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Unveiling the hidden factors: A comprehensive study on ovarian cysts incidence at Bahteramas Regional General Hospital

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Abstract

Ovarian cysts are fluid-filled sacs that grow within the ovaries, resembling a balloon filled with fluid. This fluid can be water, blood, pus, or thick brown fluid similar to menstrual blood. This study aims to identify factors associated with the incidence of ovarian cysts at Bahteramas Regional General Hospital, Southeast Sulawesi Province. The research method used is quantitative analytical research with a case-control design. The study was conducted in the ob-gyn polyclinic in May 2024. The study population included all women with gynecological diseases, totaling 162 respondents. The research sample consisted of 98 respondents, divided into two groups: case and control, each consisting of 49 respondents. The sampling technique used was purposive sampling. The results showed a significant relationship between age, age at menarche, parity, and education with the incidence of ovarian cysts. Chi-square statistical test results showed a p-value for age of 0.000, for age at menarche of 0.032, for parity of 0.005, and for education of 0.004, all of which are less than 0.05, indicating statistical significance. The conclusion of this study is that there is a significant relationship between these factors and the incidence of ovarian cysts at Bahteramas Regional General Hospital, Southeast Sulawesi Province. These findings highlight the importance of considering these factors in efforts to prevent and manage ovarian cysts and the necessity for education and increased awareness regarding reproductive health among women. Further research with a larger sample size and longitudinal design is needed to strengthen these findings and develop more effective interventions.

Keywords: Ovarian Cysts; Age; Age at Menarche; Parity; Education

1. Introduction

Reproductive health is a fundamental aspect of human survival. It encompasses not only physical health but also mental and social well-being. This means that individuals are not only free from diseases or disabilities related to the reproductive system, functions, and processes, but they also enjoy good mental and social well-being (1). Optimal reproductive health includes a balance between these various dimensions of health and is key to a good quality of life. This emphasizes the importance of attention to various aspects of reproductive health to ensure comprehensive health and individual well-being (2).

One common reproductive health issue among women is ovarian cysts. An ovarian cyst is a fluid-filled sac that forms inside the ovary and can contain varying fluids such as water, blood, pus, or thick brown fluid similar to menstrual blood (3). These cysts can develop over time and are often discovered during routine examinations or when women complain

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of symptoms such as pelvic pain or menstrual disturbances. Ovarian cysts are generally benign and can disappear on their own within six weeks after being discovered, but their presence and development need to be carefully monitored (4)

Although most ovarian cysts are benign, some types have the potential to become malignant. Malignant ovarian cysts can develop into ovarian cancer, which is one of the types of cancer that is difficult to detect in its early stages and often has a poor prognosis if not treated. Therefore, it is important to monitor and properly manage ovarian cysts to prevent the possibility of progression into more serious conditions (5). Early detection and effective management can help reduce the risk of complications and improve health outcomes for women diagnosed with ovarian cysts (6).

Ovarian cysts can significantly affect a woman's quality of life. Symptoms such as pelvic pain, menstrual disturbances, and other physical discomforts can impact daily activities and mental health (7). In some cases, ovarian cysts can cause serious complications such as ovarian torsion or cyst rupture, which require immediate medical intervention. Therefore, it is important for women to receive adequate information and education about ovarian cysts and the signs to watch for to ensure good reproductive health and optimal quality of life (8).

Ovarian cysts are a significant global health issue. According to the World Health Organization (WHO), in 2020, there were approximately 14,896 cases of malignant ovarian cysts worldwide, with the number of deaths reaching 9,581, or about 64% of the cases (9). In Asia, the prevalence of ovarian cysts is also high, with many countries reporting an increase in the number of cases each year. This disease is of particular concern in developing countries due to the lack of access to early detection and adequate care. The absence of specific regional data makes it difficult to have a complete picture, but global trends reflect similar conditions in Asia (10). In Indonesia, the prevalence of ovarian cysts is also alarming. In 2015, it was reported that 23,400 women had ovarian cysts, with 13,900 of them dying, meaning about 59.40% of these cases ended fatally (11). Increased awareness and access to healthcare services are key to reducing these mortality rates.

Based on recent data from Rumah Sakit Umum Daerah Bahteramas in 2023, the incidence of ovarian cysts reached 49 cases out of a total of 162 gynecological diseases, equivalent to 31% of the total cases. This number indicates that ovarian cysts are the most common reproductive health issue found in this hospital over the past five years (12). This high incidence emphasizes the need for deeper attention and treatment of this issue, especially given its impact on women's health. This data provides an important basis for further research on the factors influencing the incidence of ovarian cysts in the region.

