



IMPACT OF OBESITY ON MALE AND FEMALE REPRODUCTION: A REVIEW

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ABSTRACT:

Obesity and overweight have in the last decade become global problem according to World Health Organisation(WHO).Recent researches suggest that rise in obesity is primary due to altered sedentary lifestyle, energy dense diet and low level of physical activity. Obesity is considered as a worldwide epidemic disease. It is one of the alarming health problems in modernized societies that lead to infertility. Nutritional and lower educational level in Low – Income Womentrying to conceive should be provided healthy programsin reproductive clinics. It has reached pandemic proportional with 1.6 millions adult classified as overweight and further 400 millions adult classified as obese.It counts for 7.5 % of total world burdens of disease. The effect of obesity on male reproduction are less well documented then in female.

Studies reveal that male obesity is due to reduction in sperm concentration and total sperm count motility and increase in sperm DNA damage and changes in reproductive hormones. The effect of obesity on male fertility is thought to be multifactorial and may be modulated by genetic and decline environmental influences.Obesity has a serious impact on various aspect of female reproductive functions. In this review, the fertility problem in obese women had discussed.Obese women have increased risk of infertility and pregnancy complication, preterm birth, miscarriage, ectopic pregnancy, polycystic ovary syndrome, irregular menstrual cycle due to hormonal imbalance and thyroid dysfunction etc.

This article reveals study linking the pathology of obesity to male and female infertility. Present paperdiscussednew detailed current information showing how obesity influence over male and female reproduction.It recommended that there should be future investigative ongoing research on 'Impact of Obesity on Male and Female Reproduction'.

Keyword: Obesity, infertility, hormonal, reproduction, pathology.

INTRODUCTION:

In this new century, obesity and overweight address a significant matter of general wellbeing. As per the World Health Organization, the overall commonness of obesity has nearly multiplied starting around 1980. In 2008, around 35% of the grown-ups over the age of twenty were overweight and 11% were fat.. At first thought to be a condition ordinarily found in major league salary social orders, weight turned pestilence additionally among the emerging nations. As a result, more than half of the world's population lives in countries where overweight and obesity have a higher impact on mortality than underweight. Over 200 millions men and nearly 30 millions women are obese. Imbalanced diet along with bad nutritional habits, mental stress and alteration on junk or fast food such as insufficient sleep behavior and other factors contribute day to day to the epidemic explosion of obesity. The growing prevalence of obesity may be attributed to increased intake of high-caloric food. Subsequently, the greater part of the total population lives in nations where overweight and heftiness highly affect mortality than underweight. Obesity is a medical condition in which excess body weight has accumulated to the extent that it may have adverse effect on health leading to reduced life expectancy for increase health problem. Obesity increases the risk of various diseases particularly heart disease, type 2 diabetes, obstructive sleep apnea, certain type of cancer and osteoarthritis. Obesity is most commonly caused by a combination of excessive food energy intake, lack of physical activity and genetic susceptibility. Although a few cases are caused primarily by genes and endocrine disorder. Obesity is a complex disease resulting from the interaction of wide variety of hereditary and environmental factors. People are considered as obese, when the body mass index (BMI) a measurement obtained by dividing a person's weight in kilogram by a square of the person's height in metre exceed 30 kg/m³. At present, worldwide obesity rates have doubled and currently over 10% of population is obese. In 2008, over 1.4 billion adult age 20 years above are obese having the BMI above a healthy weight.

REVIEW OF LITERATURE:

Obesity is found to have adverse effect on reproduction in both sexes. The effects of obesity on male reproduction are less well documented than in the female. (Sallmen *et al.* ,2006).The effect of obesity on male and female fertility is

