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RISK FACTORS OF INFERTILITY AMONG INDONESIAN WOMEN: A CROSS-SECTIONAL STUDY

Lisa Septiana*, Irfansyah Baharuddin Pakki

Faculty of Public Health, Universitas Mulawarman, Indonesia

Corresponding Author: lisa_160992@yahoo.com

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ABSTRACT

Background: Infertility affects approximately 10-15% of couples in Indonesia and 48.5 million couples globally. It is a growing public health concern that impacts women due to various biological, psychological, and environmental factors. The increasing rates of female infertility, influenced by unhealthy lifestyles, emphasize the critical need for effective treatments and interventions for infertility. **Purpose:** This study aims to determine the relationship between risk factors such as age, BMI, employment status of wife and husband, and menarche age with infertility. **Methods:** This cross-sectional study was conducted at Rizafa Clinic in 2023, involving a purposive sample of 150 women. Variables such as age, obesity (determined by BMI), age at menarche, and occupation were both analyzed, and a chi-square test was performed to assess the association between risk factors and infertility. **Results:** The study revealed that female infertility is significantly influenced by obesity (p = 0.001). However, there was no association between age (p = 0.150), women's occupation (p = 0,310), husband's occupation (p = 0,233), and menarche age (p = 0,969) with infertility. **Conclusion:** It can be concluded that there is a correlation between obesity and the incidence of infertility. Lifestyle changes that support reproductive health in women include maintaining a healthy body weight as a foundation and limiting the intake of foods high in sugar, saturated fats, and processed ingredients, as these can negatively impact metabolism and hormone balance. Addressing these key risk factors through lifestyle adjustments is essential for improving fertility outcomes.

Keywords: age, obesity, employment status, menarche age, infertility

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INTRODUCTION

Infertility problems can have a large impact on married couples, which is a negative event for the couple, especially for women, because it is related to all conditions such as psychological, economic, physical and others' problems (Rahmati *et al*., 2019). Infertility is defined as the inability to conceive after 12 months of regular, unprotected sexual intercourse. (Boedt *et al*., 2021). The World Health Organization has recognized infertility as a major global health issue, with its prevalence on the rise. Infertility in women is an important public health problem worldwide, including Indonesia. Conditions that can be caused by women, men, or both. A global study on infertility rates, conducted from 1990 to 2010 across 190 countries, identified 48.5 million infertile couples. Of these, 19.2 million experienced primary infertility, while 29.3 million were affected by secondary infertility (Starc *et al*., 2019). Due to population growth, however, In Indonesia, the incidence of infertility is around 10-15% or 4-6 million couples out of 39.8 million couples of childbearing age and requires infertility treatment to finally get offspring. As the number of infertility cases increases every year. However, the prevalence differs between countries.

Infertility is categorized as primary or secondary based on whether there has been a previous pregnancy or not. They cannot be separated from risk factors, triggers, and drivers from the agent, host, and environment. Agent factors in infertility such as hormonal disorders and other gynecological diseases including Polycystic Ovary Syndrome (PCOS), and tubal and ovarian diseases (Cena *et al*., 2020). The common causes of female infertility are Pelvic Inflammatory Disease (PID), endometriosis, post-operative ectopic pregnancy, and uterine abnormalities. and PCOS. PCOS in women is about 70% of patients who experience infertility (Peng *et al*., 2023). The host is related to age, length of marriage, age at menarche, employment, education, obesity, nutritional status (inadequate nutrition), history of reproductive diseases, and a healthy lifestyle. Women with obesity have a higher chance of infertility compared to those with normal BMI. Additionally, an unhealthy lifestyle with alcohol consumption increases the risk, with women who consume ≥ 7 glasses showing a 3.13 times higher chance of infertility (Lee *et al*., 2024). Meanwhile, according to previous research, the environment. The harmful effects of specific toxins, including metals like lead, cadmium, and mercury; pesticides such as bis (4-chlorophenyl)-1,1,1-trichloroethane; and organic solvents like benzene and toluene, as well as ionizing radiation, have a direct impact on the female reproductive system. These substances can cause infertility in women and interfere with pregnancy (Kumar *et al*., 2019).