According to some theories, the causes of ovarian cysts can be associated with disruptions in estrogen formation and feedback mechanisms between the ovaries and the hypothalamus (13). Hormonal imbalances, especially estrogen, and disturbances in the development of unfertilized eggs in the ovaries can contribute to the formation of cysts. Disruptions in this process can lead to the formation of cysts that can further develop into more serious conditions if left untreated. Understanding these mechanisms in depth is crucial for effective diagnosis and management (14).

The impact of poorly managed ovarian cysts can extend to serious complications, including the potential to become malignant and the occurrence of bleeding and infection in the cysts (13). If cysts are left without adequate treatment, complications such as infection or cyst rupture can occur, leading to more dangerous health conditions (15). Therefore, proper preventive and management measures are crucial. One of the primary actions is surgery or operation to effectively address the cyst and reduce the risk of further complications.

Several factors that can influence the incidence of ovarian cysts include maternal age, age of menarche, parity, as well as education level and occupation (16). Theories suggest that these factors can indirectly contribute to the risk of ovarian cysts in women of reproductive age. For instance, earlier age at menarche and parity history can influence hormonal risks associated with cyst development (17,18). Additionally, education level and occupation can also affect access to healthcare services and awareness of reproductive health issues (1,19). Further research is needed to identify the relationship between these factors and the incidence of ovarian cysts in more detail.

Based on this background, researchers are interested in further exploring the factors associated with the incidence of ovarian cysts at Rumah Sakit Umum Daerah Bahteramas, Southeast Sulawesi Province. This study aims to identify specific risk factors and develop more effective prevention strategies to reduce the incidence of ovarian cysts in the region. By conducting this research, it is hoped to gain better insights into the prevalence of ovarian cysts and the influencing factors, as well as to formulate data-based recommendations for better management and prevention at the local level.

2. Methods

The type of research used in this study is quantitative analytic research with a case-control design (20). This research was conducted in the Obgyn Outpatient Clinic at Bahteramas General Hospital in May 2024. The population in this study includes all women who experienced gynecological diseases in 2023, totaling 162 individuals. The sample in this study is divided into a case group consisting of 49 respondents and a control group consisting of 49 respondents, with the sampling technique being purposive sampling (21). The inclusion and exclusion criteria are as follows:

- Inclusion criteria: All women with ovarian cysts.
- Exclusion criteria: Women with gynecological diseases other than ovarian cysts.

The total sample size in this study is 98 respondents. There are two variables in this study: the independent variables consist of maternal age, age at menarche, parity, education, and occupation, while the dependent variable is the incidence of ovarian cysts. The instrument used is a checklist form. The data used are secondary data taken from medical records in the Obgyn Outpatient Clinic at Bahteramas General Hospital in 2023. The study employs univariate and bivariate analysis using the chi-square test.

3. Results and discussion

Table 1 Frequency Distribution of Ovarian Cyst Incidence by Maternal Age at Bahteramas General Hospital, Southeast Sulawesi Province, 2023

Maternal Age	Frequency (f)	Percentages (%)
20-35 Years	40	40.8
>35 Years	58	59.2
Total (N)	98	100

Table 1 shows that of the 98 respondents with ovarian cysts, the highest incidence was in the >35 years maternal age group, totaling 58 (59.2%), followed by the 20-35 years age group with 40 (40.8%).

Table 2 Frequency Distribution of Ovarian Cyst Incidence by Age at Menarche at Bahteramas General Hospital, Southeast Sulawesi Province, 2023

Age at Menarche	Frequency (f)	Percentage (%)
<12 Years	31	31.6
12-13 Years	31	31.6
>13 Years	36	36.7
Total (N)	98	100

Table 2 shows that of the 98 respondents with ovarian cysts, the highest incidence was in the >13 years age at menarche group, totaling 36 (36.7%), followed by the 12-13 years age group and the <12 years age group, both with 31 (31.6%).

Table 3 Frequency Distribution of Ovarian Cyst Incidence by Parity at Bahteramas General Hospital, Southeast Sulawesi Province, 2023

Parity	Frequency (f)	Percentage (%)
At risk	47	48
Not at risk	51	52
Total (N)	98	100

Table 3 shows that of the 98 respondents with ovarian cysts, the highest incidence was in the at-risk parity group with 47 (48%), and the lowest incidence was in the not at-risk group with 51 (52%).

