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Frequency of Subfertility in Women with High Body Mass Index (BMI)

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ABSTRACT

Objectives: It is essential to carry out a study to ascertain the prevalence of subfertility in women with high BMI because of these inconsistent results and the dearth of data in the local population. The findings of this study will assist us in providing evidence-based education to women with high BMI and subfertility about the advantages of weight loss for increased fertility. **Study Design:** Descriptive, cross-sectional study. **Settings:** Department of Obstetrics & Gynecology, Jinnah Postgraduate Medical Centre, Karachi. **Duration of study:** November 2022 to April 2023. **Methodology:** A total of 138 women of reproductive age, aged 15 to 45, with a high BMI (≥ 25 kg/m2) were chosen. Individuals with low or normal body mass index, a history of pregnancy, thyroid and androgen hormone endocrine abnormalities, and the use of any form of contraception were not included. The researcher recorded baseline information such as age, height, weight, BMI, and menstrual cycle regularity. A consultant gynecologist evaluated each patient in the trial for subfertility, which was defined as the inability to conceive after a year of unprotected sexual activity. **Results:** The study's participants ranged in age from 15 to 45, with a mean age of 26.54 ± 5.93 years. A mean height of 159.12 ± 12.65 cm was recorded. 79.87 ± 8.71 kg was the average weight. Mean BMI was 33.24 ± 6.52 kg/m2. 55 individuals (39.86%) with high BMI had subfertility. **Conclusion:** Obesity and overweight are prevalent disorders that have an impact on reproductive health in addition to overall health.

INTRODUCTION

An excessive or aberrant buildup of fat or adipose tissue in the body is referred to as obesity. People who are obese are more likely to develop diabetes mellitus, cardiovascular disease, hypertension, and hyperlipidemia—all of which are harmful to their health.[1-3] It is a serious public health emergency that has gotten worse during the past fifty years. The causes of obesity are complex and include a variety of factors. It is the second most common preventable cause of mortality in the US, after smoking. Many strategies should be used to treat obesity, and the patient may need to get treatment for the remainder of their life. A five to ten percent reduction in weight can significantly improve a person's health, quality of life, and the financial strain on the nation.[4,5]

Although there is evidence linking obesity to lower fertility, the exact mechanisms and mechanisms underlying this relationship are still unclear. Reduced fertility has been associated with obesity. Obese women, particularly those with central obesity, have a substantially harder time becoming pregnant in a single cycle. Women who are obese are up to three times more likely to experience oligo/anovulation, which results in irregular or nonexistent menstrual cycles, as well as hypothalamic-pituitary-ovarian axis disturbances, which interrupt the menstrual cycle. Obesity has been shown to change the hormonal environment. Actually, adipocytes produce the hormone leptin, which has been linked to decreased fertility and is seen in high concentrations in obese women. A complex hormonal balance controls both follicular development and oocyte maturation. It has been noted that obesity changes the hormonal environment. Obesity can make it more difficult to conceive because it negatively affects not only ovulation but also the endometrium's growth and implantation.[6,7]

Despite this, the prevalence of subfertility in women with high body mass index is rarely given much attention. According to a recent study, there is a strong correlation between obesity and subfertility. Women with a high body mass index had a 50% chance of experiencing subfertility.[8] One study that looked at several risk factors for female infertility found that 35.73% of women with a high body mass index (BMI) had subfertility, which was far lower than previous studies.[9] It is essential to carry out a study

to ascertain the prevalence of subfertility in women with high BMI because of these inconsistent results and the dearth of data in the local population. The findings of this study will assist us in providing evidence-based education to women with high BMI and subfertility about the advantages of weight loss for increased fertility.

MATERIALS AND METHODS

Approved by the ethical review committee, this descriptive, cross-sectional study involved 138 women of reproductive age, aged 15 to 45, with a high BMI (≥ 25 kg/m2) between November 2022 and April 2023. Using the following values, the sample size was calculated using the WHO sample size calculator: Absolute accuracy (d) = 8%, confidence level (α) = 95%, Subfertility is predicted to occur more frequently in women with high BMIs (35.73%[9]) and 138 is the calculated sample size (n). Individuals with low or normal body mass index, a history of pregnancy, thyroid and androgen hormone endocrine abnormalities, and the use of any form of contraception were not included.