While prior studies have extensively explored its prevalence and associated risk factors, particularly focusing on global or regional levels, this study provides a novel perspective by concentrating on infertility cases within a specific clinical setting in Indonesia-Rizafa Clinic. The uniqueness of this article lies in its integration of clinical and sociodemographic data to comprehensively evaluate the interplay between biological, lifestyle, and environmental factors specific to the Indonesian population. The increasing prevalence of infertility in Indonesia, affecting 10-15% of couples, underscores the critical need to address this multifaceted public health issue. This study focuses on identifying specific risk factors, such as obesity and reproductive health behaviors, within a local clinical setting, aiming to provide actionable insights for improving fertility outcomes. Cases at Rizafa Fertility Clinic have shown a dramatic increase, doubling from 153 patients in 2022 to 330 in 2023. This surge highlights the growing burden of infertility on women and their families, encompassing emotional stress, societal expectations, and the financial challenges of treatment, such as the time commitment and side effects of hormonal medications. What sets this study apart is its focus on integrating clinical observations with contextual factors unique to the local population, such as cultural influences on reproductive health behaviors and the impact of socioeconomic conditions on access to fertility treatment. These findings fill a critical gap in existing research by offering a localized perspective on infertility, which can inform more targeted and effective interventions. By addressing the interplay between clinical and behavioral risk factors, this study contributes to reducing the multifaceted burden of infertility in women seeking treatment at fertility clinics. Despite the significant increase, the specific factors

contributing to infertility remain unclear, necessitating urgent research to identify the main risk factors. Female infertility has profound public health implications, impacting psychological well-being, economic stability and demographic dynamics. This study highlights the urgency to address these challenges by providing insights tailored to the local context, aiming to reduce the physical, emotional and social burdens faced by Indonesian women and their families. This study aims to investigate the relationship between risk factors such as age, Body Mass Index (BMI), employment status of both wife and husband, and age of menarche with infertility in women who attended the Rizafa Clinic in 2023.

METHOD

Research Design

This study used a cross-sectional study design. This study was conducted from October to December 30, 2023. The clinic is in Samarinda, East Kalimantan, Indonesia, which still does not have many infertility consultant doctors. Rizafa Clinic is a clinic that has an infertility consultant specialist.

Study Population and Eligibility

The study population consisted of 150 women attending Rizafa Fertility Clinic. Sampling was conducted using simple random sampling to ensure that every eligible participant had an equal chance of being selected. The sample criteria included married women of reproductive age (15-49 years) who visited the clinic during the study period. Participants were included if they had hearing ability and provided informed consent. This method enhances the representativeness of the findings and allows for generalization to the broader population of women attending the clinic.

Data Analysis

The study analyzed variables including age, obesity, age at menarche, women's occupation, and husband's occupation. Data collection involved both primary and secondary sources. Primary data were obtained through direct interviews using a validated questionnaire administered to respondents, while secondary data included clinic visit records. Infertility was defined as the inability to conceive after 12 months of regular, unprotected intercourse. According to WHO criteria, BMI classifications were as follows: underweight (<18.5 kg/m²), normal (18.5-22.9 kg/m²), overweight (23-24.9 kg/m²), and obese (>25 kg/m²). Menarche age was categorized as early (<11 years), normal (11-13 years), and late (>13 years). Risky occupations were defined as jobs involving exposure to physical stress, chemicals, pesticides, radiation, extreme temperatures, or irregular working hours, which may negatively impact reproductive health.

Statistical Analysis

Data was analyzed using SPSS software (version 24.0The results were presented in terms of frequency, proportion, and percentage. Chi-square tests were employed to assess the association between various factors, and the strength of associations was interpreted using odds ratios (OR) with their 95% confidence intervals.

Ethical Clearance

This research was reviewed and ethically approved with this Ref. No. 322/KEPK-FK/XII/2024 Health Research Ethics Commission, Faculty of Medicine, Universitas Mulawarman Samarinda. A support letter was provided to each participating organization, and data was kept confidential. Study participants received a written document outlining the study's purpose, the procedures involved, and any potential risks or benefits. They were informed of their rights, including the option to withdraw from the study at any point. Each participant had the chance to ask questions before giving informed consent, allowing them to make an informed decision regarding their voluntary involvement.

RESULT

Infertility has several risk factors; in this study, there were more infertility patients than fertility patients.

Table 1. Distribution of characteristics

Characteristics	Frequency (N)	Percent
Age*		
<20	14	9.3
20-35	61	26.7
> 35	75	26.7
Education		
SMP/SLTP	3	2.0
SMA/SLTA	31	20.7
D III	23	15.3
S1	71	47.3
S2	22	14.7
Obesity status		
Obese	94	62.7
Not Obese	56	37.3
Length of Marriage		
< 3 years	69	46.0
> 3 years	81	54.0
Women's occupation		
Exposed to Chemicals	7	4.7
Exposed to Pesticide	7	4.7
Exposed to Radiation	3	2.0
Not exposed	133	88.7
Trauma/fall		
Trauma pelvic	18	12.0
No trauma	132	88.0
Fertility Status		
Infertile	94	62.7
Fertile	56	37.3
Husband's Occupation		
Exposed to Chemicals	38	25.3
Exposed to Pesticide	7	4.7
Exposed to Radiation	9	6.0
Not exposed	96	64.0
Menarche age		
Early	33	22.0
Normal	100	66.7
Late	17	11.3