Table 4 Frequency Distribution of Ovarian Cyst Incidence by Education Level at Bahteramas General Hospital, Southeast Sulawesi Province, 2023

Education Level	Frequency (f)	Percentage (%)
Low education	37	37.8
Higher education	61	62.2
Total (N)	98	100

Table 4 shows that of the 98 respondents with ovarian cysts, the highest incidence was in the higher education group with 61 (62.2%), and the lowest incidence was in the low education group with 37 (37.8%).

Table 5 Relationship Between Maternal Age and Ovarian Cyst Ovarium Incidence at Bahteramas General Hospital, Southeast Sulawesi Province, 2023

Maternal Age	Ovarian Cyst Incidence				Total		*P Value*
	Yes		No		F	%	0.000
	F	%	F	%			
20-35 Years	9	22,5	31	77,5	40	100	
>35 Years	40	69	18	31	58	100	
Total (N)	49	50	49	50	98	100	

Table 5 shows that in the maternal age category <20 years, no respondents experienced or did not experience ovarian cysts. In the maternal age group 20-35 years, 9 people (22.5%) experienced ovarian cysts, while 31 people (77.5%) did not. In the maternal age group >35 years, 40 people (69%) experienced ovarian cysts, and 18 people (31%) did not. The statistical test using chi-square showed a p-value of 0.000, which is smaller than $\alpha = 0.05$, indicating a significant relationship between maternal age and the incidence of ovarian cysts at Bahteramas General Hospital, Southeast Sulawesi Province in 2023.

This study is in line with the research conducted by Prasanti Adriani (2016) titled "Relationship Between Parity and Maternal Age with Ovarian Cysts at RSUD Dr. R. Goeteng Tarunadibrata Purbalingga." The chi-square test results in that study showed a p-value of 0.001 and an Odds Ratio of 19.333, indicating a significant relationship between maternal age and the incidence of ovarian cysts. These findings suggest that maternal age can influence the risk of developing ovarian cysts (22)

Theoretically, women aged between 20 and 50 are at increased risk of developing ovarian cysts. This is due to the decline in organ function and immune system efficiency that occurs with age, making the body more susceptible to various diseases, including ovarian cysts (23). Aging is also associated with hormonal changes that can affect ovarian cyst development (24). The biological mechanism behind the relationship between maternal age and ovarian cysts involves cellular and hormonal aging processes. As women age, the number of ovulation cycles they experience increases, and each ovulation cycle involves the repair of ovarian epithelial cells. Repeated damage to these epithelial cells can lead to neoplastic transformation, increasing the risk of ovarian cysts (25). Additionally, the decline in protective hormones such as progesterone and the relative increase in estrogen can also contribute to this risk.

This study emphasizes the importance of monitoring reproductive health in women, especially those over the age of 35. Regular health check-ups, education on the signs and symptoms of ovarian cysts, and early intervention can help reduce the risk and impact of this condition. Women with high-risk factors, such as advanced age, should undergo routine ultrasound examinations for early detection of ovarian cysts (26). In the future, further research is needed to explore interventions that can reduce the risk of ovarian cysts in older women, including hormone therapy and other preventive

approaches. This study can also help in developing better clinical guidelines for managing reproductive health in women of various age groups.

Table 6 Relationship Between Age at Menarche and Incidence of Ovarian Cysts at Bahteramas General Hospital, Southeast Sulawesi Province, 2023

Usia Menarche	Kejadian Kista Ovarium				Total		P Value
	Ya		Tidak		F	%	0.032
	F	%	F	%			
<12	20	40.8	11	22.4	31	31.6	
12-13	17	34.7	14	28.6	31	31.6	
>13	12	24.5	24	49.0	36	36.7	
Total (N)	49 100		49 100		98 100		

Table 6 shows that in the age at menarche category <12 years, 20 people (40.8%) experienced ovarian cysts, while 11 people (22.4%) did not. In the age at menarche category 12-13 years, 17 people (34.7%) experienced ovarian cysts, and 14 people (28.6%) did not. Meanwhile, in the age at menarche category >13 years, 12 people (24.5%) experienced ovarian cysts, and 24 people (49.0%) did not. The statistical test using chi-square showed a p-value of 0.032, which is smaller than $\alpha = 0.05$, indicating a significant relationship between age at menarche and the incidence of ovarian cysts at Bahteramas General Hospital, Southeast Sulawesi Province, in 2023.

