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Title: THE EFFECT OF LOW BODY MASS INDEX (BMI) ON OOCYTE QUALITY IN IVF CYCLES

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Objective: The impact of low BMI on oocyte quality and IVF outcomes has not been clearly established. The aim of this study was to determine if women with a low BMI produce oocytes of lesser quality and have poorer outcomes with IVF compared to normal weight women.

Design: Cross-sectional study.

Materials and Methods: Data for 256 women undergoing their first ICSI or oocyte cryopreservation cycles at a single center between 2011-2012 were analyzed. Participants were classified into two groups based on BMI, less than or equal to  $19 \text{ kg/m}^2$  ( $n=51$ ) and  $19.1-25 \text{ kg/m}^2$  ( $n=205$ ). The primary outcome was oocyte quality as determined by qualitative descriptors provided by the embryologist at the time of oocyte retrieval. Oocytes described as being granular or having vacuoles, dark cytoplasm, debris or inclusions were considered poor quality. Secondary outcomes included fertilization, day 5 blastulation rate, implantation rate, clinical and ongoing pregnancy rate. Logistic regression analyses adjusted for age were used to determine the association between BMI and outcomes of interest.

Results: Underweight women had a higher prevalence of poor quality oocytes compared to normal weight women (31% vs. 19%,  $p = 0.055$ ). When controlling for age the multivariate model found that being underweight was associated with an almost 2 fold increased odds of poor oocyte quality (OR 1.93, 95% CI 0.95 - 3.82). The blastulation rate was significantly lower in underweight women than normal weight women (19% vs. 35%,  $p < 0.05$ ). There were no differences in the number of oocytes retrieved, fertilization rate, clinical or ongoing pregnancy rates between the two groups.

Conclusions: Underweight women have a strong trend toward a higher prevalence of poor quality oocytes compared to normal weight women. Although no differences in pregnancy rates were observed, the significantly lower blastulation rate in underweight women could suggest underlying poor oocyte quality. These findings warrant further investigation with a larger study population.