



IJCRR
Section: Healthcare
Sci. Journal Impact
Factor: 6.1 (2018)
ICV: 90.90 (2018)

Scopus[®]

Effect of Feminine Obesity on the Outcome of Oocyte in Subfertile Females

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ABSTRACT

Introduction: Rising levels of obesity pose a public health problem globally. Approximately 1.6 billion adults were overweight by having (BMI 25-30 kg / m²) and 400 million (BMI > 30 kg / m²) in 2005 globally. In general, obese women have lowered oocyte production, lower developmental output, and poor clinical experiences while undergoing assisted reproductive (IVF) treatment. The aim of this study was to perform a preliminary assessment of the influence of BMI on quality oocyte outcome i.e. finally impact on IVF outcome in these patients and to provide data for future trials in this field.

Aim and Objectives: To study the effectiveness of body mass index on oocyte quality in subfertile females.

Materials and Methods: This study is done in Wardha test tube baby centre AVBRH (SAWANGI) WARDHA Relevant data on the demographics and treatment history of 40 subfertile female patient as well as the indications for IVF treatment were recorded.

Observation and Result: Patient in 21-24 BMI group 80% of them found with increased metaphase II stage oocyte retrieval. In BMI group 25-29, 45% patients observed with increase in metaphase II oocyte. In the BMI group of 30-34 only one out of 6 patients observed with increased oocyte quality remaining 5 showed negative responses.

Conclusion: Increase in BMI in ovulatory women may be inversely proportional to affect the outcome of treatment with ovulation induction and finally on the likelihood of pregnancy.

Key Words: Body Mass Index [BMI], IVF, Oocyte quality

INTRODUCTION

Rising levels of obesity pose a public health problem globally. Approximately 1.6 billion adults were overweight by having (BMI 25-30 kg / m²) and 400 million (BMI > 30 kg / m²) in 2005 globally. Such estimates are expected to increase to 2.3 billion and 700 million by 2015¹. However the prevalence rate of obesity is relatively lower in Asian countries, i.e. 4% of Chinese and 0.5 percent of Indian women². The study revealed that time to conception can be increased in the Obese women than in normal weighted women^{3,4,5} and the risk of anovulatory infertility is 2.7 (95% CI, 2.0-3.7) in women at age 18 with BMI ≥ 32 kg/m². one meta-analysis study concluded that obese or overweight women had significantly lower clinical pregnancy rates (CPR) and live-birth rates, along with miscarriage rates were significantly

higher compared in women with a BMI <25 kg/m². In general, obese women have lowered oocyte production, lower developmental output, and poor clinical experiences while undergoing assisted reproductive (IVF) treatment^{8,9,10}. In this context, evaluating the impact of BMI on the outcome of oocyte quality among the non-obese women and obese women would be important. The aim of this study was to perform a preliminary assessment of the influence of BMI on quality oocyte outcome i.e. finally impact on IVF outcome in these patients and to provide data for future trials in this field.

AIM AND OBJECTIVES

To study the effectiveness of body mass index on oocyte quality in subfertile females.

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ISSN: 2231-2196 (Print)

ISSN: 0975-5241 (Online)

Received: 14.05.2020

Revised: 06.06.2020

Accepted: 15.06.2020

Published: 21.07.2020

MATERIALS AND METHODS

This study was one in Wardha test tube baby centre AVBRH (SAWANGI) WARDHA Relevant data on the demographics and treatment history of 40 subfertile female patient as well as the indications for IVF treatment were recorded. Serum cortisol level of all participants was analyzed and then stimulated using a routine short antagonist protocol. The routine protocol in our set up was as follows: Ovarian stimulation with recombinant follicle stimulating hormone (FSH) or purified urinary human menopausal gonadotrophin (HMG) along with baseline sonography started on cycle Day 2. The dose of gonadotropins was individualized according to the patient's age and previous stimulation history or response to stimulation. Cycles were monitored by Trans Vaginal Ultrasonography and serum Estradiol, FSH, LH and Progesterone levels. Follicular maturation was completed by the administration of 10,000 IU hCG injection or injection leuprolide 0.2mg, when at least two follicles will be reached a diameter of >17 mm. After oocyte pick-up (OPU) quality of oocyte was monitored.

