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Obesity is Associated with Primary Infertility in Women of Childbearing Age

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A B S T R A C T

Infertility problems can have a big impact on married couples who experience them, apart from causing medical problems, infertility can also cause economic and psychological problems. From 2020 data at the research place, as many as 206 (20.15%) women of childbearing age experienced primary infertility and as many as 43 women of childbearing age (20.87%) experienced obesity. This study aims to analyze the association between obesity and primary infertility in women of childbearing age. The method used in this research is quantitative with a cross-sectional approach. The sample of this study was 840 women of childbearing age who visited the infertility clinic in 2021. The results showed that there was a significant association between obesity and the incidence of primary infertility at with the P value <0.001. This is very important to prevent obesity in women of childbearing age to avoid primary infertility.

I. INTRODUCTION

According to the World Health Organization (WHO), infertility is referred to as a disease in men and women that must be treated properly to improve its condition. Primary infertility is defined as the inability to become pregnant after 1 year of unprotected sexual intercourse and without prior conception ((WHO) World Health Organization 2015; (WHO) World Health Organization 2021). Meanwhile, secondary infertility is a condition when a woman's wife or partner who has been pregnant before is unable to get pregnant in the future (Harzif et al. 2019).

Infertility problems can have a big impact on married couples who experience them, apart from causing medical problems, infertility can also cause economic and psychological problems. Broadly speaking, couples who experience infertility will undergo a long process of evaluation and treatment, where this process can be a physical and psychological burden for the couple. Infertility is related to a person's lifestyle. Consuming alcohol, illegal drugs and smoking can cause infertility. In addition, factors such as age, reproductive conditions, obesity, nutritional status and stress are also known to cause infertility (Mascarenhas et al. 2012; Hiferi 2013).

Most married couples yearn to have children as a result of marriage. It's just that 15% of married couples fail to get pregnant at the age of 1 year of marriage. The cause of this infertility occurs due to factors of the wife and husband respectively 30%, interference on both sides 30% and unknown causative factors 10% (Ahsan, Hakim, and Muh. Tamar 2020).

Consensus data for 2013 conducted by the Indonesian Association of Reproductive Endocrinology and Fertility (HIFERI) and the Indonesian In Vitro Fertilization Association (PERFITRI) show that the infertility rate in Lampung province is still quite high, namely from 1,380,636 couples of childbearing age who are estimated to experience infertility is 138,064 pairs (10%) (Hiferi 2013; Ningsih et al. 2013). South Lampung Regency has quite a lot of infertility rates. Researchers conducted a preliminary study at one of the Kalianda regional hospitals. The hospital is the main place frequented by couples of childbearing ages to consult regarding infertility for couples of childbearing age in the Kalianda area, South Lampung. Based on a preliminary study conducted at Kalianda Hospital, South Lampung in 2020, data was obtained from 1022 Women of Reproductive Age (WRA) who came to receive treatment at the Mother Clinic in 2020, as many as 206 (20.15%) WRA experienced infertility Primary, and 43 WRA (20.87%) were obese.

Several studies have stated that there is a link between obesity and infertility in women. This is closely related to physical conditions including the hormonal system which inhibits ovulation in the reproductive system of obese women, causing infertility. At this time, no specific research has been conducted on the impact of obesity on women in the Lampung area, especially those of reproductive age. For this reason, this study aims to assess the relationship between obesity and primary infertility in women of childbearing age (Dağ and Dilbaz 2015)(Nelson and Fleming 2007) (Amarudin 2012).

II. METHODS

This study used a quantitative analytic design with a cross-sectional approach using 804 women of childbearing age who visited the infertility clinic at Kalianda Hospital, South Lampung in 2021. The sample selection used a total sampling of all women in childbearing age who visited the infertility clinic in 2021. This study measured mothers with obesity which is categorized as obese and not as the independent variable, and infertility (yes and no) as the dependent variable. Obesity in women was measured using a body mass index calculation with the criteria of being obese if $BMI \geq 30.0$ (Simmond et al. 2015). Data was taken from the

mother's medical record in 2021 which was completely filled in according to the sample selection criteria, namely mothers who visited an infertility clinic, women with the childbearing age. The characteristics of the respondents were measured as the basic data of the study, namely age at first menarche (<10 years, 10-15 years, >15 years), education (low/middle, high), and work (working and not working). The statistical analysis used is multivariable logistic regression. The data was analysed using SPSS 21 (SPSS Inc. Chicago USA).

This study was approved by the Ethical Committee of the Jakarta III Health Polytechnic of the Ministry of Health No. KEPK-PKKJ3/ 246/V/2021.

III. RESULT

1. Respondent characteristics

Table 1. Respondent characteristics according to the obesity in women in the childbearing age

Variables		N (804)	%
Education	Basic-middle education	589	73.3
	High education	215	26.7
Occupation	House wives	489	60.8
	Worker	315	39.2
Age of menarche (year)	< 10	215	26.7
	10-15	414	51.5
	>15	175	21.7

Based on table 1, it is known that most of the respondents are aged 20-35 years, namely 708 people (88.1%), have primary-secondary education, namely 589 (73.3%), most are housewives, namely 489 (60.8), and most are aged to get menarche the first time at the age of 10-15 years, namely 414 (51.5%).

2. Incidence of Infertility

Table 2. Incidence of Infertility in Women of Reproductive Age

Primary infertility	Total	
	N (804)	%
Yes	170	21,14
No	634	78,86

Based on the table 2, it can be concluded that 170 women (21.14%) who came to Kalianda Hospital, South Lampung, experienced infertility, while 634 people (78.86%) were not infertile.

