

Association of body mass index with primary and secondary infertility among infertile women in Mangalore: A cross-sectional study

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ABSTRACT

Background: Studies have shown that overweight and underweight can contribute to fertility problems. There is a significant paucity of data in the Indian context regarding the effect of body mass index (BMI) on infertility in women. **Aims and Objective:** To find the association of BMI with primary and secondary infertility among infertile women in Mangalore. **Materials and Methods:** This cross-sectional study included 204 infertile women (18–45 years) from a tertiary care hospital in Mangalore. Primary and secondary infertility were classified based on the infertility definitions of the World Health Organization. Weight and height were used to calculate BMI (kg/m^2). **Result:** This study showed that infertile women with overweight were maximum 87 (42.65%), followed by women with normal BMI 85 (41.67%), underweight 17 (8.33%), and obese 15 (7.35%). Of 204 infertile women, 137 (67.2%) had primary infertility and 67 (32.8%) had secondary infertility. Of 137 women with primary infertility, 12 (8.8%) were underweight, 55 (40.1%) were normal BMI, 62 (45.3%) were overweight, and 8 (5.8%) were obese. Of 67 women with secondary infertility, 5 (7.5%) were underweight, 30 (44.8%) were normal BMI, 25 (37.3%) were overweight, and 7 (10.4%) were obese. Deviation of weight from normal BMI was more in primary infertility (59.9%) than in secondary infertility (55.2%). **Conclusion:** Both overweight and underweight is a preventable risk factor for infertility and precautionary measures to manage them may be an effective means of reducing the risk of infertility and other associated disorders. Future studies are needed to understand if correction of weight improves fertility in these women.

KEY WORDS: Body Mass Index; Primary Infertility; Secondary Infertility; Tertiary Care Hospitals; Mangalore, Female Infertility


INTRODUCTION

Infertility is the inability to get pregnant after a year of unprotected intercourse.^[1] It is estimated to affect 48 million women. The burden of infertility remains high. The general burden of female infertility has continued to be the same in the estimated levels and

trends from 1990 to 2010, according to a study published at the end of 2012 by the World Health Organization (WHO).^[2]

Infertility is distributed in two groups, primary and secondary. An analysis done on 53 demographic health surveys^[3] reported that the overall rate of primary infertility ranged between 0.6%–3.4% and 8.7%–32.6% for secondary infertility. The same analysis also showed that in India in 2005, the prevalence of primary infertility was 2.7% and secondary infertility was 24.6%. The weight in relation to fertility is a curious thing. An ideal body weight in females is linked to the commencement and conservation of reproductive functions.

Reproductive dysfunctions have been related to both high and low body weight^[4] and it may reveal both biological and social influences. Underweight or overweight contributes nearly to one-fifth of infertilities.^[5] Underweight as well as overweight and

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obesity are linked with an increased risk of anovulatory infertility. Studies have shown that overweight (body mass index [BMI] ≥ 25 kg/m²) or underweight (BMI ≤ 18.5 kg/m²) can contribute to fertility problems.^[6] In a study on Finnish people, it was reported that when compared to women with normal BMI, the probability of having children is less in obese and underweight adolescents.^[7]

There are many biological and other causes of infertility, which can be treated by medical intervention and lifestyle modification.^[8] One of such causes that can easily be prevented is deflection from the normal BMI. One of the easiest ways to decide underweight or overweight is to determine BMI, which is an index of a person's relative "skinniness or heaviness." Various studies^[9-11] concentrated primarily on infertility due to ovulatory disorders and marked the effect of obesity on infertility.

To diminish the load of this global disability, the fundamental move is to have a precise description of the distribution, prevalence, and trends of infertility. Although studies have explored the effect of BMI on infertility in women in the developed countries, there is a significant paucity of data in the Indian context. This study was aimed to identify the association of BMI with primary and secondary infertility in a sample population of infertile women in Mangalore.

MATERIALS AND METHODS

This is a cross-sectional study that was carried out on infertile women coming for infertility checkup at the Lady Goschen hospital and KMC Attavar hospital, Mangalore. A total of 204 infertile women (failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse) in the age group of 18-40 years were included. The data were collected from the files in the Medical Records Department after taking permission. Weight in kilograms (kg) was measured using Equinox BR-9201 Analog Weighing Scale and height was measured in meters (m) using SM2M Professional Stature Meter (2M). BMI was calculated using the formula weight/height² (kg/m²).