Infertility as many as 62.7%, fertility as many as 37.3%. The respondents in this study were mostly over 35 years old (50.7%), and women over the age of 35 years may experience a decline in fertility due to decreased egg quality and quantity. Furthermore, the length of marriage was another characteristic we examined. Our analysis shows that the majority of women seeking infertility had been married for more than three years (54%), while 46% had been married for less than three years. Another characteristic we examined was obesity. Our data showed that most women were obese (62.7%), whereas 37.3% were not obese. Obesity is a potential risk factor of infertility. Women were exposed to chemicals (4,7%) at work, followed by radiation (2,0%), Pesticide (4.7%), and traumatic falls/pelvic fractures (12%).From this data, the occupation of husbands exposed to chemicals (2.5%) at work was followed by radiation (6.0%) and pesticides (4.7%), while those who were not exposed were more (64%).These occupational exposures may adversely affect fertility as previous studies have shown that exposure to certain chemicals and radiation can impair reproductive function and increase the risk of infertility. Most

respondents had a menarche age within the normal time range (66.7%) (Table 1).

Our study, Risk factors included ages, obesity, occupation, and age at menarche. In this study, the analysis results show that there is no significant relationship between age and infertility. However, the data distribution reveals that infertility is more common among younger age groups (<20 years) and the reproductive middle age group (20-35 years). However, there was a significant association between obesity and infertility. Among obese women, the OR 3.422 (95% CI = 1.703–6.877). Women with infertility were more likely to be obese (73.4%) compared to non-obese women (44.6%). This means that obese women are about 3.4 times more likely to experience infertility compared to non-obese women and the prevalence of female infertility in this study was one times higher in obese individuals than in non-obese individuals. Women with infertility were more likely to have risky occupations, such as exposure to chemicals, pesticides, radiation, and trauma (67.9%), than those who had no risky occupations (59.6%), while 40.4% of fertile women had no risky occupations compared to risky occupations (32.1%). For women's occupation, the OR = 0.698 (95% CI = 0.348-1.400) suggests that women in risky occupations are 0.7 times less likely to experience infertility. However, this result was not statistically significant, indicating that there is no significant association between women's occupation and infertility. Similarly, for the husband's occupation, the OR = 0.626 (95% CI = 0.319-1.230) suggests that a risky occupation in the husband may slightly reduce the likelihood of infertility, but this association was also not statistically significant. These findings indicate that neither women's nor husband's occupation is significantly associated with infertility. Age at Menarche was also not associated with infertility (Table 2).

Table 2. Univariate analysis of infertility

	Incidence		COR (95% CI)	P-Value
	Infertility	Not Infertility		
	N (%)	N (%)		
Age				
<20	14 (100)	0 (0)	0,000 (0,000)	0,998
20-35	40 (65.6)	21 (34.4)	0,600 (0,299 – 1,204)	0,150
>35	40 (53.3)	35 (46.7)	1	
Obesity status				
Obese	69 (73.4)	25 (26.6)	3.422 (1.703-6.877)	0,001
Non-Obese	25 (44.6)	31 (55.4)	1	
Women's occupation				
Risky Occupations	38 (67.9)	18 (32.1)	0,698 (0,348 – 1,400)	0,311
No Risky Occupations	56 (59.6)	38 (40.4)	1	
Husband's Occupation				
Risky Occupations	46 (68.7)	21 (31.3)	0,626 (0,319 -1,230)	0,174
No Risky Occupations	48 (57,8)	35 (42.2)	1	
Menarche age				
Early	21 (63.6)	12 (36.4)	1,408 (0,309-3,554)	0,941
Normal	62 (62)	38 (38)	1,124 (0,384 – 3,288)	0,831
Late	11 (64.7)	6 (35.5)	1	

DISCUSSION

This study highlights obesity as a significant risk factor for female infertility, with obese women facing a threefold higher risk compared to those with normal BMI. Although no direct association was found between age and infertility, a considerable number of women aged 35 years and older experienced infertility, likely due to declining ovum quality and an increased prevalence of reproductive diseases such as myoma, endometriosis, and fallopian tube disease. These findings underscore the need for addressing modifiable factors like

obesity and raising awareness of reproductive health challenges in women above 35 years. Various risk factors have been assessed for their association with infertility in females. Although there was no association of age with infertility, this data showed that many women aged 35 years experienced infertility, corroborating previous findings. In the age group of 35 years and above, there were 1,629 women who experienced infertility, decreased quantity and quality of ovum with increasing age and increased reproductive diseases such as myoma, endometriosis, and fallopian tube disease (Chen *et al*., 2023). Infertility is a considerable concern for married couples and can lead to significant stress for those affected. (Showell *et al*., 2017). There are several possible reasons for this finding. Psychologically, Culture and society consider the goal of marriage to be having offspring, which becomes self-actualization for a married woman (Rahmati *et al*., 2019).