This study aligns with research conducted by Heddy et al. (2023), where the chi-square test results showed a p-value of 0.001, also smaller than $\alpha = 0.05$, indicating that age at menarche is a factor associated with the incidence of ovarian cysts. The p-value of $0.004 < \alpha = 0.05$ indicates that parity is also a risk factor for ovarian cysts (27)

Theoretically, early menarche is associated with an increased risk of ovarian cysts due to a longer period of estrogen exposure during a woman's lifetime (28,29). Early menarche means a woman will experience more ovulation cycles before reaching menopause, which can increase the risk of damage to ovarian epithelial cells and neoplastic transformation that can lead to ovarian cysts (17).

Factors influencing age at menarche include genetics, nutritional status, and environmental conditions. Women who experience early menarche may have an increased risk of other health issues related to prolonged hormone exposure, such as breast cancer and cardiovascular disease (17,30). Therefore, understanding the relationship between age at menarche and the risk of ovarian cysts can help in developing more effective health prevention and intervention strategies.

Table 7 Relationship between Parity and Incidence of Ovarian Cysts at Bahteramas General Hospital, Southeast Sulawesi Province, 2023

Parity	Incidence of Ovarian Cysts				Total		*P Value*
	Yes		No		F	%	
	F	%	F	%			
At Risk	31	66	16	34	47	100	0.005
Not at Risk	18	35.3	33	64.7	51	100	
Total (N)	49	50	49	50	98	100	

This study underscores the importance of early detection and health education regarding the risk factors for ovarian cysts, especially in women who experience early menarche. Appropriate interventions can help reduce the risk and impact of ovarian cysts through increased awareness and effective preventive measures. For instance, education on healthy eating patterns, the importance of physical activity, and regular health check-ups can play a significant role in managing the risk of ovarian cysts. Further research with larger populations and more comprehensive designs is needed to strengthen these findings and explore the biological mechanisms underlying the relationship between age at

menarche and ovarian cysts. Such research will be crucial for developing more effective health policies and intervention programs to prevent and manage ovarian cysts in the future.

Table 7 shows that in the at-risk parity category, 31 people (66%) experienced ovarian cysts, while 16 people (34%) did not. In the not-at-risk parity category, 18 people (35.3%) experienced ovarian cysts, and 33 people (64.7%) did not. Statistical analysis using the chi-square test showed a p-value of 0.005, which is smaller than $\alpha = 0.05$, indicating a significant relationship between parity and the incidence of ovarian cysts at Bahteramas General Hospital, Southeast Sulawesi Province, in 2023.

These findings align with the study conducted by Heddy et al. (2023) titled "Factors Associated with the Incidence of Ovarian Cysts in Women of Reproductive Age at KIA Kencana Clinic, Serang City." The study found that the majority of women with ovarian cysts were multiparous or grand multiparous, with chi-square test results showing a p-value of 0.004, also smaller than $\alpha = 0.05$, confirming that parity is a risk factor for ovarian cysts (27). Theoretically, each ovulation cycle involves damage to ovarian epithelial cells that requires time for repair. If this damage occurs repeatedly before complete healing, it can result in the transformation of cells into neoplastic cells, increasing the risk of developing ovarian cysts (31,32)

High parity, referring to the number of pregnancies a woman has experienced, contributes to the increased frequency of ovulation (33)., thereby increasing the risk of ovarian epithelial cell damage. This indicates that women with high parity are at greater risk of developing ovarian cysts compared to those with low parity or who have never given birth (34).

This study emphasizes the importance of reproductive factors, such as parity, in influencing women's health risks. With a better understanding of the relationship between parity and the incidence of ovarian cysts, more targeted interventions can be implemented to prevent and manage this condition. Health education and routine check-ups are crucial for women with high parity to detect and manage the risk of ovarian cysts early. These findings also highlight the need for a multidisciplinary approach in research and management of ovarian cysts, involving obstetrics and gynecology, oncology, and public health to ensure comprehensive strategies for reducing the burden of this disease. Further research with larger populations and longitudinal designs is needed to strengthen these findings and develop more effective preventive interventions.

