

**RESEARCH ARTICLE****Relationship Between Age and Menopausal Status With The Incident of Epithelial Ovarian Carcinoma at RSUP Dr. M. Djamil Padang**Carmiyana Puja Harsby¹, Syamel Muhammad^{2,*}, Yenita³¹ Student of Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia² Department of Obstetrics and Gynecology, Faculty of Medicine, Andalas University, West Sumatra, Indonesia³ Department of Anatomical Pathology, Faculty of Medicine, Andalas University, West Sumatra, Indonesia**Corresponding Author:** Syamel Muhammad, Syamelmuhammad.sm@gmail.com**Submitted:** October 20, 2025;**Accepted:** January 21, 2026;**Published:** February 02, 2026**DOI:** <https://doi.org/10.25077/aoj.10.1.88-96.2026>**Abstract**

Introduction : High Grade Serous Ovarian Carcinoma (HGSOC) been the dominant subtype and accounted for the highest mortality rate of epithelial ovarian cancer. Therefore, knowledge of the risk factors for epithelial ovarian cancer was needed for early detection. Age and menopausal status were examples of risk factors. This study aimed to determine the relationship between age and menopausal status with the incidence of epithelial ovarian cancer subtype of HGSOC at M Djamil Central Hospital Padang.

Method : This type of research is an observational analytic research design cross-sectional. The form sample is secondary data used in the total sampling method, which comes from 90 patients of ovarian cancer. Research in analysis univariate and bivariate presented in form table frequency.

Result : In this study, it was found that epithelial ovarian cancers subtype HGSOC was found mostly in women aged > 50 years (68,9%) and who had experienced menopause (80%). In the analytic test, the p value for age and menopausal status was 0.382 and 0.104.

Conclusion: Concluded there is no relationship between age and menopausal status with the incidence of epithelial ovarian cancer subtype HGSOC at M Djamil Central Hospital Padang

Keywords: Age, HGSOC,menopause status, epithelial ovarian cancer

INTRODUCTION

Ovarian cancer is the 3rd most common gynecological cancer after cervical and uterine cancer and ranks 8th as the most common cause of death in women.¹ According to American Cancer Society data in 2018 there were only about 2.5% of all cancer cases in women but the mortality rate was high at 5%.² Based on data from The International Agency For Research On Cancer (IARC) in 2018, Indonesia was ranked fifth out of 19 countries with the most ovarian cases after Russia, the United States, India and China, with the discovery of 295,414 (1.6%) new cases of ovarian cancer and the death rate reached 184,799 (1.9%).³ As for ovarian cancer cases in Indonesia, according to data from the Global Cancer Observatory (GCO) in 2020 there were 14,896 (3.8%) new cases of ovarian cancer with a mortality rate of 9,581 cases (4.1%) of 36 types of cancer reported.⁴

Based on the type of cell of origin, ovarian cancer can be divided into 3 types, namely ovarian cancer originating from ovarian epithelium, germ cells, and sex cord stromal. In general, ovarian cancer originates from the ovarian epithelium with an incidence percentage about 85-90% of all types of ovarian cancer.^{5,6} Kurman and Shih divided epithelial ovarian cancers into two major groups based on molecular histopathology and genetic studies. Type I consists of low-grade serous carcinoma, endometrioid, clear cell, and mucinous. Meanwhile, type II consists of high grade serous ovarian carcinoma and undifferentiated.⁷ Until now HGSOC (high grade serous carcinoma ovarian cancer), is the dominant subtype diagnosed clinically and accounts for 70-80% mortality of all epithelial ovarian cancer types.⁸