The entire sample population was divided into primary and secondary infertility based on the WHO infertility definitions and terminologies.^[1] These women were further grouped according to the WHO BMI classification as follows: underweight < 18.5 kg/m², normal 18.5-24.99 kg/m², overweight 25-29.99 kg/m², and obese ≥ 30 kg/m².^[12] Institutional ethics committee approval was obtained for this study.

Statistical Analysis

Data were analyzed using SPSS software (Statistical Package for Social Sciences), version 17.0. Calculation was done using proportions.

RESULT

This study showed that infertile women with overweight were maximum (87 kg/m², 42.65%), followed by women with normal

BMI (85 kg/m², 41.67%), underweight (17 kg/m², 8.33%), and obese (15 kg/m², 7.35%) (Figure 1). Of 204 infertile women, 137 (67.2%) had primary infertility and 67 (32.8%) had secondary infertility (Figure 2). Of 137 women with primary infertility, 12 (8.8%) were underweight, 55 (40.1%) were normal BMI, 62 (45.3%) were overweight, and 8 (5.8%) were obese. This study also identifies that of 67 women with secondary infertility, 5 (7.5%) were underweight, 30 (44.8%) were normal BMI, 25 (37.3%) were overweight, and 7 (10.4%) were obese (Table 1). Deviation of weight from normal BMI was more in primary infertility (59.9%) than in secondary infertility (55.2%) (Figure 3).

DISCUSSION

Infertility is not simply an individual distress; it is a public health problem. Although the total percentage of underweight women is less when compared to overweight and obese women in this study, it is to be noted that fertility disputes also apply to women who are under their approved body weight to an equal degree as higher body weight. Many women feel the stress to stay slim by continuous dieting and keep their weight just on the lower limit of being healthy. In level with our findings, studies conducted in Norway also show less prevalence of underweight in infertile women.^[13]

Studies have shown that, compared to healthy weight women, underweight women are more than twice as likely to take more than a year to get pregnant.^[7,8] Sex hormones are fat soluble and they are deposited in the body's fat layers. Women who have a low BMI yield a reduced amount of estrogen that can lead to an abnormal menstrual cycle.^[5,14]

Owing to our disordered lifestyles and effortless availability of fast foods, the proportions of overweight and obesity have mounted intensely in today's world. It is shocking to many subjects that their weights are considered medically elevated. In this study, overall more than 50% women are more than the normal range of BMI. A study conducted by Al-Azemi et al.^[15] reported that 76.3% infertile women exceeded the normal BMI range, which is more than that in our study. A study conducted by Norman et al.^[16] showed that with increasing weight in females, there is a clear and consistent decrease in fertility.

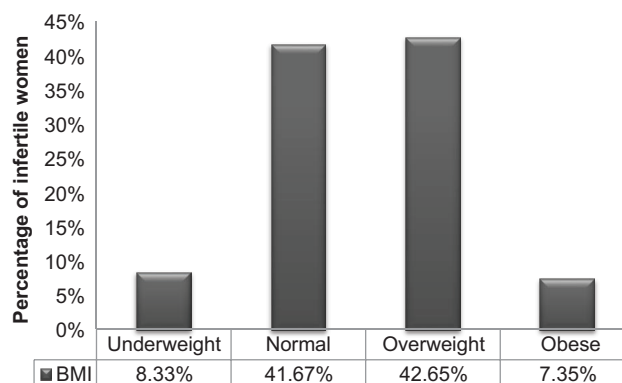


Figure 1: Association of body mass index (BMI) with infertile women.

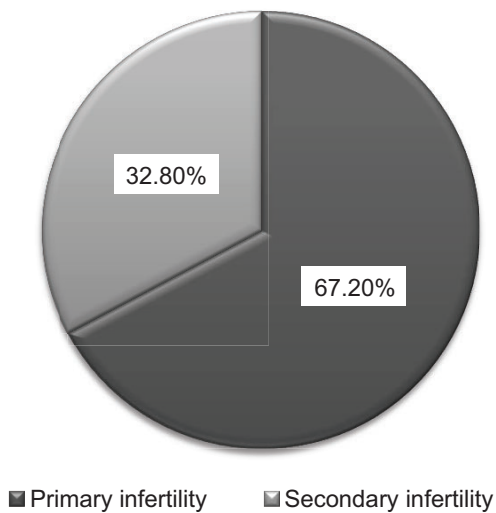


Figure 2: Prevalence of primary and secondary infertility in infertile women in Mangalore.