Table 8 Relationship Between Education and Incidence of Ovarian Cysts at Bahteramas General Hospital, Southeast Sulawesi Province, 2023

Eduvation	**Incidence of Ovarian Cysts**				**Total**		**P Value**
	Ya		**Tidak**		**F**	**%**	
	F	**%**	**F**	**%**			
Low Education	11	29.7	26	70.3	37	100	0.004
High Education	38	62.3	23	37.7	61	100	
Total (N)	49	50	49	50	98	100	

Table 8 shows that in the low education category, 11 people (29.7%) experienced ovarian cysts, while 26 people (70.3%) did not. In the high education category, 38 people (62.3%) experienced ovarian cysts, and 23 people (37.7%) did not. Statistical analysis using the chi-square test showed a p-value of 0.004, which is smaller than $\alpha = 0.05$, indicating a significant relationship between education and the incidence of ovarian cysts at Bahteramas General Hospital, Southeast Sulawesi Province, in 2023.

These findings align with the research conducted by Ria Ulfah et al. (2023) titled "Analysis of the Incidence of Ovarian Cysts in Reproductive Age Couples at Muara Teweh General Hospital." The study found a p-value of 0.042, also smaller than $\alpha = 0.05$, indicating a significant relationship between education and the incidence of ovarian cysts (35)

The theory supporting these results states that higher education plays a crucial role for women in improving their living standards, healthy behaviors, and ability to make health-related decisions (36). Women with higher education are more knowledgeable about health information, both from peers and the environment, which helps them prevent or manage

health conditions such as ovarian cysts (37). The results of this study show that education level is directly related to the incidence of ovarian cysts.

Higher education enables women to better understand health risks and take appropriate preventive measures (38). Women with higher education are more likely to undergo regular health check-ups, adopt healthy lifestyles, and seek medical care when needed. They are also more likely to understand and follow medical recommendations, which can reduce (39).

Higher education is also associated with better access to health resources and medical information (40). Women with higher education tend to have better access to medical literature, the internet, and health communities that can provide essential information about the prevention and treatment of ovarian cysts (41). Consequently, they are more capable of identifying early symptoms and seeking care before the condition becomes serious.

This research underscores the importance of education in the prevention and management of ovarian cysts. Enhancing educational access and health awareness among women can be an effective strategy in reducing the incidence of ovarian cysts and improving overall reproductive health. Further research is needed to explore the specific mechanisms through which education affects reproductive health and to develop more effective interventions for preventing and managing ovarian cysts.

4. Conclusion

This study found a significant relationship between maternal age, age at menarche, parity, and education level with the incidence of ovarian cysts at Bahteramas Regional General Hospital, Southeast Sulawesi Province, in 2023. Women over the age of 35, with early menarche (<12 years), high parity, and higher education levels are at greater risk of developing ovarian cysts. These findings are consistent with previous studies that show these factors contribute to the increased risk of ovarian cysts.

Recommendations

There is a need for increased reproductive health education and the promotion of routine health checks to detect ovarian cysts early, especially for high-risk women such as those over 35 years of age, with early menarche, and high parity. Improving access to education and health information can help women understand the risks and take appropriate preventive measures. Additionally, further research with larger populations and longitudinal designs is needed to develop more effective prevention interventions, involving a multidisciplinary approach that includes obstetrics, gynecology, oncology, and public health.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Gani I, Ara I, Altaf Dar M. Reproductive Health of Women: a comprehensive review. Int J Curr Res Physiol Pharmacol. 2023 Aug 27;7:11–25.

[2] Otu A, Danhoundo G, Yaya S. Prioritizing sexual and reproductive health in the face of competing health needs: where are we going? Reprod Health [Internet]. 2021;18(1):8. Available from: https://doi.org/10.1186/s12978-021-01068-0

[3] InformedHealth.org. Institute for Quality and Efficiency in Health Care (IQWiG); [Internet]. Cologne, Germany:; 2022. Available from: https://www.ncbi.nlm.nih.gov/books/NBK539572/

[4] Chafitz OB, Chemerinski A, McGovern P. Management of Simple Ovarian Cysts. Top Obstet Gynecol [Internet]. 2023;43(9). Available from: https://journals.lww.com/postgradobgyn/fulltext/2023/06300/management_of_simple_ovarian_cysts.1.aspx

[5] Cheng Y. Ovarian cysts. Am J Obstet Gynecol [Internet]. 2021;225(5):B23–5. Available from: https://doi.org/10.1016/j.ajog.2021.06.042

[6] Schmidt B-M, Durao S, Toews I, Bavuma CM, Hohlfeld A, Nury E, et al. Screening strategies for hypertension. Cochrane database Syst Rev. 2020 May;5(5):CD013212.