The absence of specific symptoms in the early stages causes a high mortality rate in ovarian cancer, so patients are usually diagnosed at an advanced stage, with a 5-year survival rate of only around 45%. Therefore, to prevent the detection of ovarian cancer at an advanced stage, early examination is needed. One of which is by knowing the risk factors of ovarian cancer.⁹ Many factors can trigger ovarian cancer. One of them is age. According to the results of several studies, the late adults to late elderly aged 36-65 years has a higher risk of ovarian cancer. This occurs due to the repeated ovulation process as the age increases which can increase the irritation process to the surface cells of the ovary, which can cause ovarian neoplasia.¹⁰ In addition to age, menopausal status is also associated with the occurrence of ovarian cancer. Studies show that women with late menopause have a higher risk of developing ovarian cancer. When the onset of menopause is late, the body will be exposed to the estrogen for longer which results in malignancy of the ovaries.¹¹

Based on previous studies, age and menopausal status have been widely recognized as risk factors for ovarian cancer in general. However, most of these studies have focused on ovarian cancer as a whole without specifically examining the association of these factors with particular histopathological subtypes. To date, studies that specifically evaluate the relationship between age and menopausal status with epithelial ovarian cancer subtype high-grade serous ovarian carcinoma (HGSOC), especially in the Indonesian population, remain limited. Considering that HGSOC is the most dominant subtype of epithelial ovarian cancer and contributes to the highest mortality rate, a more focused investigation is required to better understand the role of these risk factors in this

subtype. Therefore, this study aims to determine the relationship between age and menopausal status with the incidence of epithelial ovarian cancer subtype high-grade serous ovarian carcinoma at RSUP Dr. M. Djamil Padang.

METHODS

This study is an observational analytic study with a cross sectional approach. This study uses secondary data in the form of medical record data for epithelial ovarian cancer patients at RSUP Dr. M. Djamil Padang from 2021 to 2023. This research was conducted from November 2022 to October 2023.

The population in this study were all ovarian cancer patients recorded in the medical records of Dr. M. Djamil Padang Hospital from January 2021 to July 2023. A total of 90 patients with epithelial ovarian cancer were included in this study. Among these patients, cases with epithelial ovarian cancer subtype high-grade serous ovarian cancer (HGSOC) were compared with non-HGSOC epithelial ovarian cancer cases. The distribution of respondents based on age and menopausal status is presented in the following tables. The sample used in this study was obtained by *total sampling* technique. Data analysis was performed by univariate analysis by looking at the distribution of age categories and menopausal status using a frequency distribution table. Bivariate analysis using the chi square statistical test to see the relationship between age and menopausal status with the incidence of epithelial ovarian cancer subtype high grade serous ovarian carcinoma. This research has passed the ethical review of the Research Ethics Commission of the RSUP Dr. M. Djamil Padang with the number LB.02.02/5.7/262/2023.

RESULT

Respondent Characteristics

This study was conducted in the medical records section of M. Djamil Central Hospital Padang and obtained 90 patients with 45 patients with epithelial ovarian cancer subtype HGSOC and 45 patients with epithelial ovarian cancer subtype non-HGSOC (*low grade serous carcinoma, endometrioid, clear cell, and mucinous*) were used for control. The distribution of respondent characteristics can be seen in the following table.

Table 1. Age Distribution of Respondents

Age	HGSOC		Control	
	F	%	F	%
≤ 50 years	14	31,1%	19	42,2%
> 50 years	31	68,9%	26	57,8%
n	45	100%	45	100%

Table 1 shows the frequency distribution of age in the incidence of epithelial ovarian cancer subtype high grade serous ovarian carcinoma of 90 cases of epithelial ovarian cancer. Based on this table, it was found that the samples of epithelial ovarian cancer subtype HGSOc were mostly (68.9%) in women with age group >50 years.

Table 2. Distribution of Menopausal Status of Respondents

Menopausal Status	HGSOc		Control	
	F	%	F	%
Menopause	36	80%	28	62,2%
Not Menopause	9	20%	17	37,8%
n	45	100%	45	100%

Table 2 shows the frequency distribution of menopausal status in the incidence of epithelial ovarian cancer subtype high grade serous ovarian carcinoma of 90 cases of epithelial ovarian cancer. Regarding menopausal status, the majority of patients had experienced menopause (80%), while 20% of patients were not menopausal.

