Overweight and obesity in infertility: cost and consequences

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The global epidemic of overweight and obesity is rapidly becoming a major public health problem in many parts of the world. More than half of all women in the United States (USA) and United Kingdom (UK) are either overweight or obese (Ogden et al., 2006; Balen and Anderson, 2007). Along with the other conditions, such as diabetes and hypertension, obese women are more likely to experience reproductive problems (Clark et al., 1998). There have been concerns that fertility treatments for overweight and obese women lead to lower success rates and increased costs. Hence some health care settings include strict upper limits for body mass index (BMI) for access to fertility treatments especially assisted reproduction treatment (ART; Farquhar, 2006; Gillet et al., 2006; Zachariah et al., 2006).

Numerous studies have been published in the last decade exploring the effect of BMI on outcomes, especially for ART. Some have shown detrimental effects of raised BMI (Wang et al., 2000; Winter et al., 2002), although others have failed to do so (Lashen et al., 1999; Dechaud et al., 2006; Dokras et al., 2006). These differences could be explained by considerable clinical, methodological and statistical heterogeneity in studies in terms of (i) population included, (ii) stimulation protocols, (iii) their definition of normal BMI and thresholds for defining overweight as well as obesity and (iv) numerators as well as denominators used to report outcomes. Even small variations in these factors can give a large difference in odds ratio when determining the effect of BMI. This problem is encountered in most studies on infertility treatments.

Despite concerns regarding costs, there are few studies on economics of infertility treatment in overweight and obese women. Our group published costs of live birth (derived from patient level data) in women undergoing ART only, stratified by WHO defined BMI groups, earlier in this year (Maheshwari et al., 2009).

Koning et al. (2009), published in this issue, have developed a framework for evaluating the costs and outcomes of fertility care, from a hospital perspective. From an extensive literature searches, the authors derive the success rates for women undergoing ovulation induction, intrauterine insemination and in-vitro fertilization. They then went on to do the modeling, although simplistic, to calculate costs per live birth based on hypothetical cohort of 1000 women in ovulatory and anovulatory group separately. They have concluded that there is an increased cost per live birth through the path of infertility treatment for overweight (BMI ≥ 25) and obese (BMI ≥ 30) women when compared with those with normal BMI. Koning et al. (2009) have not incorporated the costs of stimulating drugs. Even though previous studies vary in their conclusions about pregnancy rates, there is robust evidence that overweight and obese women require higher doses of gonadotrophins. Inclusion of costs of stimulating drugs will further strengthen the argument for increased cost.

In their calculations, cost per live birth for a normal weight ovulatory woman is higher than obese anovulatory women. This may be due to the fact that anovulation is corrected mostly by ovulation induction, whereas a higher proportion of ovulatory women would need ART which is expensive, more so in overweight and obese women (according to this framework).

These findings, though important, should be taken cautiously, as this model is based on data from varied observational studies, hence there is an inherent risk of bias, despite robust methodology. In addition, there is an assumption that every patient will follow the same pathway, which may not represent every overweight and obese woman. There may be other factors such as sperm dysfunction, tubal factor and access to public funding, that may determine the treatment pathway a woman follows.

This study however also concludes that reduced effectiveness with raised BMI is not a reason to withhold treatment. This has been the subject of a recent debate (Vahratian and Smith, 2009). There is predictably reduced success rate with advanced age, however, it is well-accepted practice to treat older women worldwide. Therefore, disadvantaging individuals with raised BMI must be justified. Although, there may be case for rationing where public funding is available; rationalization for a specific cut-off BMI is questionable.

There is limited information in the literature on outcomes after fertility treatments for women with BMI > 35. Hence most data are based on BMI 18.5–35. According to the WHO, there are principal cut-off points for BMI (<18.5, 18.5–24.9, 25–29.9, 30–34.9, >35). In recent years, there is a growing debate as to whether there is a need for developing different BMI cut-off points for different ethnic groups, due to the increasing evidence that the associations between BMI, percentage of body fat and body fat distribution differs across populations (http://apps.who.int/bmi/index.jsp?introPage=intro_3.html). Hence,
even where studies have used same BMI thresholds, which is usually not the case, the same conclusions may not be applicable to diverse ethnic populations.

Access to individual patient data, rather than meta-analysis of published heterogeneous observational studies, from large datasets may allow adjusting for confounders, most important being age. This may generate a more accurate assessment of impact at various BMI thresholds on meaningful outcomes, such as live births. However, unlike age, BMI data does not seem to be recorded in National databases such as Human Fertilization and Embryology Authority (HFEA, UK). In the absence of such data, with controversial evidence from various studies, on the effect of BMI on outcomes of ART, it is difficult to justify a specific cut-off to access treatment, especially as most fertility care across the world is not publically funded.

Obstetric risks associated with obesity are often quoted as most important factor having a cut-off BMI for fertility treatment. Although the case against morbid obesity is clear, the upper limit of BMI, compatible with an acceptable risk profile in pregnancy, is still to be determined.

The framework by Koning et al. (2009), like most on this topic, considers BMI to be a marker of obesity. There are suggestions that waist-hip ratio (WHR) is a better predictor of reproductive outcome (Zaadstra et al., 1993; Wass et al., 1997), as BMI does not differentiate between android and gynecoid fat distribution. However, there are no further studies on effect of WHR in women undergoing fertility treatments.

There is little doubt that women who are trying to conceive should follow healthy lifestyle and attempt to attain a normal BMI. This should be emphasized in preconception counseling. In anovulatory overweight and obese women, weight loss should be the first line of treatment (Clark et al., 1998). As many of these women have polycystic ovarian syndrome, weight loss will reduce their long-term risks such as endometrial cancer and diabetes.

However, when it comes to fertility treatment in women with regular ovulation there are questions still to be answered; (i) How much the success rate of an individual couple is affected? (ii) Should there be a BMI cut-off to access treatment? (iii) Should that cut-off applies to all fertility treatments or only ART?

Despite all the limitations of the available data, as infertility healthcare providers, we have a unique opportunity. Women should be counseled about implications of increased BMI on reproductive outcomes and general health. Weight loss should be encouraged in those undergoing fertility treatment, not only for obese but for overweight women as well, especially where age permits i.e. younger women with good ovarian reserve. For those with reduced ovarian reserve, individualized judgment is recommended by balancing improvement in live birth by reducing weight versus reduction in success rate due to increasing ovarian age.

References


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