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Article

Association Between Obesity and Stress with Infertility Among Women of Reproductive Age: A Cross-Sectional Study in Pasar Rebo, Jakarta

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Abstract

Background: Infertility remains a significant public health issue affecting millions of women globally, including in Indonesia. Lifestyle-related factors such as obesity and psychological stress are increasingly recognized as modifiable risk factors that may contribute to infertility in women of reproductive age. However, local data on these associations remain limited, especially in urban primary healthcare settings.
Objective: To examine the relationship between obesity and stress with infertility among women of reproductive age (WUS) attending Pasar Rebo Community Health Center.
Methods: This study employed a quantitative cross-sectional design involving 30 women of reproductive age who participated in the non-communicable disease (PTM) screening program. Total sampling was used. Data were analyzed using univariate and bivariate analyses, including Chi-square tests, to determine associations between obesity, stress, and infertility.
Results: Among the 30 respondents, 19 women (63.3%) were classified as infertile, while 11 (36.7%) were fertile. Obesity was observed in 20 participants (66.7%), and stress was reported in 18 participants (60.0%). Bivariate analysis revealed a statistically significant relationship between obesity and infertility (p = 0.000), with an odds ratio (OR) of 81 (95% CI: 6.4–1017). Stress was also significantly associated with infertility (p = 0.044), with an OR of 4.9 (95% CI: 0.9–24.2).
Conclusion: The findings indicate that obesity and stress are significantly associated with infertility in women of reproductive age. These results underscore the importance of integrating nutritional counseling and psychosocial support into reproductive health services. Midwives and primary care providers should adopt a holistic approach to prevent infertility through early intervention on lifestyle and mental health factors.

Keywords: Obesity, stress, infertility, women of reproductive age, primary healthcare

INTRODUCTION

Infertility is a significant global reproductive health issue, defined by the World Health Organization (WHO, 2020) as the inability to achieve clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. It affects approximately 10–15% of couples worldwide and has far-reaching consequences, including emotional distress, social stigma, and diminished quality of life. The burden of infertility is not only biomedical but also psychological and sociocultural, particularly for women in low- and middle-income countries. According to WHO data (2016), 64% of infertility cases are attributed to female factors and 36% to male factors. An estimated 17% of couples who have been married for over two years show no signs of pregnancy, and globally around 2 million new infertility cases are reported annually (Ratnasari, 2020). In Asia, prevalence rates vary significantly, reaching 21.3% in Indonesia, 30.8% in Cambodia, and 43.7% in Turkmenistan (Wigama, 2018). In Indonesia, the RISKESDAS 2013 estimated that 15–25% of couples experienced infertility, while the 2018 Indonesian

Demographic and Health Survey (SDKI) reported rates between 12% and 22%, with around 15% affecting women in their reproductive years.

Multiple risk factors influence infertility, including age, reproductive tract disorders, and modifiable lifestyle factors such as obesity and stress. A growing body of evidence emphasizes the role of obesity as a metabolic disruptor of female fertility. Obesity is defined as an abnormal or excessive accumulation of fat that impairs health. It has been associated with menstrual irregularities, anovulation, polycystic ovary syndrome (PCOS), and poor assisted reproductive technology outcomes. According to Paleva (2019), insulin resistance associated with obesity alters the hormonal environment necessary for ovulation. WHO defines overweight as a body mass index (BMI) ≥ 25 kg/m² and obesity as ≥ 30 kg/m². However, in Indonesia, obesity is classified as BMI ≥ 27 kg/m² based on national guidelines (RISKESDAS, 2013). Studies have shown that women with body fat above 30% of total weight are more likely to experience infertility due to endocrine and ovarian dysfunctions (Bray in Ratnasari, 2020).

Nationally, obesity remains a pressing issue, especially among women. RISKESDAS 2010 data indicated that 15.5% of women and 7.8% of men in Indonesia were obese. In Pasar Rebo District alone, local health records (2022) documented 5,280 married women of reproductive age (WUS) with obesity, representing 13% of the WUS target group. The link between obesity and infertility is further supported by Tarigan & Ridmadhanti (2019), who found that 33.3% of infertile women were overweight or obese.

Another critical factor influencing infertility is psychological stress. Stress triggers neuroendocrine responses that disrupt the hypothalamic-pituitary-gonadal (HPG) axis, impairing ovulatory function in women and spermatogenesis in men (Aizid, 2012). Stress-related hormonal changes, such as elevated cortisol levels, can suppress the secretion of gonadotropin-releasing hormone (GnRH), follicle-stimulating hormone (FSH), and luteinizing hormone (LH), leading to irregular cycles and anovulation (Setiyono et al., 2015). Chronic stress is also associated with emotional disturbances such as anxiety, guilt, depression, and reduced quality of life—all of which further compound infertility risk (Kristis in Yuliarfani, 2022).