Relationship Between Age and the Incident of Epithelial Ovarian Cancer Subtype HGSOc

Based on the results of statistical analysis, there was no association between age and the incidence of ovarian cancer epithelial type subtype high grade serous ovarian carcinoma with $p = 0.382$ ($p > 0.05$) (Table 3).

Table 3. Relationship between Age and the Incident of Epithelial Ovarian Cancer Subtype HGSOc

Age	HGSOc		Control		OR	P Value
	F	%	F	%		
≤ 50 years	14	31,1%	19	42,2%	1,618	0,382
> 50 years	31	68,9%	26	57,8%		

Relationship Between Menopausal Status and the Incident of Epithelial Ovarian Cancer Subtype HGSOc

The results of the analysis the relationship between menopausal status and the incidence of epithelial ovarian cancer subtype high grade serous ovarian carcinoma obtained a p value of 0.104 (Table 4). This value states that there is no significance between the two variables.

Table 4. Relationship between Menopausal Status and the Incident of Epithelial Ovarian Cancer Subtype HGSOc

Menopausal Status	HGSOc		Control		OR	P Value
	F	%	F	%		
Menopause	36	80%	28	62,2%	2,429	0,104
Not Menopause	9	20%	17	37,8%		

DISCUSSION

Observing the respondents' characteristic in this study, the majority of respondents are > 50 years old (68,9%). This result is in line with study by In the present study by Olsen's research in the *Australian Ovarian Cancer Study*, which says that women with an age range of 50-59 years are the age group that most often suffer from ovarian cancer.¹² About 60% Type II epithelial ovarian cancer is found in the age group of <21 years old. Meanwhile, in the age group of 21-55 of 50.6% is type I. And in the age group >55 years had the same percentage for both types of 50%. In a study conducted by Nofia (2020), it was found that the age group most commonly found from 100 samples of patients with epithelial ovarian cancer was the 21-55 year age group with a percentage of 79%.¹³ Although the majority of high-grade serous ovarian carcinoma (HGSOc) cases occurred in women aged over 50 years, statistical analysis did not demonstrate a significant association between age and the incidence of this subtype. This finding suggests that chronological age alone may not be a decisive determinant in the development of HGSOc. While increasing age is generally associated with cumulative genetic damage and prolonged exposure to carcinogenic processes, the pathogenesis of HGSOc appears to be driven predominantly by early molecular events rather than age-related physiological changes.^{14,15} Unlike other epithelial ovarian cancer subtypes that may arise from the ovarian surface epithelium and are influenced by ovulatory trauma over time, HGSOc is now widely recognized to originate from the distal fallopian tube epithelium, particularly through precursor lesions known as serous tubal intraepithelial carcinoma (STIC).^{16,17} These lesions are characterized by early TP53 mutations, which can occur independently of patient age. Consequently, the development of HGSOc may be initiated long before clinical detection, potentially explaining why age did not emerge as a significant risk factor in this study.¹⁸

Table 2 shows the frequency distribution of menopausal status in the incidence of epithelial ovarian cancer subtype high grade serous ovarian carcinoma. Based on this table, it was found that most (80%) samples of the epithelial type ovarian cancer were women who had experienced menopause. This is in line with research conducted by Desi *et al.* where out of 60 patients with ovarian cancer 71.4% were women with late menopause. In this study statistically also obtained an OR value = 4.68, which means that patients who have menopause have a 4.6 times higher risk of ovarian cancer than patients who have not yet menopause. This is thought to occur because in women who have menopause, especially late menopause, there will be a longer exposure to