thought to be multifactorial and may be modulated by genetic, endocrinological and environmental influences. In another study, overweight and obese men had reduced sperm motility and increased sperm DNA fragmentation (Kort *et al.*, 2006). Obesity has been associated with physiological, hormonal and sexual dysfunction. (Esposito and Giugliano, 2005; Bacon *et al.*, 2006), therefore reduced intercourse frequency could be a mediating factor by which obesity produces infertility. Sex hormone imbalance may affect reproduction in both male and female, and excess weight can affect male hormone levels (Jensen *et al.*, 2004; Roudebush *et al.*, 2005; Fejes *et al.*, 2006). A significantly reduced testosterone to estradiol ratio has been observed among overweight or obese men (BMI >25) when compared with men with lower BMI (Fejes *et al.*, 2006). Men with higher BMI have also exhibited altered quantity and quality of sperm (Jensen *et al.*, 2004; Magnusdottir *et al.*, 2005; Fejes *et al.*, 2006; Kort *et al.*, 2006). Obesity has a serious impact on various aspect of female reproductive function. Overweight and obese female are prone to numerous pathological conditions in relation to reproduction. While women's obesity has been studied with regard to infertility, there is little population-based data for men. (Grodstein *et al.*, 1994; Jensen *et al.*, 1999; Rich-Edwards *et al.*, 2002; Pasquali *et al.*, 2003; Norman *et al.*, 2004), Obese women have an increased risk of infertility and pregnancy complications. (Weinberg, 1993). Over and above decrease in ovulation rates, obesity also increase the rates of miscarriage thus further decreasing successful pregnancy rate in obese women. Overweight women are 50% more likely to have ectopic pregnancy. A complex set of hormones work in balance to control menstrual cycle ovulation and development of endometrium. Obesity has been demonstrated to disturb the hormonal imbalance in reproductive process via several direct and indirect mechanism. (Azziz, 1989). Adipose tissue has been shown to disturb sex hormones secretion and bioavailability. Adipose tissue is the important site of steroid production and metabolism. Indirectly obesity in female, exerts its negative effect on reproduction.

In this review, focus on the fertility problem in obese men and women are discussed. Perhaps there is a well establish connection between obesity and reproductive problem which ultimately has an adverse effect on fertility.

IMPACT OF OBESITY ON MALE REPRODUCTION:

Obesity in men is associated with infertility. Infertility in men constitute 25 to 30% of all the cases. Numerous reasons have been proposed for the decline in male fertility. Reduced semen quality has been found to be a universal trend in last few decades due to changes in lifestyle of civilized community around the world. Obesity can negatively affect reproductive hormones, reduce semen quality, increased adipose hormones and genetic and sexual mechanism. Male obesity mainly shows reduced sperm concentration. (Jensen *et al.*, 2004; Magnusdottir *et al.*, 2005; Fejes *et al.*, 2006; Kort *et al.*, 2006). Obesity affects male infertility by influencing the hypothalamic - pituitary- gonadal axis which are interconnected and provide infertility about physiological and pathological changes in testis formation causing detrimental effect upon spermatogenesis. Studies on male obesity also reveals that excess of adipose tissue can alter the relative ratio of testosterone and oestrogen. Research carried out on overweight related to infertility indicates that when the body weight of men increases, the level of testosterone decreases. Healthy men having their body weight in the normal range are known to have high sperm count as compared to obese men. Obese men have low testosterone levels and high oestrogen levels. This imbalance in hormone levels decreases sperm production and hence affects fertility in obese men.

Leptin is a protein produced by fatty tissue that plays an important role in controlling food intake and regulate the reproductive function. Due to storage of fat in body, leptin levels increases, the brain act to decrease food intake and increase energy expenditure. Excess leptin decreases lehdig cell function (decrease intratesticular testosterone) and has a direct negative effect on sperm and therefore plays an important role in relationship between obesity and fertility. Abnormal spermatogenesis arising from obesity is associated with defective sperm capacitation and bring deleterious effect upon the hormonal and molecular mechanism controlling spermatogenesis and male fertility.

Studies have revealed that an obese / overweight men show much less interest in indulging in sexual activities as compared to men with normal body weight. In fact, obese men are known to suffer from performance problems and hence, they tend to avoid sex altogether. While this in itself may not indicate that obesity leads to infertility, what complicates the matter is the fact that their performance issue is often due to erectile dysfunction. Obesity or overweight can

damage the blood vessels and cause erectile dysfunction. Sperm cells need a precise environment for their production and growth. This environment must be two to four degrees less than the body temperature. In the case of obese men, the layers of fat tissue in the thigh and groin areas increase the temperature of the testicles. This leads to a negative effect on the quantity and quality of sperm. Obese men were 42% more likely have a low sperm count than the normal weight and 81% are likely to produce no sperm. Increase obesity is also a result of exposure to environmental pollution during foetal and adult life.