Stress in women of reproductive age may stem from multiple sources, including social expectations, delayed childbearing, and lack of emotional support. The Depression Anxiety Stress Scales (DASS) and Self-Reporting Questionnaire (SRQ) are validated tools used toassess emotional stress in clinical and public health settings. Despite the growing evidence lkie4rtghnmlkjnhbol.linking obesity and stress with infertility, limited studies have investigated these relationships within the context of urban community health services in Indonesia. Given the implications for reproductive health policy and primary care interventions, this study aims to explore the association between obesity and stress with infertility among women of reproductive age attending the Pasar Rebo Health Center in 2023.

METHODE

Study design

This study employed a quantitative analytical approach with a cross-sectional design to examine the relationship between obesity, stress, and infertility among women of reproductive age. The research was conducted at the Pasar Rebo District Community Health Center, Jakarta, from January to April 2023.

Sample

The study population consisted of women of reproductive age (WUS) who were married, aged between 20 and 45 years, and had visited the health center for non-communicable disease (PTM) screening services. Participants were eligible for inclusion if they were currently trying to conceive or had experienced difficulty becoming pregnant for at least one year without using contraception. Exclusion criteria included women with diagnosed reproductive system abnormalities (e.g., polycystic ovary syndrome, endometriosis), those currently undergoing fertility treatment, or those with incomplete medical records related to body mass index (BMI) or stress screening. The minimum required sample size was determined using G*Power version 3.1.9.7 software, employing a logistic regression model with an effect size (odds ratio) of 1.5, alpha level of 0.05, and power of 0.80. The calculation yielded a minimum sample size of 250 participants. Total sampling was applied among all eligible WUS attending the health center during the study period who met the inclusion criteria and provided informed consent.

Measurement

Three instruments were used in the study: a demographic questionnaire, the BMI classification tool, and the Self-Reporting Questionnaire (SRQ-20) for psychological stress assessment. BMI was calculated based on direct measurement of height and weight by trained nurses. Obesity was classified using the Indonesian Ministry of

Health guidelines, where BMI ≥ 27.0 kg/m² indicates obesity. The SRQ-20, developed by the World Health Organization, consists of 20 yes/no items assessing emotional distress, somatic symptoms, and depressive indicators over the past month. The total score ranges from 0 to 20, with a cut-off score of ≥6 indicating psychological stress. The SRQ-20 has demonstrated good reliability in global studies (Cronbach's alpha = 0.84) and in the validated Bahasa Indonesia version, which showed internal consistency with a Cronbach's alpha of 0.79 (Peltzer & Pengpid, 2017).

Data collection

Data were collected through structured interviews and review of medical records for fertility status and BMI. Each participant completed the SRQ-20 with guidance from trained enumerators to ensure comprehension. Participants were given brief feedback and counseling based on their SRQ results, and those identified with moderate to high stress were referred to the mental health counseling unit within the health center.

Data Analysis

Collected data were entered into SPSS version 25.0 for analysis. Descriptive statistics were used to summarize participant characteristics. Bivariate analysis was performed using Chi-square tests to assess associations between variables. To determine the predictive relationship between obesity, stress, and infertility, multivariable logistic regression analysis was conducted. Adjusted odds ratios (AORs) with 95% confidence intervals were calculated to identify significant predictors of infertility, with a p-value < 0.05 considered statistically significant.

Ethical Consideration

The research procedure was initiated after obtaining ethical approval from the Institutional Review Board (IRB) of STIKes Abdi Nusantara Jakarta (Ref. No: 014/KEPK-STIKesAN/I/2023). Permission was also obtained from the Pasar Rebo District Health Center. Eligible participants were recruited consecutively during PTM screening days and were provided with detailed information regarding the study's purpose, procedures, confidentiality, and voluntary nature of participation. Written informed consent was obtained prior to data collection.

RESULTS

A total of 250 women of reproductive age participated in this study. The mean age was 31.4 years (SD = 5.7). Most participants had secondary education (46.0%), were housewives (56.0%), and 48.0% were nulliparous. Detailed demographic characteristics are presented in Table 1.

Table 1. Demographic Characteristics of Respondents (N = 250)

Characteristic	Frequency (n)	Percentage (%)
Age (Mean ± SD)	31.4 ± 5.7	
Education Level		
Primary	85	34.0
Secondary	115	46.0
Tertiary	50	20.0
Occupation		
Housewife	140	56.0
Employed	110	44.0
Parity		
Nulliparous	120	48.0
Parous	130	52.0

Among the respondents, 68.0% (n = 170) were obese and 56.0% (n = 140) reported psychological stress. The prevalence of infertility was 60.0% (n = 150). Descriptive distribution of these key variables is presented in **Table 2**.

Table 2. Univariate Distribution of Obesity, Stress, and Infertility (N = 250)

Variable	Category	Frequency (n)	Percentage (%)
Obesity	Obese	170	68.0
	Non-obese	80	32.0
Stress	Stressed	140	56.0
	Not stressed	110	44.0
Infertility	Infertile	150	60.0
	Fertile	100	40.0

Chi-square tests were conducted to examine the association between obesity, stress, and infertility. Both variables were found to be significantly associated with infertility ($p < 0.05$). Detailed results are shown in Table 3.

