Evidence Based Practice Critically Appraised Topic

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Clinical Scenario:

A 28 year old male with a BMI of 34.6 trying to conceive with his 27 year old wife for 14 months. The patient is wondering if his obesity is causing the infertility.

Clinical Question:

In males without a known factor to affect fertility, does obesity versus a normal weight contribute to infertility?

Articles:

Nguyen, R., Wilcox, A., Skjaerven, R., & Baird, D. (2007). Men's body mass index and infertility. Human Reproduction, 22 (9), 2488-2493.

Hammoud, A., Wilde, N., Gibson, M., Carrell, D., Parks, A., & Meikle, A. (2008). Male obesity and alteration in sperm parameters. *Fertility and Sterility, 90* (6), 2222-2225.

Critical Review of Study:

- Summary of Key Evidence
    - *Study design:*
        - Hammound et al (2008) is a retrospective cohort study level IIb to study the effect of male obesity on sperm parameters and erectile dysfunction.
        - Nguyen et al (2007) is a retrospective cohort study level IIb investigating whether higher BMI among men is associated with infertility and if so, to what extent that effect might be mediated by altered sexual function.
    - *Sample:*
        - Hammound et al. sample consisted of 526 males who presented for infertility evaluation. Males with a male factor known to affect fertility were excluded, so there were 390 males included in the study.
        - Nguyen et al. sample included 26,303 couples with planned pregnancies.

- *Method:*
  - Hammound et al. method to obtain data included the males reporting their weight and height and filling out an intake form with questions regarding the existence of factors that affect male fertility. Male subjects were divided into three groups: normal weight (BMI <25), overweight (BMI >25 and <30), and obese (BMI >30) and all underwent comprehensive semen analysis. Distribution of the BMI groups included: normal weight 24.1% (94 of 390), overweight 43.1% (168 of 390), and obese 32.8% (128 of 390). Prevalence of oligozoospermia, low total progressively motile sperm per ejaculate, and decreased percentage of normally formed sperm was calculated and compared among the three BMI groups.
  - Nguyen et al. method to obtain data included questionnaires assessing mother's and father's height and weight and time to pregnancy. Couples were considered infertile if they took >12 months to achieve pregnancy or received infertility treatment. Women reported the height and weight of the child's father at the time of the questionnaire. Classification of BMI was: overweight (25-29.9), obese (30-34.9), and severely obese (>35). The sample was divided into eight BMI categories.
- *Results*
  - The results of Hammound et al. included: the overall prevalence of oligozoospermia was 10.5% and increased with increasing BMI. The ratio of oligozoospermia in obese patients compared with patients with a normal BMI was 3.3. The prevalence of low progressively motile sperm count increased with BMI. The ratio of having a progressively motile sperm count in obese patients compared to patients with a normal BMI was 3.4. When obese patients were compared to non-obese patient the ratio of having a high percentage of abnormal morphology was 1.6.
  - The results of Nguyen et al. included 12% (3113) of the couples were infertile with 42% (1322) having received infertility treatment for the current pregnancy. Infertility was significantly related to the men's BMI. After adjusting for the woman's own BMI and the ages and smoking habits of both partners, overweight men had a ratio for infertility of 1.19 relative to men with normal BMI. For obese men, the ratio was 1.36. The association shows a general increase in ratio with higher BMI. Ultimately, the data suggests an increase in male adiposity was associated with increased infertility.

Clinical Bottom Line

Both studies suggest an increase in risk of infertility with an increase in BMI especially if the male is overweight or obese. There is a strong relationship between overweight and obesity and altered sperm parameters. Obesity is associated with a higher incidence of oligozoospermia, reduced motile sperm count, and abnormal morphology.

The strength of Nguyen et al. is there was a very large sample size to evaluate. Also, in Hammound et al., the people that were being evaluated for infertility were the males evaluated for increasing risk of infertility and increased BMI, so it was a good indicator of the people who were having infertility issues. Some of the weaknesses in Hammound et al. included the selection of patient population was couples who presented for infertility treatment, so it did not evaluate the general population. The self-reported height and weight were used to calculate the BMI, which may not have been accurate. Nguyen et al. limited their study to planned pregnancies. The men's BMI was provided by the women, so there may be misreporting of data. BMI was used as an indicator for overweight and obesity, but it does not distinguish between adipose tissue versus muscle, so the BMI does not individualize differences in body composition. Also, the question of the BMI was asked during the woman's pregnancy and the time period for the BMI effect on pregnancy is before pregnancy, so this may have been years before pregnancy. Opportunity for this research includes information regarding infertility and obesity, which may be causing or contributing to infertility. A threat to the studies may be that the males were not randomly selected. In one study they were there for infertility treatment and the other it was because the woman was already pregnant. Further studies are needed to define the extent of the relationship and examine the effect of weight loss of sperm parameters, and future studies would benefit from collection of BMI data at the start of pregnancy attempt instead of once infertility is established.

This has relevance to clinical practice because obesity is rapidly increasing worldwide, and excess weight is not only linked to increased risk of chronic disease, but also has been shown to increase risk of reproductive problems because of the significant disturbance in hormonal balance. If a couple is having infertility issues and male is overweight or obese, it may be contributing to the infertility.