RESEARCH ARTICLE

The frequency of epithelial ovarian cancer subtypes in Sudanese women at Omdurman Maternity Hospital, 2013-2018: A cross-sectional study [version 1; peer review: 2 approved with reservations]

Rawia Eljaili Elmassry ¹, Nassr Eldin M.A. Shrif², Aisha Osman Mohamed ¹, Fayad Jamaeldin³, Arwa Elaagip⁴, Nazik Elmalaika Husain⁵

¹Department of Histopathology and Cytology, Alzaiem Alazhari University, Khartoum, 11111, Sudan

²Department of Clinical Chemistry, Alzaiem Alazhari University, Khartoum, 11111, Sudan

³Department of molecular biology, Institute of Endemic Diseases, Khartoum, 11111, Sudan

⁴Department of Parasitology and Medical Entomology, University of Khartoum, Khartoum, 11111, Sudan

⁵Department of Pathology, Omdurman Islamic University and Radioisotope Center of Khartoum, Khartoum, 11111, Sudan

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Abstract

Background: Globally, epithelial ovarian carcinoma (EOC) is considered the gynecological cancer with the highest mortality. In Sudan, there are scarce publications about the frequency of this carcinoma. Therefore, the present study intended to perform a cross-sectional study to review the morphological sub-types and sort EOC according to age and grade in Omdurman Maternity Hospital (OMH) in Sudan.

Methods: This cross-sectional, hospital-based study included 70 EOC cases diagnosed at OMH in the period 2013-2018. The data were collected from OMH records in the period 2016-2018, and included ovarian cancer types, ages of patients, and tumor grades.

Results: The participants' median age was 50 years, and the majority of EOC cases were in younger patients (48.6%; n=34; ≤ 50 years (18 to 50 years)). The most familiar tumor sub-type was serous carcinoma (44.3%; n=31), followed by endometrioid carcinoma (27.1%; n=19), mucinous carcinoma (17.1%; n=12), clear cell carcinoma (8.6%; n=6) and undifferentiated carcinoma (2.9%; n=2). The majority of cases were categorized as low grade (51.4%; n=36). Our results revealed significant relationships between EOC types and grades (Fisher's Exact test, p=0.000).

Conclusion: In Sudanese patients with EOC, serous carcinoma is the most common histological subtype, and EOC is likely to occur in women of a younger age (<50 years). Our results indicate a younger presentation of EOC and warrants quick and thorough investigation of

Open Peer Review

Approval Status

	1	2
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<p>1. Ahmed Abdalla Mohamedani, University of Gezira, Wad Madani, Sudan</p> <p>2. Sulma Ibrahim Mohammed , Purdue University, West Lafayette, USA</p> <p>Any reports and responses or comments on the article can be found at the end of the article.</p>		

any vague abdominal complaint in women of a younger age (<50 years). Also, it may help in guiding researchers developing screening programs especially for younger women, pay attention to the serous type as the common type and finding novel biomarkers especially for treatment and prognosis of this type.

Keywords

Epithelial Ovarian Cancer, Sudan, hospital-based, Omdurman Maternity Hospital

Corresponding author: Rawia Eljaili Elmassry (rose01001@gmail.com)

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Competing interests: No competing interests were disclosed.

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Introduction

Ovarian carcinoma (OC) is the second most frequent gynecological cancer in developing countries and globally^{1,2}. They are the fifth most mortal disease in women^{3,4}, and in 2018, ~22,240 new events and 14,070 deaths were associated with OCs in the United States^{5,6}. In Sudan, OCs ranked as the fourth highest malignancy in women, with an incidence rate of ~188 for every 100,000 people, which is 8 for every 100,000 people when gender is specified, and 7 for every 100,000 people with an age-standardized rate^{7,8}.

Epithelial ovarian carcinoma (EOC) is the most widespread and has the highest mortality of OC^{1,9}, with high-grade serous ovarian cancer classed as the deadliest sub-type^{10,11}. In the United State, generally, EOC has been considered an age-related disease; women aged >65 years are considered the target population^{12,13}. Although the incidence of OCs is decreasing, in the majority of cases, distant metastasis is seen at diagnosis^{14,15}. Surgery and chemotherapy are the most important treatments of this cancer but are efficient only in the early stages^{16,17}. Currently; the prognosis for this cancer is still poor, and the five-year survival rate remains low^{18,19}. In Sudan, scarce publications are available about the frequency and incidence of EOC. The present study intended to evaluate the morphological sub-types in Sudan using data from one hospital, sort the disease by age and grade and compare the results with similar studies in other regions of Sudan and other countries.

Methods

Study design

This was a cross-sectional, hospital-based study performed to determine the frequency of newly diagnosed EOC subtypes, as well as to identify the relationship between subtypes and tumor grades and ages of patients.

The Ethics Committee of Alzaiem Alazhari University and Omdurman Maternity Hospital approved the study and waived informed consent from patients since there was anonymization of patients' identity and only laboratory numbers were used.

Participants

A total of 70 EOC patients from Omdurman Maternity Hospital diagnosed in the period between 2013 and 2018 were selected for this study via convenience sampling. The data were collected in the period between 2016 and 2018. All patients were adult women with OC and no other malignancies. Patients with tiny biopsies, missed blocks, or missing data (more than 50%) were excluded.

Data collection

Data were collected from hospital records, which included patients' ages, EOC types, and tumor grades.