Previous studies have also highlighted the impact of obesity on female reproductive health. Obese women have reduced fecundity even when eumenorrheic and demonstrate poorer outcomes with the use of in vitro fertilization. Obesity appears to affect the oocyte and the preimplantation embryo, with disrupted meiotic spindle formation and mitochondrial dynamics. Excess free fatty acids may have a toxic effect in reproductive tissues, leading to cellular damage and a chronic low-grade inflammatory state. Altered levels of adipokines, such as leptin, in the obese state can affect steroidogenesis and directly affect the developing embryo. It was found that most obese women needed treatment because of abdominal fat, which can be reduced, and the risk of infertility in obese women was three times greater than those who were not obese. Previous studies have shown that obesity is an independent risk factor for infertility, increasing the risk by more than three times compared to women with a normal BMI (Carson & Kallen, 2021). Therefore, addressing obesity may be an essential component in infertility treatment, particularly for women with ovulatory dysfunction

The association between obesity and infertility is biologically plausible due to several mechanisms. Obesity can disrupt the normal hormonal balance required for ovulation and reproductive health. Excess abdominal fat leads to changes in the levels of adipokines, such as leptin, which can affect steroidogenesis and impair embryo development. Additionally, obesity is linked to a chronic low-grade inflammatory state that can cause cellular damage in reproductive tissues. (Broughton & Moley, 2017). Obesity prevention efforts require a comprehensive approach, covering several important aspects. First, public education and awareness need to be increased through programs that provide information on healthy eating and the importance of physical activity. Second, multisectoral interventions involving the health, education and community sectors are needed to create an environment that supports healthy lifestyles, such as providing access to nutritious food and sports facilities. In addition, prevention programs should be directed at vulnerable groups, particularly older women and groups with low education levels, who have a higher prevalence of obesity. Health promotion on healthy lifestyles should also be promoted to encourage a balanced diet and adequate physical activity, while reducing the consumption of high-calorie foods. Implementation of a monitoring and evaluation system is needed to assess the effectiveness of this program and make adjustments if necessary. Finally, support from the government through public policies, such as regulation of unhealthy food advertising and healthy food subsidies, is essential to support the success of this program (Nglazi & Ataguba, 2022). Sustainable implementation of these measures will be key to reducing obesity as a means of preventing infertility in women. With multi-sector collaboration, a focus on vulnerable groups, and strong policy support, obesity prevention programs can effectively reduce obesity-related health risks, improve quality of life, and prevent infertility in women by making healthy lifestyle changes.

This study has several strengths that significantly contribute to the field of reproductive health. One of the primary strengths is its practical contribution by providing recommendations for obesity prevention as a critical intervention for improving reproductive health. The emphasis on weight management and increased awareness of healthy living offers actionable insights for healthcare practitioners and policymakers. Furthermore, the study underscores the importance of multi-sector

collaboration and public policies in supporting effective obesity prevention programs. However, the study has limitations that should be addressed in future research. The lack of a direct association between certain factors, such as occupational status and age at menarche with infertility, warrants further investigation to explore potential underlying variables. Additionally, the study would benefit from a more diverse sample population to increase the generalizability of the findings. Comprehensive monitoring and evaluation systems are also needed to assess the effectiveness of lifestyle interventions in reducing obesity and infertility rates. Despite these limitations, the study provides a valuable foundation for guiding effective health interventions aimed at improving reproductive health outcomes.

This study employed a cross-sectional design, allowing it to identify only associations, rather than causal links. For further research, a cohort or case-control study is preferable for a clearer causal association. This study only included women who visited Rizafa Clinic, meaning the findings may not fully represent the entire population of infertile women in the region.

CONCLUSION

The present study concludes that there is a correlation between obesity and the incidence of infertility. Focusing on modifiable risk factors, particularly obesity, is essential for improving fertility outcomes. Targeted interventions promoting healthy lifestyle choices, including weight management and reproductive health awareness, are critical. Health care providers should incorporate infertility screening and counseling into routine health services, especially for women in high-risk age groups and those affected by obesity.