oestrogen hormones in the body which results malignancy in the ovaries, due to the suspicion that oestradiol and estriol which are part of the oestrogen hormone are carcinogenic which causes proliferation of ovarian tissue.¹⁹ Menopausal status has traditionally been considered an important risk factor for ovarian cancer due to prolonged estrogen exposure. However, the absence of a significant association between menopausal status and HGSOC observed in this study suggests that hormonal influences may play a limited role in the carcinogenesis of this specific subtype. This finding challenges the applicability of classical hormonal theories, such as the incessant ovulation hypothesis, in explaining the development of HGSOC.^{20,21} Emerging evidence indicates that HGSOC tumorigenesis is less dependent on estrogen-driven proliferation and more strongly influenced by genomic instability and defective DNA repair mechanisms. The frequent inactivation of BRCA1 and BRCA2 genes in HGSOC supports the notion that defects in homologous recombination repair pathways are central to disease development. As such, menopausal status, which primarily reflects hormonal changes, may not accurately capture the biological risk profile associated with HGSOC.²²

Discrepancies between the findings of this study and previous reports may be attributed to differences in study design and analytical approaches. Many earlier studies assessed ovarian cancer as a single disease entity without stratification by histopathological subtype, potentially obscuring subtype-specific risk factor associations.²³ In contrast, the present study focused exclusively on HGSOC, which is biologically and clinically distinct from other epithelial ovarian cancer subtypes. Furthermore, population-based differences may contribute to inconsistent results across studies. Genetic predisposition, environmental exposures, and healthcare access vary among populations and may influence ovarian cancer epidemiology. Studies conducted in Western populations, where genetic screening and early detection strategies are more widely implemented, may yield different associations compared to studies conducted in developing countries, including Indonesia.^{24,25}

Several methodological factors should be considered when interpreting the findings of this study. The cross-sectional design limits the ability to establish temporal relationships between exposure and disease onset. Additionally, the relatively small sample size may have reduced the statistical power to detect subtle associations between age, menopausal status, and HGSOC incidence. The use of secondary data from medical records also restricts the availability of information on potentially important confounding variables, such as age at menarche, parity, use of hormonal contraception, hormone replacement therapy, and genetic mutation status. The absence of molecular data, particularly regarding BRCA and TP53 mutations, further limits the ability to explore gene–environment interactions that may underlie HGSOC development.

Despite these limitations, the findings of this study underscore the importance of recognizing HGSOC as a biologically distinct entity with a unique risk profile. Clinicians should be cautious in extrapolating risk assessment models based solely on age and menopausal status to patients at risk for HGSOC. Instead, increased emphasis should be placed on molecular risk factors, family history, and emerging biomarkers associated with fallopian tube origin. From a research perspective, these results highlight the need for future studies employing prospective designs, larger sample sizes, and comprehensive molecular profiling. Such approaches are essential to

elucidate the complex interplay between genetic susceptibility, reproductive factors, and environmental influences in the pathogenesis of high-grade serous ovarian carcinoma.

CONCLUSION

This study demonstrates that although high-grade serous ovarian carcinoma (HGSOC) was more frequently observed in women aged over 50 years and those who had experienced menopause, age and menopausal status were not significantly associated with the incidence of HGSOC. These findings suggest that demographic and reproductive factors alone may not adequately explain the occurrence of this aggressive ovarian cancer subtype, which is increasingly recognized to be driven by molecular and genetic mechanisms. The results of this study highlight the importance of considering high-grade serous ovarian carcinoma as a distinct clinical and biological entity with risk factors that may differ from other epithelial ovarian cancer subtypes. In clinical practice, reliance solely on age and menopausal status may be insufficient for risk stratification. Greater emphasis should be placed on genetic susceptibility, molecular profiling, and early detection strategies targeting the fallopian tube origin of HGSOC. Future studies are recommended to include larger, multicenter populations with comprehensive assessment of genetic and molecular factors, such as BRCA mutations and TP53 alterations. Prospective study designs incorporating reproductive history, hormonal exposure, and molecular markers are needed to further elucidate the complex pathogenesis of high-grade serous ovarian carcinoma and to improve preventive and early detection strategies.

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