Statistical analysis

The statistical analysis of the collected data was performed using SPSS, version 24 (IBM SPSS). Descriptive analysis was performed for all study variables: EOC types, patient's ages, and tumor grades. Fisher's exact test was used for finding statistical significance between EOC types, patients' ages, and tumor grades. A p-value of <0.05 was considered to be statistically significant.

Results

This study was conducted among 70 new EOC cases. The median age of participants was 50 years (range, 18 – 75 years). In total, 48.6% (n=34) of the participants were in the age group ≤ 50 years (18 to 50 years), and 44.3% (n=31) were in the age group > 50 years (51 to 75 years). The frequency of common histological subtypes is shown in Figure 1. The results

Figure 1. Frequency of epithelial ovarian carcinoma histological sub-types among Sudanese women.

showed that the majority of the cases were low grade (51.4%; n=36) compared with high grade (48.6%; n=34).

Our results showed significant associations between EOC tumor types and EOC tumor grades (Fisher's Exact test, $p = 0.000$) and no significant associations between tumor types and ages (Fisher's Exact test, $p > 0.05$).

Discussion

OCs are the most lethal gynecological malignancy worldwide and constitutes the fifth leading cause of cancer-related death in women^{20,21}. Comparison of the age distribution of new OC cases revealed that the median age of 50 years recorded in this study is similar to a local study from Gezira State, Sudan⁷, sub-Saharan African^{22,23} and other developing countries²⁴. Nevertheless, it is lower than that reported from developed countries²⁵, for example a median age of 65 years was reported from the Netherlands²⁶. The lower age in this study may suggest an earlier onset or a more aggressive course of the disease in our environment. Also, it may be because Africa has the youngest population of any of the continents²⁷. Our study results indicate a younger presentation of EOC and warrants quick and thorough investigation of any vague abdominal complaint in women of a younger age (<50 years). In the present study, serous adenocarcinoma is the most frequent histological type (43.1%), which is supported by previous studies^{28–30}.

Limitations of the study

This research was affected by the inherent limitations of the retrospective type of study. Also, it was reliant on the data extracted from medical records, was based at a single institution-based,

and had a small sample size. Finally, there were missing variables for some participants; incomplete or missing documents may lead to the introduction of bias into the study and affect the outcome.

Conclusion

The present study revealed that contrary to some previously published data, EOC affected a larger proportion of younger Sudanese women. The most prevalent subtype of EOC is serous carcinoma. A further study of frequency and prevalence of EOCs in other parts of Sudan is needed.

Data availability

Underlying data

Figshare: frequency data.csv, <https://doi.org/10.6084/m9.figshare.9255200>³¹

Data are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](#) (CC0 1.0 Public domain dedication).

Grant information

The authors confirm that no grants were involved in supporting this work.

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Current Peer Review Status: ? ?

Version 1

Reviewer Report 09 January 2020

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Sulma Ibrahim Mohammed

Department of Comparative Pathobiology, Purdue University Center for Cancer Research, Purdue University, West Lafayette, IN, USA

The article describes the frequency of epithelial ovarian cancer subtypes in Omdurman Maternity Hospital. It examines the association of EOC with age and determined subtypes and grade association. The study is significant as more cancer documentation is needed in Sudan. That said my enthusiasm for this study greatly hampered by the following:

1. Omdurman Maternity Hospital is not the major hospital where women with cancers are diagnosed - so that may affect the conclusion.
2. Not sure from where the authors extracted the tissue grading - as this is not a common practice in Sudan and therefore the authors need to provide more details and present results with some pictures.
3. Detail is also needed in how the data for subtype is obtained - from pathology reports or by using archival blocks and then repeat the pathology reports?

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Cancer research and interest in cancer in Sudan.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 01 October 2019

<https://doi.org/10.5256/f1000research.21706.r53798>

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Ahmed Abdalla Mohamedani

Faculty of Medicine, University of Gezira, Wad Madani, Sudan

This is a concise piece of work and perhaps the third paper addressing ovarian cancer in Sudan. The title is concise and reflects very well the content of the research, but a minor change below may be adopted by the authors:

“The frequency of epithelial ovarian cancer subtypes in Sudanese women at Omdurman Maternity Hospital in the period 2013-2018, Sudan”

Comments

Methods:

- The authors may agree to add the word retrospective to the type of the study.
- Have the authors designed a data collection form for the purpose.
- Have they revised some of the archived histology slides or produced some from the archived wax blocks.
- What is the total number of EOC diagnosed during the period 2013- 2018 and what is thus the number excluded according to the exclusion criteria set by the authors.
- What is meant by “newly diagnosed EOC subtypes “diagnosed or described as this is a retrospective study and there are no new cases. (line 2 under study design)

Results:

- Only one figure is presented. What about other data regarding residence, parity etc.
- It may be a good idea if the authors would agree to add a table/figure to display the tumour grades.

Discussion:

- Is very short compared to the number of cited references.

References:

Are adequate and covered the research subject quite well but:

- About a third of the references covered the pathogenesis, behaviour, response to therapy and molecular biology of EOC.
- Reference 27 (please see below) looks a bit odd as it is about breast cancer. I know why it is cited (young African population) but still it looks odd.

27. Harford JB: Breast-cancer early detection in low-income and middle-income countries: do what you can versus one size fits all. *Lancet Oncol.* 2011; **12**(3): 306–312. [PubMed Abstract](#) | [Publisher Full Text](#)

I have also annotated a [copy of the manuscript](#) with some comments and corrections to the text.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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