The researcher recorded baseline information such as age, height, weight, BMI, and menstrual cycle regularity. A consultant gynecologist evaluated each patient in the trial for subfertility, which was defined as the inability to conceive after a year of unprotected sexual activity. The performa contained all of the data. Women were informed and urged to choose strategies to lower their BMI after receiving a diagnosis. The anonymity of the patient was the top consideration.

SPSS version 26.0 was used for data analysis. While frequency and percentages were used for categorical data (such as the occurrence of subfertility and the regularity of the menstrual cycle), the numerical variables (age, weight, height, and BMI) were reported as mean with standard deviation (SD) and median (IQR). Age, BMI, and menstrual cycle regularity were used to stratify the data. A p-value of less than 0.05 was considered significant when using the post-stratification chi-square test.

RESULTS

The study's participants ranged in age from 15 to 45, with a mean age of 26.54 ± 5.93 years. According to Table I, the majority of the patients, 83 (60.14%), were between the ages of 15 and 30. Distribution of patients according to regularity of menstrual cycle is shown in Table II. A mean height of 159.12 ± 12.65 cm was recorded. 79.87 ± 8.71 kg was the average weight. Mean BMI was 33.24 ± 6.52 kg/m^2 (Table III).

According to Figure I, 55 individuals (39.86%) with high BMI had subfertility. Stratification of subfertility with respect to age, regularity of menstrual cycle and BMI is shown in Table IV.

Table I

Distribution of patients according to Age (n=138).

Age (in years)	No. of Patients	%age
15-30	83	60.14
31-45	55	39.86
Total	138	100.0

Mean ± SD = 26.54 ± 5.93 years

Table II

Distribution of patients according to regularity of menstrual cycle (n=138).

regularity of menstrual cycle	No. of Patients	%age
Irregular	72	52.17
Regular	66	47.83
Total	138	100.0

Table III

Distribution of patients according to BM (n=138).

BMI (kg/m^2)	No. of Patients	%age
25-30	61	44.20
>30	77	55.80
Total	138	100.0

Figure I

Frequency of subfertility in women with high body mass index (BMI) (n=138).

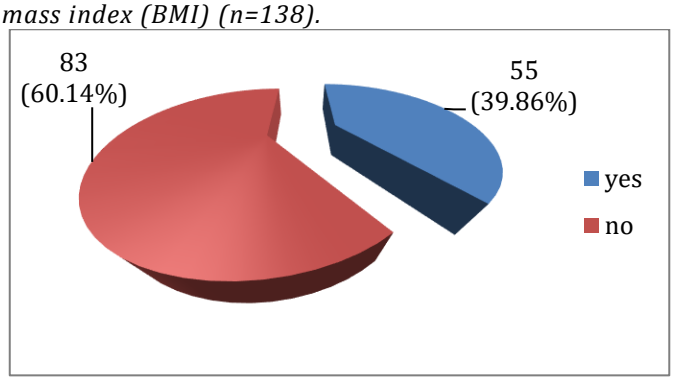

Table IV

Stratification of subfertility with respect to age, regularity of menstrual cycle and BMI.

		Yes (n=55)	No (n=83)	P-value
Age (years)	15-30	36 (43.37%)	47 (56.63%)	**0.299**
	31-45	19 (34.55%)	36 (65.45%)	
Regularity of menstrual cycle	Irregular	31 (43.06%)	41 (56.94%)	**0.422**
	Regular	24 (36.36%)	42 (63.64%)	
BMI (kg/m^2)	25-30	22 (36.07%)	39 (63.93%)	**0.418**
	>31	33 (42.86%)	44 (57.14%)	

DISCUSSION

Obesity and overweight are becoming worldwide public health issues. Over the past three decades, the prevalence of obesity has quadrupled or tripled in several countries worldwide. Sedentary lifestyles, urbanization, and an increase in the use of processed foods high in calories are most likely to blame for this.[10] Underweight (less than 18.5 kg/m2), overweight (25.0–29.9 kg/m2), and obesity (more than 30.0 kg/m2) are frequently diagnosed using the body mass index (BMI). Using waist circumference (WC) is another method of measuring central obesity. Central obesity is defined as having a waist-to-hip ratio (WHR) of 80 cm for women and 94 cm for men, or 0.85 for women and 0.90 for males.[11]