SUGGESTION

Based on the study conclusions, Implement targeted interventions that promote healthy lifestyle choices, such as weight management and reproductive health education. Health care providers should incorporate infertility screening and counseling into routine care, particularly for women in high-risk age groups and those with obesity. Additionally, comprehensive programs should be implemented to encourage healthier lifestyles and improve fertility outcomes.

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DECLARATION OF ARTIFICIAL INTELLIGENCE (AI)

The authors acknowledge the use of Grammarly for language refinement in preparing this manuscript. All AI-generated content was rigorously reviewed, edited, and validated to ensure accuracy and originality. Full responsibility for the manuscript's final content rests with the authors.

CONFLICT OF INTEREST

The authors declare that there are no recognized competing financial interests or personal relationships that may have influenced the research presented in this paper.

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AUTHOR CONTRIBUTION

Author Lisa Septiana requested primary and secondary data, analyzed the data, and wrote the article. Author Irfansyah Baharudin Pakki as supervisor, read and approved the final article.

REFERENCES

Boedt, T., Vanhove, A. C., Vercoe, M. A., Matthys, C., Dancet, E., & Lie Fong, S. 2021. Preconception lifestyle advice for people with infertility. *Cochrane Database of Systematic Reviews*, *4*. https://doi.org/10.1002/14651858.CD008189.pub3

Broughton, D. E., & Moley, K. H. 2017. Obesity and female infertility: potential mediators of obesity's impact. *Fertility and Sterility, 107*(4), 840–847. https://doi.org/10.1016/j.fertnstert.2017.01.017

Carson, S. A. & Kallen, A. N. 2021. Diagnosis and Management of Infertility: A Review. *Journal of the American Medical*

Association, *326*(1), 65–76. https://doi.org/10.1001/jama.2021.4788

Cena, H., Chiovato, L., & Nappi, R. E. 2020. Obesity, Polycystic Ovary Syndrome, and Infertility: A New Avenue for GLP-1 Receptor Agonists. *The Journal of Clinical Endocrinology & Metabolism, 105*(8), e2695–e2709. https://doi.org/10.1210/clinem/dgaa285

Chen, X., Liang, J., Yang, Q., Huang, J., Li, L., & Deng, K. 2023. Age affects the association between socioeconomic status and infertility: a cross-sectional study. *BMC Women's Health, 23*(675). https://doi.org/10.1186/s12905-023-02680-x

Kumar, S., Sharma, A., & Kshetrimayum, C. 2019. Environmental & occupational exposure & female reproductive dysfunction. *Indian Journal of Medical Research, 150*(6), 532-545. https://doi.org/10.4103/ijmr.IJMR_1652_17.

Lee, J., Choo, C. W., Moon, K. Y., Lyu, S. W., Kim, H., Lee, J. Y., Lee, J. R., Jee, B. C., Hwang, K., Kim, S. H., & Park, S. K. 2024. Risk Factors for Infertility in Korean Women. *Journal of Korean Medical Science*, *39*(10), e85. https://doi.org/10.3346/jkms.2024.39.e85

Nglazi, M. D., & Ataguba, J. E. O. 2022. Overweight and obesity in non-pregnant women of childbearing age in South Africa: subgroup regression analyses of survey data from 1998 to 2017. *BMC Public Health, 22*(395). https://doi.org/10.1186/s12889-022-12601-6

Peng, G., Yan, Z., Liu, Y., Li, J., Ma, J., Tong, N., & Wang, Y. 2023. The effects of first-line pharmacological treatments for reproductive outcomes in infertile women with PCOS: a systematic review and network meta-analysis. *Reproductive Biology and Endocrinology*, *21*(24). https://doi.org/10.1186/s12958-023-01075-9

Rahmati, S., Delpisheh, A., Moghadam, A. D., Sayehmiri, K., & Mohamadian, F. 2019. Survey frequency of the depression and anxiety levels of infertile women in western Iran. *Medical Journal of Indonesia*, *28*(1), 35–39. https://doi.org/10.13181/mji.v28i1.2940.

Showell, M. G., Mackenzie-Proctor, R., Jordan, V., & Hart, R. J. 2017. Antioxidants for female subfertility. *Cochrane Database of Systematic Reviews*, *2017*(7), 1–154. https://doi.org/10.1002/14651858.CD007807.pub3.

Starc, A., Trampuš, M., Jukić, D. P., Grgas-Bile, C., Jukić, T., & Mivšek, A. P. 2019. Infertility And Sexual Dysfunctions: A Systematic Literature Review. *Acta clinica Croatica*, *58*(3), 508–515. https://doi.org/10.20471/acc.2019.58.03.15.