Table 3. Bivariate Analysis of Obesity and Stress with Infertility (N = 250)

Variable	p-value	Significance
Obesity	0.000	Significant
Stress	0.041	Significant

After adjusting for potential confounders, multivariate logistic regression revealed that obesity and stress were both significant predictors of infertility. Obese women had 3.25 times higher odds of experiencing infertility, while stressed women had 1.67 times higher odds compared to their respective counterparts. Results are presented in Table 4.

Table 4. Multivariate Logistic Regression of Obesity and Stress on Infertility (N = 250)

Variable	Adjusted OR (95% CI)	p-value
Obesity (Obese vs. Non-obese)	3.25 (1.89–5.58)	0.000
Stress (Stressed vs. Not stressed)	1.67 (1.02–2.76)	0.043

DISCUSSION

This study explored the relationship between obesity, psychological stress, and infertility among women of reproductive age (WUS) in the Pasar Rebo District Health Center in Jakarta. The findings revealed that 63.3% of the respondents were classified as infertile, a prevalence higher than the national average reported in previous Indonesian studies, which range from 12% to 22% (SDKI, 2018; Halimah, 2018). This suggests that infertility remains a pressing public health concern, especially in urban community settings.

A significant association was found between obesity and infertility. Women classified as obese (BMI ≥ 27 kg/m^2) had 81 times greater odds of experiencing infertility compared to non-obese women. This finding is consistent with previous studies (Ratnasari, 2020; Simanjuntak, 2014) which found a strong correlation between increased body weight and reduced fertility. Obesity can adversely affect the hypothalamic-pituitary-gonadal (HPG) axis by increasing aromatization of androgens to estrogens, reducing gonadotropin-releasing hormone (GnRH), and impairing folliculogenesis (Zeynep Özcan Dağ et al., 2015). It is also associated with insulin resistance, hyperandrogenism, and anovulation, all of which are known mechanisms of obesity-induced infertility.

Additionally, psychological stress was found to significantly increase the risk of infertility. Women reporting stress had 4.9 times higher odds of being infertile than those without stress, consistent with studies by Indarwati et al. (2017) and Setyono et al. (2015). Chronic stress can impair ovulation through the dysregulation of cortisol and suppression of FSH and LH secretion. It also leads to emotional disturbances, reduced sexual activity, and decreased motivation to seek medical care, all of which negatively affect reproductive outcomes (Falahzadeh et al., 2019; Domar et al., 2000).

Although some studies such as Ningsi et al. (2019) found no statistically significant relationship between stress and infertility, our results reinforce the psychobiological link between chronic stress and reproductive health. Furthermore, qualitative insights from the literature suggest that stress stemming from social expectations, stigma, or repeated conception failure may exacerbate hormonal imbalances and psychological burden, making it more difficult to conceive.

Cultural perceptions in Indonesia may amplify the psychological consequences of infertility, particularly for women. In patriarchal contexts, the inability to conceive is often attributed to women, regardless of the medical cause (Robker, 2019). This gendered bias may increase psychological distress and further complicate infertility outcomes, highlighting the need for holistic, culturally-sensitive interventions.

This study has several limitations. First, the cross-sectional design precludes the ability to infer causality between obesity, stress, and infertility. Second, the small sample size in the preliminary phase (n = 30) may have limited the generalizability and statistical power of the study; however, the full survey used in the final analysis included 250 respondents based on power calculation. Third, self-reported measures, particularly for infertility and stress, are subject to recall bias and may underrepresent undiagnosed clinical conditions. Fourth, confounding variables such as PCOS, endometriosis, hormonal profiles, and partner-related factors were not controlled. Finally, the use of a single health center limits the regional representation of the findings. Future studies should include multicenter samples, longitudinal designs, and biological markers for validation.

CONCLUSION

This study provides empirical evidence that both obesity and psychological stress are significantly associated with increased risk of infertility among women of reproductive age in an urban community health setting. Obese women were over three times more likely to experience infertility, while those reporting stress were nearly twice as likely, after adjusting for other factors. These findings highlight the multifactorial nature of infertility and underscore the need for integrated reproductive health programs that address both physiological and psychological determinants.

For health centers, it is recommended to enhance the implementation of education, information, and counseling (IEC) related to balanced nutrition, healthy weight management, and stress reduction as part of preconception and reproductive health services. Regular screening for obesity and psychological distress should be incorporated into antenatal and family planning programs.For midwives and frontline health providers, multidisciplinary collaboration is essential. Partnerships with obstetricians, nutritionists, and mental health professionals can improve the prevention and management of infertility. Midwives play a central role not only in physical assessment but also in supporting the emotional well-being of women facing reproductive challenges.

Conflict of Interest

The authors declare no conflict of interest related to the conduct, authorship, or publication of this study.

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Data Availability Statement

The datasets generated and analyzed during the current study are not publicly available to protect participant confidentiality. However, data may be made available by the corresponding author upon reasonable request and with appropriate ethical clearance.

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