Participants in the study were between the ages of 15 and 45, with an average age of 26.54 ± 5.93 years. Eighty-three (60.14%) of the patients were in

the 15–30 age range. The average BMI was 33.24 ± 6.52 kg/m^2. Of those with a high BMI, 55 (39.86%) were subfertile. According to a a study that examined a number of risk factors for female infertility, the prevalence of subfertility among women with high body mass index (BMI) was 35.73%, which was significantly lower than that found in earlier research.[9]

A cross-sectional study[8] conducted among infertile women in Karnataka by Dhandapani K et al. produced a similar outcome. They discovered that 7% were obese, 42% had a normal BMI, 8% were underweight, and 43% were overweight. 32% of infertile women experienced secondary infertility, while 68% experienced primary infertility. This occurred at the same time as the Dhandapani K et al. study, which revealed that 33% of women experienced secondary infertility and 67% experienced main infertility.[8]

Each unit rise in BMI lowers the risk of infertility by 33% for BMI values below 19.5 kg/m2, however above this threshold, there is a 3% increase in infertility risk for every unit increase in BMI, according to the current study's non-linear connection. In contrast, Zhu et al.'s[12] analysis demonstrates a linear association, with an odds ratio of 1.03 per 1% increase in BMI, indicating that a higher BMI is consistently associated with an increased chance of infertility. In addition, Godstein et al.'s[13] research adds to this discussion by showing that women with a BMI of 27 or above have a 3.1 higher relative risk of ovulatory infertility than women with a lower BMI (20-24.9). Women with BMIs between 25 and 26.9 or under 17 had minor effects as well, with relative risks of 1.2 and 1.6, respectively, according to their study. Together, these results highlight the complex association between BMI and infertility and need for more study to clarify underlying mechanisms and provide specialized treatment interventions for women facing reproductive issues.[12,13]

According to a study by Fichman V et al., women who are overweight or obese are 7.5 times more likely to become infertile than women who fall within the normal BMI range. According to our research, women who are overweight or obese are 2-4 times more likely to experience infertility. Although there is a strong correlation between BMI and infertility in both studies, the odds were exceptionally high in the Fichman V et al. study. This could be because the research was conducted in two different nations, resulting in extremely distinct social and environmental conditions.[14]

A 5% reduction in the chance of getting pregnant has been shown for each unit of BMI above 29 kg/m2.[15] Obesity has been linked to a decreased fertility rate and altered reproductive functioning in early adulthood, according to numerous research. Infertility and menstrual problems were more common in these women.[16] Obesity makes it hard to get pregnant in a number of ways, such as by slowing down the size of ovarian follicles, the quality and quantity of oocytes, fertilization, embryo development, and implantation.[17] Uncertainty surrounds the relationship between fertility and obesity. It appears that chronic anovulation brought on by hyperandrogenism is the precise cause of infertility.

Limitations

Other variables including smoking, alcohol use, and underlying diseases were not included, even though age and menstrual cycle regularity were. The outcomes might have been impacted by these unmeasured factors. When evaluating the study's findings and their generalizability, it's critical to be aware of these limitations.

CONCLUSION

Obesity and overweight are prevalent disorders that have an impact on reproductive health in addition to overall health. Therefore, in order to decrease the bad obstetrical outcomes caused by obesity, people should be made aware of the significance of losing weight before becoming pregnant and urged to do so before receiving treatment.

REFERENCES

1. Riess, K., Zippl, A. L., Reh, L., Feil, K., & Toth, B. (2023). Prevalence of low and high BMI in patients with infertility. *Clinical and Experimental Obstetrics & Gynecology*, *50*(6). https://doi.org/10.31083/j.ceog5006126
2. Zheng, Y., Dong, X., Chen, B., Dai, J., Yang, W., Ai, J., & Jin, L. (2022). Body mass index is associated with miscarriage rate and perinatal outcomes in cycles with frozen-thawed single blastocyst transfer: A retrospective cohort study. *BMC Pregnancy and Childbirth*, *22*(1). https://doi.org/10.1186/s12884-022-04443-2
3. Dhandapani, K., Kodavanji, B., N.A, V., N.J, P., & Deshpande, S. B. (2021). Prevalence and causes of infertility in overweight and obese women in a tertiary care hospital setup in Mangalore - A retrospective secondary data analysis. *Journal of Evidence Based Medicine and Healthcare*, *8*(29), 2656-2660. https://doi.org/10.18410/jebmh/2021/489
4. Kundu, S., Ali, B., & Dhillon, P. (2023). Surging trends of infertility and its behavioural determinants in India. *PLOS ONE*, *18*(7), e0289096. https://doi.org/10.1371/journal.pone.0289096
5. Borumandnia, N., Alavi Majd, H., Khadembashi, N., & Alaii, H. (2022). Worldwide trend analysis of primary and secondary infertility rates over past decades: A cross-sectional study. *International Journal of Reproductive BioMedicine (IJRM)*, *20*(1), 37-46. https://doi.org/10.18502/ijrm.v20i1.10407
6. Amoah, C., Adageba, R. K., Appiah, E. K., & Sefogah, P. E. (2025). Obesity and overweight and