[7] Lotfy A, Gonied A, Mohamed S, Abd el monem M. Effect of Ovarian Cysts on Women Health Related Quality of Life. Zagazig Nurs J. 2024;20(1):81–93.

[8] Mobeen S, Apostol R. Ovarian Cyst. In Treasure Island (FL); 2024.

[9] Cabasag CJ, Fagan PJ, Ferlay J, Vignat J, Laversanne M, Liu L, et al. Ovarian cancer today and tomorrow: A global assessment by world region and Human Development Index using GLOBOCAN 2020. Int J cancer. 2022 Nov;151(9):1535–41.

[10] Momenimovahed Z, Mazidimoradi A, Banakar N, Allahqoli L, Salehiniya H. Temporal Trends of Ovarian Cancer Between 1990 and 2019, in Asian Countries by Geographical Region and SDI, Comparison with Global Data. Indian J Gynecol Oncol [Internet]. 2023;21(2):38. Available from: https://doi.org/10.1007/s40944-023-00714-8

[11] Greenlee RT, Kessel B, Williams CR, Riley TL, Ragard LR, Hartge P, et al. Prevalence, incidence, and natural history of simple ovarian cysts among women >55 years old in a large cancer screening trial. Am J Obstet Gynecol. 2010 Apr;202(4):373.e1-9.

[12] Bahteramas R. Data Kejadian Kista Ovarium RSUD Bahteramas Provinsi Sulawesi Tenggara. 2023.

[13] Abduljabbar HS, Bukhari YA, Al Hachim EG, Alshour GS, Amer AA, Shaikhoon MM, et al. Review of 244 cases of ovarian cysts. Saudi Med J. 2015 Jul;36(7):834–8.

[14] Satpathi S, Gaurkar SS, Potdukhe A, Wanjari MB. Unveiling the Role of Hormonal Imbalance in Breast Cancer Development: A Comprehensive Review. Cureus. 2023 Jul;15(7):e41737.

[15] Choi MK, Chung KJ. Factors affecting complications after treatment of epidermal cyst. Yeungnam Univ J Med. 2019 May;36(2):136–40.

[16] Muglia LJ, Benhalima K, Tong S, Ozanne S. Maternal factors during pregnancy influencing maternal, fetal, and childhood outcomes. BMC Med [Internet]. 2022;20(1):418. Available from: https://doi.org/10.1186/s12916-022-02632-6

[17] Mishra GD, Pandeya N, Dobson AJ, Chung H-F, Anderson D, Kuh D, et al. Early menarche, nulliparity and the risk for premature and early natural menopause. Hum Reprod. 2017 Mar;32(3):679–86.

[18] Bragg JM, Kuzawa CW, Agustin SS, Banerjee MN, McDade TW. Age at menarche and parity are independently associated with Anti-Müllerian hormone, a marker of ovarian reserve, in Filipino young adult women. Am J Hum Biol Off J Hum Biol Counc. 2012;24(6):739–45.

[19] Du KC, Mohosin AB, Amin A, Hasan MT. Influence of education on sexual and reproductive health service utilization for persons with disabilities in nationwide Bangladesh: an explanatory sequential mixed-methods study. Reprod Health [Internet]. 2022;19(1):46. Available from: https://doi.org/10.1186/s12978-022-01352-7

[20] Sugiono. Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung : Alfabeta, CV. 2022;

[21] Sugiyono. Metode Penelitian Kuantitatif,Kualitatif dan R&D. Bandung: Alfabeta; 2017.

[22] Widyarni A. Faktor Resiko Kejadian Kista Ovarium Di Poliklinik Kandungan dan Kebidanan Rumah Sakit Islam Banjarmasin. Din Kesehat J Kebidanan Dan Keperawatan. 2020;11(1):28–36.

[23] Cheng W, Du Y, Zhang Q, Wang X, He C, He J, et al. Age-related changes in the risk of high blood pressure. Front Cardiovasc Med. 2022;9:939103.

[24] Tesarik J, Galán-Lázaro M, Mendoza-Tesarik R. Ovarian Aging: Molecular Mechanisms and Medical Management. Int J Mol Sci. 2021 Jan;22(3).