IMPACT OF OBESITY ON FEMALE REPRODUCTION:

Obese women have more infertility and are less successful at conceiving than women of normal weight. It was observed that obese women had 45% lower fertilization rate when compared with normal women. Obesity is common at puberty, pregnancy, menopause due to active secretion of reproductive hormones by endocrine glands. Once pregnant, obese women are more likely to have complicated pregnancy and are likely to have life born babies because at a higher rate of miscarriage, ectopic pregnancy and stillbirth. The babies born to obese women are more likely to die in the first month of life. Babies of overweight or obese mother gained less weight and groove less in length than babies of normal weight women. It implies that the obesity epidemic is harming children while they are still in womb.

Babies experiences distress labor in the pregnancies of obese women. As a result of this problem, obese women are delivered by cesarean than women at of normal weight. Maternal obesity is associated with increased morbidity and mortality for both mother and offspring. A complex set of hormone work in balance to control menstrual cycle, ovulation and development of endometrium. Obesity has been demonstrated to disturb hormonal imbalance in reproductive processes via several direct and indirect mechanism. Adipose tissue has been shown to disturb sex hormone, secretion and bioavailability. Adipose tissue is the important site of steroid production and metabolism. Indirectly, obesity exert its effect via leptin and insulin hormone.

Obesity decreases successful pregnancy rate in both natural and assisted conception cycles. The mechanism by which obesity reduces pregnancy rates are complex and multifactorial. Insulin resistance appears to be a key factor of obesity. It decreases ovulation rates and increase biochemical abnormalities.

Insulin resistant also causes Polycystic ovarian syndrome (POS). Obesity in peri-pubertal girls may also be associated with increased level of the hormone androgen (hyperandrogenemia) which may have the risk of adolescent polycystic ovary syndrome.

The increase insulin resistance in obese pregnant woman leads not only to pregnancy complication for the mother but also greater growth and disproportionally greater fat deposition for the baby. Decrease in ovulation rates, increase the rate of miscarriage is further decreasing successfully pregnancy rate in obese women. It is observed that women particularly those with central obesity are less likely to conceive per cycle. Obese women suffer menstrual cycle disturbance and up to three times more likely to suffer oligo /anovulation (less or no ova formation). It has been observed overweight women had significantly fewer oocyte numbers. It was also studied that interfollicular human chorionic gonadotrophic (HCG) concentration was significantly lower in obese women.

Overweight women were 50% more likely to have ectopic pregnancy (a pregnancy outside of the uterus usually in the fallopian tube). It has been observed that hormonal imbalance regulate follicular development and oocyte maturation, but obesity causes hormonal imbalance. Leptin, a hormone produced by adipocytes is elevated in obese women and this result with impaired fecundity, reduce ovulation, affect endometrial development and implantation. It has been studied that increased level of leptin and low level of adenopectin reduces conception rates.

Obesity during childhood advances puberty in girls at an early age and delayed puberty in boys. Obese women may have reduced fertility due to psychological and socio-biological factor. Sexual function may also be affected by obesity. Prolonged time to conception could be secondary to a comparative reduction in sexual frequency. It has been demonstrated that these people do not have sexual intercourse as frequently as thinner people. Obese women are likely to experience sexual dysfunction. It was suggested that the decreased sex drive in the obese women may be derived due to decreased level of dopamine activity and increased level of serotonin level in the brain.

CONCLUSION:

Excess weight and obesity have become a serious world problem of both adult male and female throughout the world. The purpose of this review is to

provide and increase public awareness about obesity and its impact on male and female reproductive function. Obesity not only affects reproduction processes, but it also has important consequence upon the health and of outcome of infertility. Present review that BMI is a factor having a detrimental impact on the hypothalamus pituitary- gonadal (HPG) axis in both men and women. According to the study, it is observed that obesity have greater influence on women than men regarding hormone level, gametogenesis and Assisted Reproductive Technology.(ART). Obese and overweight female should be advised to overcome the poor obstetrical problems due to obesity. Although there is ART, treatment should not be delayed too much owing to obesity and increasing age.

Nutritional and lower educational level in Low- Income Women trying to conceive should be provided healthy programs in reproductive clinics. It is essential to identify Clinical and Pathological complication regarding obesity in both male and female.

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