It is estimated that 8%–15% of all women in their reproductive life, experience primary or secondary infertility at one point in time.^[17] In this study, majority of cases had primary infertility. This suggests that primary infertility is predominant in Mangalore population. In line with our study, studies conducted

Table 1: Influence of body mass index class on women with primary and secondary infertility

Body mass index (kg/m ²)	Primary infertility (n = 137)	Secondary infertility (n = 67)
Underweight (< 18.5), n (%)	12 (8.8)	5 (7.5)
Normal (18.5–24.9), n (%)	55 (40.1)	30 (44.8)
Overweight (25–29.9), n (%)	62 (45.3)	25 (37.3)
Obese (30–34.9), n (%)	8 (5.8)	7 (10.4)

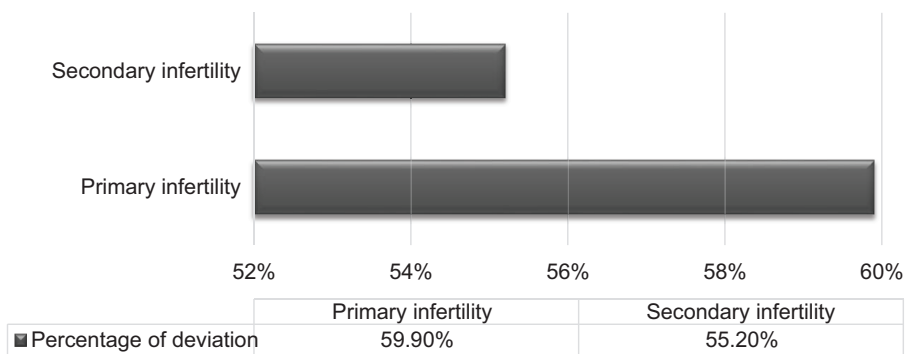


Figure 3: Deviation from normal body mass index in women with primary and secondary infertility.

in Turkey and Iran similarly found out that primary infertility was more common, when compared to secondary infertility.^[18,19] But, in contrary, a study conducted in sub-Saharan Africa displays that primary infertility is relatively low.^[20] Moreover, a study conducted on the tribal communities in India presents that, within the same region the prevalence of primary infertility has been shown to differ across tribes and castes.^[21]

However, it is eminent that many of these estimations use diverse definitions for infertility and deal with varying time periods, which build direct comparisons hard among any studies. Low prevalence of secondary infertility may be because the couples with secondary infertility tend to get less social support than couples who have primary infertility. Additional reason may be that many couples decide to be a one-child family.

In this study, the proportion of women with normal BMI was more in primary infertility when compared to secondary infertility. This may possibly be because other causes such as semen abnormalities in their partner^[22] and congenital uterine anomalies^[23] could be the major cause of infertility. We also found that the deflection from normal BMI was also high in primary infertility when compared to secondary infertility. This might be due to the modifications in lifestyle factors such as intake of junk foods, lack of exercise, and increased stress.

The lacking component between fat and fertility could be a protein hormone, leptin, which is formed by adipocytes that operate both at the hypothalamic–pituitary axis and the gonadal levels.^[24] Rise in body fat is transformed into escalation in serum leptin levels, which is in correlation with BMI.^[25] The possible complications with increased BMI in women trying to get pregnant includes hypertension, gestational diabetes, pre-eclampsia, and stillbirth.^[26] Several recent and previous studies have linked overweight and obesity to low pregnancy rate and spontaneous abortion.^[26,27] On the other hand, excessive body fat produces more estrogen than necessary, which may interfere with the ovulation cycle and also increases the risk of developing estrogen dominance diseases.^[4,14]

Limitations

The first limitation of this study is the small sample size and the study is conducted in selected hospitals in Mangalore. Concerning the high prevalence of infertility, future studies

should assess a huge sample with varied characteristics. Second, this study did not comprise men. Therefore, future research should explore the strategies among men with infertility.

CONCLUSION

This study brings to our consideration that deviation from normal BMI in primary infertile women implies to be substantially higher. This is a preventable risk factor for infertility and precautionary measures to manage them may be an effective means of reducing the risk of infertility and other associated disorders. Lifestyle modification stays to be of extreme priority, although numerous approaches for weight reduction including exercise, diet, and pharmacological and surgical intervention prevail. These conclusions might also be more appropriate to women who are trying to conceive. Precise instructions for women concerning healthy lifestyle adoptions are warranted.

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