3. Incidence of Obesity

Table 3. Incidence of obesity in Women of Reproductive Age

Obesity	Total	
	N (804)	%
Yes	107	13,31
No	697	86,69

Based on table 3, it was found that women of childbearing age who came to Kalianda Hospital, South Lampung in 2021 had the largest percentage not experiencing obesity, namely 697 people (86.69%), while women of childbearing age who experienced obesity, namely 107 people (13.31%).

Table 4. Association between Obesity and Primary Infertility Incidence In Women of Childbearing Age

Variable	Primary infertility				Total (N=804)		P-value*	OR (CI 95%)
	Yes		No		N	%		
	N	%	N	%				
Obese	59	55.14	48	44.86	107	100	< 0.001	6,49 (4,21–9,99)
Not obese	111	15.92	586	84.08	697	100		

* chi-square analysis

Based on table 4, the majority of obese women experienced primary infertility, 59 (55.14), and the majority of women who were not obese did not experience primary infertility, 586 (84.08%). p-value < 0.001, which means that there is a significant association between obesity in women of childbearing age with primary infertility. The OR value (95% CI) was 6.49 (4.21-9.99) meaning that women of childbearing age with obesity would be at risk of experiencing primary infertility 6 times greater than women of childbearing age who were not obese (OR= 6.49).

IV. DISCUSSION

The results of bivariate analysis showed that obesity has a very significant association with infertility (p value=0.00). When viewed from the 95% CI, it is found that the obesity variable has a positive association with infertility (95% CI 1.94–5.77), which means that the obese group can increase the incidence of infertility or the greater the number of women of reproductive age who are obese, the greater as well as infertility.

According to WHO in 2015 stated that obesity is a risk factor for infertility or subfertility. Obesity can make it difficult for a woman of childbearing age to get pregnant or maintain her pregnancy ((WHO) World Health Organization 2021). The criteria for obesity in women that can affect infertility are women with a BMI of 30 or more who are informed that it will take longer to experience conception. Meanwhile, women with a BMI of 30 or more who are not ovulating are informed that losing weight can increase the chances of conception (Nelson and Fleming 2007)(Wilkes and Murdoch 2009).

A literature review conducted by Wilkes and Murdoch it was found that obese women who have a Body Mass Index (BMI) above 30 kg/m² have a high prevalence of infertility, maternal morbidity, maternal death and fetal anomalies. Obesity in women can cause ovulation disorders and energy balance disorders. Obesity has the potential to experience Polycystic Ovary Syndrome (PCOS), a reproductive disease with very rare menstruation. Obesity increases hyperinsulinemia and hyperandrogenism which then increases the risk of developing diabetes mellitus, cardiovascular disease, osteoarthritis, shortness of breath, breast cancer, uterine cancer, PCOS and metabolic syndrome. Insulin stimulates steroidogenesis in the ovaries to produce serum androgens and reduces the work of the liver in synthesizing Sex Hormone Binding Globulin (SHBG), this mechanism can reduce or even eliminate the ability to ovulate in the ovaries, which can cause infertility (Wilkes and Murdoch 2009; Ningsih et al. 2013). The main cause of female infertility due to oocyte abnormalities is failure to ovulate regularly or not to ovulate at all. Disorders that cause oligoovulation or anovulation are also causes of amenorrhea and are divided into 3 groups: hypothalamic dysfunction, diseases of

the pituitary, and ovarian dysfunction (Kusumaningrum 2019; Cui 2010).

Juwarnis at RSUP Dr. M. Djamil Padang in 2008 who found that obesity has an association with Primary and Secondary Infertility ($p < 0.05$) (Juwarnis 2009). Likewise, the results of research by Ahsan, et al, in 2012 in North Palu District, Palu City, Central Sulawesi, showed that one of the variables at risk of delaying conception (infertility) in male couples was an obesity ($p=0.004$; $OR=2.695$; $CI: 1,361-5,337$) (Ahsan, Hakim, and Muh. Tamar 2020). According to Salmen M, et al 2006 in Ahsan, et al, 2012 states that cases of infertility caused by obesity do not only have a negative impact on women. In men there is a strong relationship between increased body weight and low sperm production and erectile dysfunction. Obesity is strongly associated with infertility in men. Fat cells produce estrogen. Men with excess fat cells produce more estrogen than men with normal weight. So one of the most common causes of male infertility is abnormal sperm production (Ahsan, Hakim, and Muh. Tamar 2020; Ahsan, dkk, 2012).

Obesity is associated with the incidence of infertility, presumably because of hormonal imbalances, usually triggered by being overweight. In women who are obese it is difficult to calculate when the fertile period will occur because hormone levels such as androgen, estrogen and progesterone can change a woman's menstrual cycle which is very important for pregnancy and conception. The fat layer in the ovary can also interfere with the development of the embryo and cause a miscarriage (Dağ and Dilbaz 2015). Of the 107 obese women, 59 experienced infertility and 48 were not infertile. Obese women who do not experience infertility are thought to be because most of these women are still of reproductive age so that the chances of pregnancy are still quite high (Nelson and Fleming 2007). In addition, the woman also had no reproductive disorders or diseases, a history of sexually transmitted diseases (STDs) and a history of chronic diseases (Djuwantono et al. 2017).

This study has used a large number of samples so that the research results can be one of the trusted study and become the evidence. It's just that this study has not carried out further analysis by adjusting it using other infertility risk factors.

V. CONCLUSION

Obesity is closely related to the occurrence of primary infertility in women of childbearing age with the incidence of primary infertility being 21.14%. The importance of providing education for women to prevent obesity in preventing infertility in women of childbearing age.

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