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ASSOCIATION OF OBESITY IN FEMALE REPRODUCTION

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The evident yet regrettable trend of a widespread obesity epidemic has presented a significant threat to global public health. The World Health Organization characterizes obesity as an abnormal or excessive buildup of fat that adversely affects health. Body mass index (BMI) serves as a crucial metric for assessing obesity and normative weight. Obesity now affects more than 21% of women of reproductive age worldwide. Obesity adversely impacts numerous facets of women's health by elevating the risk of comorbidities like cardiovascular disease, diabetes, surgical morbidity, endometrial cancer, and gestational complications. Moreover, obesity impedes women's reproductive capacity and is linked to anovulation, polycystic ovarian syndrome (PCOS), and infertility.

This article seeks to examine the correlation between obesity and comprehensive female reproduction, encompassing the hypothalamic-pituitary-ovarian axis, oocyte maturation, and embryo and fetal development, while incorporating obesity-induced inflammation and associated maternal and fetal complications.

This article reviews all literature indexed in Google Scholar and PubMed about the impact of obesity on female fertility. The inquiry commenced in December 2024 utilizing the search term "Obesity as a risk factor in pregnancy," restricted to publications from 2010 onwards. Articles authored in English from the United States, China, Africa, and India were incorporated. A comprehensive review of the reference lists of the selected papers was conducted to find any relevant articles related to the research. Only 43 articles, discovered by the search methodology, were included in this review. The predominant research encompassed in the analysis consisted of cohort studies, case series, and qualitative studies.

Obesity may influence multiple elements of the hypothalamic-pituitary-ovarian axis, thereby exerting a direct impact on ovarian function. It can lead to earlier thelarche, adrenarche, and menarche, reduced pituitary luteinizing hormone (LH) pulse amplitude, LH secretion and compromised luteal phase. Obesity adversely affects oocyte quality, resulting in diminished Graafian follicles and lower number of mature oocytes. This results from lipotoxicity, mitochondrial malfunction, impaired meiotic spindle formation, alterations in DNA methylation and an elevated apoptotic index. Subpar oocyte quality in obese women is associated with diminished early embryonic developmental competence, reproductive defects, such as implantation errors and miscarriages. The developing embryo is directly impacted by altered amounts of adipokines, including leptin, in the obese condition, which in turn affects steroidogenesis. There is evidence of poor stromal decidualization in obese women, which makes the endometrium susceptible as well. Studies indicated that obese mothers had higher rates of preeclampsia (1.58 vs. 0.54), cesarean section (25.37 vs. 10.06), and fetal macrosomia (12.68 vs. 5.47) compared to mothers with normal BMI. Pregnancy issues associated with obesity may directly affect the health of the offspring, including cardiovascular anomalies and inflammatory responses. In vitro studies utilizing assisted reproductive technologies (ARTs) have demonstrated that mothers with obesity have a reduced likelihood of attaining clinical pregnancy following IVF compared to women of normal weight.

The systemic impacts of obesity, including hormone imbalances and inflammation, interfere with the complex mechanisms of female fertility. The efficacy of assisted reproductive methods, such as IVF, is affected by obesity, underscoring the importance of maintaining an ideal body mass index. Therefore, addressing the nexus of obesity and infertility is essential for enhanced reproductive outcomes globally