Alhugaili, AJ, *et al.* 2018 [19]

Arabian Peninsula

The incidence of dangerous BRCA1 and BRCA2 germline mutations in ovarian and breast cancer patients in the Arab globe was investigated. A massively parallel sequencing approach was utilised to scan all of the BRCA coding exons using genomic DNA taken from lymphocytes of 173 Arab patients with breast and ovarian cancer. Sanger sequencing was used to validate this sequence.

Four of the 17 novel harmful mutations discovered in 28 people, or nine out of 108 breast cancer patients (8.3%) and 19 out of 65 ovarian cancer patients (29.2%), were discovered in 28 people. Four of the 17 mutations were identified in the BRCA2 gene, while 13 of the mutations were found in the BRCA1 gene. In the patient population, 54% of the mutations were harmful BRCA1 variants (c.1140dupG, c.4136_4137delCT, c.5095C>T, and c.5530delC). Additionally, a BRCA2 missense variation was discovered in one of 65 ovarian cancer patients (1.5%) and a probable pathogenic BRCA1 missense variant in two of 108 breast cancer patients (1.9%).

In all, 10.2% of breast cancer patients and 30.7% of ovarian cancer patients had BRCA germline mutations. These findings provide additional insight into the incidence of BRCA mutations among Arab women.

According to the study, just 22% of ovarian neoplasms are malignant, while 72.8% are benign. This result is consistent with data from western nations, where 20–25% of ovarian neoplasms are malignant and 75–80% are benign. Authors from other Asian nations, including India, Pakistan, and Malaysia, have reported similar numbers. Compared to

ovarian neoplasms, which made up 61.8% of ovarian lesions, functional cysts made up 38.2% of ovarian lesions. Mansoor discovered that benign cystic non-neoplastic lesions made up 47.5% of the total, neoplastic lesions made up 29.7%, and normal ovarian tissue made up 22.8% of the total in his study from the same location in Saudi Arabia.

Tumors of surface epithelial origin made up 61% of the various histological categories of ovarian neoplasms found in our study, followed by germ cell tumors [1, 21].

33% of 2026 pediatric ovarian tumors recorded in research between 1940 and 1993 were malignant, while 67% were benign. Dysgerminoma is a kind of juvenile ovarian tumor that accounts for 9.5 to 11% of all pediatric ovarian tumors and 24.5% of pediatric ovarian malignancies., is the most prevalent kind of pediatric ovarian cancer. The most prevalent ovarian tumor type observed has reportedly varied from location to location; nevertheless, data from Ghana revealed that 44 (65.7%) of a total of 67 cases were germ cell tumors. Dysgerminoma was not the most frequent malignant tumor of the ovary; rather, Burkitt lymphoma was [2, 22, 23].

According to reports, MOGCTs' median age upon clinical diagnosis is 18 years old. This number closely matched the 60.6% of MOGCT cases in the Saudi Arabian population that affected individuals between the ages of 10 and 25. The younger average age of the Saudi Arabian population may be largely blamed for this. Because MOGCTs primarily affect early children, young adolescents, early-to-late adulthood, and child-bearing age group women, the issues of fertility preservation, tumor curability, and long-term survival rates are of great importance to patients and significantly present difficult management challenges to attending gynecologic oncologists [15].

According to a study, Saudi Arabia has a greater frequency of harmful BRCA mutations than most other countries in both the breast and ovarian cancer patient cohorts. More ovarian cancer patients than breast cancer patients had pathogenic BRCA mutations, with 29% of ovarian cancer patients carrying a BRCA harmful germline mutation. Second, individuals with breast and ovarian cancer are more likely to have BRCA1 mutations than BRCA2 mutations. Third, people with TNBC are more likely to have BRCA1 mutations than patients with non-TNBC, particularly if they were diagnosed with breast cancer when they were younger than 35. Last but not least, One of the four harmful BRCA1 mutations (c.1140dupG, c.4136 4137delCT, c.5095C>T, and c.5530delC) is found in around 54% of people who have mutations [19].

CONCLUSION

Malignant ovarian neoplasms are less frequent than benign ones. Serous cystadenoma and serous cystadenocarcinoma are the most prevalent benign and malignant ovarian neoplasms, respectively. Malignant ovarian neoplasms are more common as people get older. most neoplastic ovarian tumors in children and adolescents are benign. The greatest rates of ASIR were found in Riyadh, Jouf, and Asir, whereas Jazan and Hail had the lowest rates.

A study that was conducted in Dammam, to examine the presentation of ovarian cancer patients found that the vast majority of the cancerous tumors were germ cell tumors. This study and others emphasize the importance of early detection. As most neoplasms discovered early are being. A high percentage of ovarian cancer patients had BRCA germline mutations. This indicates that there is a genetic factor that plays a role in the incidence of ovarian cancer among Saudi Women.

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