associated factors among women with infertility undergoing assisted reproductive technology treatment in a low income setting. *Scientific Reports*, *15*(1). https://doi.org/10.1038/s41598-024-82818-5

7. Ibitoye, B. O., Akadiri, O., Ibitoye, F. O., & Fasasi, O. A. (2023). Who fact sheet on infertility (definition of infertility), published in global reproductive health (2021). *Global Reproductive Health*, *8*(2), e60-e60. https://doi.org/10.1097/grh.0000000000000060
8. Dhandapani, K., Kodavanji, B., & Vinodini, N. (2016). Association of body mass index with primary and secondary infertility among infertile women in Mangalore: A cross-sectional study. *National Journal of Physiology, Pharmacy and Pharmacology*, *6*(1), 81. https://doi.org/10.5455/njppp.2015.5.2108201585
9. Cong, J., Li, P., Zheng, L., & Tan, J. (2016). Prevalence and risk factors of infertility at a rural site of northern China. *PLOS ONE*, *11*(5), e0155563. https://doi.org/10.1371/journal.pone.0155563
10. Tang, K., Guo, Y., Wu, L., Luo, Y., Gong, B., & Feng, L. (2021). A non-linear dose-response relation of female body mass index and in vitro fertilization outcomes. *Journal of Assisted Reproduction and Genetics*, *38*(4), 931-939. https://doi.org/10.1007/s10815-021-02082-8
11. Hecht, L. M., Hadwiger, A., Patel, S., Hecht, B. R., Loree, A., Ahmedani, B. K., & Miller-Matero, L. R. (2021). Disordered eating and eating disorders among women seeking fertility treatment: A systematic review. *Archives of Women's Mental Health*, *25*(1), 21-32. https://doi.org/10.1007/s00737-021-01156-x
12. Zhu, L., Zhou, B., Zhu, X., Cheng, F., Pan, Y., Zhou, Y., Wu, Y., & Xu, Q. (2022). Association between body mass index and female infertility in the United States: Data from national health and nutrition examination survey 2013–2018. *International Journal of General Medicine*, *15*, 1821-1831. https://doi.org/10.2147/ijgm.s349874
13. Grodstein, F., Goldman, M. B., & Cramer, D. W. (1994). Body mass index and Ovulatory infertility. *Epidemiology*, *5*(2), 247-250. https://doi.org/10.1097/00001648-199403000-00016
14. Fichman, V., Costa, R. D., Miglioli, T. C., & Marinheiro, L. P. (2020). Association of obesity and anovulatory infertility. *Einstein (São Paulo)*, *18*. https://doi.org/10.31744/einstein_journal/2020ao5150
15. Zohora, F. T., Islam, N., Karmakar, P., Sultana, D., & Hasib, H. M. (2023). Increased body mass index & Waist circumference are associated with female infertility: A cross-sectional study. *Eastern Medical College Journal*, *8*(2), 39-42. https://doi.org/10.3329/emcj.v8i2.69686
16. Rafael, F., Rodrigues, M. D., Bellver, J., Canelas-Pais, M., Garrido, N., Garcia-Velasco, J. A., Soares, S. R., & Santos-Ribeiro, S. (2023). The combined effect of BMI and age on ART outcomes. *Human Reproduction*, *38*(5), 886-894. https://doi.org/10.1093/humrep/dead042
17. Risch, L., Hotzy, F., Vetter, S., Hiller, S., Wallimann, K., Seifritz, E., & Mötteli, S. (2022). Assessment of nutritional status and risk of malnutrition using adapted standard tools in patients with mental illness and in need of intensive psychiatric treatment. *International Journal of Environmental Research and Public Health*, *20*(1), 109. https://doi.org/10.3390/ijerph20010109