[25] Pataky MW, Young WF, Nair KS. Hormonal and Metabolic Changes of Aging and the Influence of Lifestyle Modifications. Mayo Clin Proc. 2021 Mar;96(3):788–814.

[26] Wang X, Wang L, Xiang W. Mechanisms of ovarian aging in women: a review. J Ovarian Res [Internet]. 2023;16(1):67. Available from: https://doi.org/10.1186/s13048-023-01151-z

[27] Heddy, Jamilah N, Zulhijjah A. Faktor – Faktor Yang Berhubungan Dengan Kejadian Kista Ovarium Pada Wanita Usia Subur Di Poli Bkia Rumah Sakit Kencana Kota Serang. J Ilm Obs. 2023;15(1):354–63.

[28] Lee J-S, Lee YA, Shin CH, Suh DI, Lee YJ, Yon DK. Long-term health outcomes of early menarche in women: an umbrella review. QJM An Int J Med [Internet]. 2022 Dec 1;115(12):837–47. Available from: https://doi.org/10.1093/qjmed/hcac187

[29] Ibitoye M, Choi C, Tai H, Lee G, Sommer M. Early menarche: A systematic review of its effect on sexual and reproductive health in low- and middle-income countries. PLoS One. 2017;12(6):e0178884.

[30] Gong T-T, Wu Q-J, Vogtmann E, Lin B, Wang Y-L. Age at menarche and risk of ovarian cancer: a meta-analysis of epidemiological studies. Int J cancer. 2013 Jun;132(12):2894–900.

[31] Sokkary N, Dietrich JE. Ovarian Embryology, Anatomy, and Physiology Including Normal Menstrual Physiology BT - Endocrine Surgery in Children. In: Ledbetter DJ, Johnson PR V, editors. Berlin, Heidelberg: Springer Berlin Heidelberg; 2018. p. 319–26. Available from: https://doi.org/10.1007/978-3-662-54256-9_23

[32] Holesh JE, Bass AN, Lord M. Physiology, Ovulation. In Treasure Island (FL); 2024.

[33] Toufakis V, Katuwal S, Pukkala E, Tapanainen JS. Impact of parity on the incidence of ovarian cancer subtypes: a population-based case-control study. Acta Oncol. 2021 Jul;60(7):850–5.

[34] Tekalegn Y, Sahiledengle B, Woldeyohannes D, Atlaw D, Degno S, Desta F, et al. High parity is associated with increased risk of cervical cancer: Systematic review and meta-analysis of case–control studies. Women's Heal [Internet]. 2022 Jan 1;18:17455065221075904. Available from: https://doi.org/10.1177/17455065221075904

[35] Anisa RUNDIFN. Analisis Kejadian Kista Ovarium pada Pasangan Usia Subur di Rumah Sakit Umum Daerah Muara Teweh Tahun 2021. Heal Res J Indones. 2023;(Vol 2 No 1 (2023): Health Research Journal of Indonesia).

[36] Parvazian S, Gill J, Chiera B. Higher Education, Women, and Sociocultural Change: A Closer Look at the Statistics. Sage Open [Internet]. 2017 Apr 1;7(2):2158244017700230. Available from: https://doi.org/10.1177/2158244017700230

[37] Dluhos-Sebesto C, Jethwa TE, Bertasi TGO, Bertasi RAO, Nishi LYM, Pantin SAL, et al. Women's Health Information Survey: Common Health Concerns and Trusted Sources of Health Information Among Different Populations of Female Patients. Women's Heal reports (New Rochelle, NY). 2021;2(1):173–81.

[38] O'Neil A, Russell JD, Thompson K, Martinson ML, Peters SAE. The impact of socioeconomic position (SEP) on women's health over the lifetime. Maturitas. 2020 Oct;140:1–7.

[39] Tran DB, Pham TDN, Nguyen TT. The influence of education on women's well-being: Evidence from Australia. PLoS One. 2021;16(3):e0247765.

[40] Raghupathi V, Raghupathi W. The influence of education on health: an empirical assessment of OECD countries for the period 1995-2015. Arch Public Health. 2020;78:20.

[41] Zajacova A, Lawrence EM. The Relationship Between Education and Health: Reducing Disparities Through a Contextual Approach. Annu Rev Public Health. 2018 Apr;39:273–89.