Observation and result

In this study, patient participated from different groups of BMI i.e. from Underweight to obese category. The maximum patient who participated in this study were belonging to the 25-29 BMI group. [Table 1, Pie Diagram 1]

Table 1: BMI and patient attended intervention program

BMI	No of patient
16-19	02
20-24	10
25-29	22
30-34	06
≥34	00
Total	40

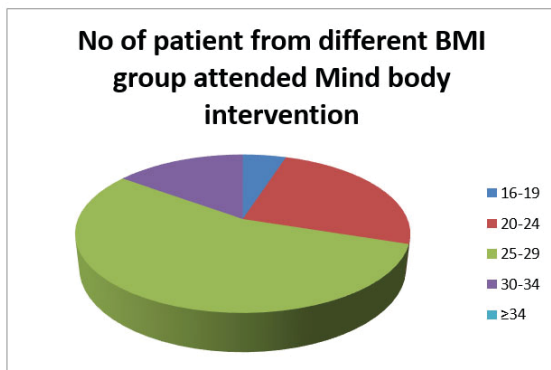
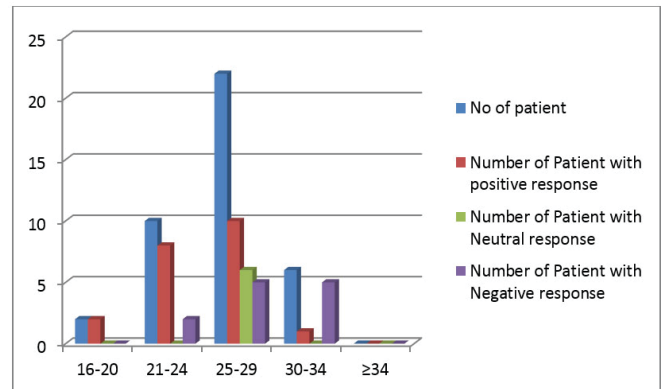


Diagram 1: Showing BMI and patient attended intervention program.

The patient in 21-24 BMI group 80% of them found with increased metaphase II stage oocyte retrieval. In BMI group 25-29, 45% patients observed with an increase in metaphase II oocyte. In the BMI group of 30-34, only one out of 6 patients observed with increased oocyte quality remaining 5 showed a negative response. [Table 2, Pie Diagram 2]

Table 2: BMI Wise distribution of patient and its correlation with patient response in terms of Metaphase II stage oocyte retrieved

BMI	No of patient	Number of Patient with positive response	Number of Patient with Neutral response	Number of Patient with Negative response
16-20	02	02	00	00
21-24	10	08	00	02
25-29	22	10	06	05
30-34	06	01	00	05
≥34	00	00	00	00
Total	40	21	06	12



Pie Diagram 2: BMI Wise distribution of patient and its correlation with patient response in terms of Metaphase II stage oocyte retrieved.

DISCUSSION

The prevalence of underweight infertile women was 3 percent, normal weight 17 percent, and overweight 42 percent, regardless of the causes of infertility¹¹. Studies also have been shown that there are no significant differences in the number of oocytes obtained among all groups^{12,13}. From both clinical data and animal studies it is obvious that obesity has a negative impact on oocyte growth performance¹⁴. Literature indicates that women who are overweight face a lesser chance of pregnancy and an increased risk of post-IVF abortions. They have also reduced the number of retrieved oocytes even with higher doses of gonadotrophins.¹⁵ This is in favor of our study. It also reported that the number of patients with positive human serum chorionic gonadotrophin

decreased considerably as BMI increased.¹⁶ Similar findings were observed in the polycystic ovarian syndrome (PCOS) patients, They observed that the rates of clinical pregnancy in the obese group were lower than in the other BMI groups, particularly in the age group of about 35 years.^{7,17} this again goes consistent with our findings showing that BMI is positively correlated with oocyte retrieval. According to this observation, we suggest that good oocyte retrieval may be affected by the obese surroundings. This could be the reason for the subfertile condition in obese women.

CONCLUSION

Obesity has a great impact on fertility and fertility treatment in women. An increase in BMI decreases the chance of conception in ovulatory women. It also affects the outcome of ovulation induction treatment. Obese women require higher doses of gonadotrophins, give poor response to ovarian stimulation, and have fewer oocytes harvested. Obesity is associated with low fertilization rates, poor quality embryos and higher miscarriage rates. Weight loss in these women improves their reproductive outcomes; however, in order for this to be effective, it has to be gradual and sustained. Hence, an increase in BMI in ovulatory women may be inversely proportional to the outcome of treatment with ovulation induction and finally on the likelihood of pregnancy.

Acknowledgement: Authors acknowledge the immense help received from management of Datta Meghe Institute of Medical Sciences, Sawangi, India for providing support to conduct this study.

Conflicts of Interest: Nil

Source of Funding: Nil

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