Body mass and probability of pregnancy during assisted reproduction treatment: retrospective study

J X Wang, M Davies, R J Norman

Being underweight or overweight has an adverse effect on reproduction. Overweight women have a higher incidence of menstrual dysfunction and anovulation, possibly because of altered secretion of pulsatile gonadotropin releasing hormone, sex hormone binding globulin, ovarian and adrenal androgen, and lutetinising hormone and also because of altered insulin resistance. The prevalence of obesity in infertile women is partly because of repeat sampling of a core group of HIV-1 infected men with repeated new infections. If so, it will represent a marker of significant risk for HIV-1 transmission in the population. These men probably have more partners and engage in riskier sex than those without an acute sexually transmitted infection. The facilitatory effect of many acute infections on HIV-1 transmission may also have contributed to the higher prevalence. Health promotion directed at this group of men should be intensified.

Participants, methods, and results

The participants were 3586 women who received assisted reproduction treatment between 1987 and 1998 in a tertiary medical unit in Adelaide, South Australia. The difference in trends between men with and without acute sexually transmitted infections may be partly because of repeat sampling of a core group of HIV-1 infected men with repeated new infections. If so, it will represent a marker of significant risk for HIV-1 transmission in the population. These men probably have more partners and engage in riskier sex than those without an acute sexually transmitted infection. The facilitatory effect of many acute infections on HIV-1 transmission may also have contributed to the higher prevalence. Health promotion directed at this group of men should be intensified.

Contributors: MAC, ONG, and DM conceived and designed the study; PAR was responsible for the statistical analysis in collaboration with CAMG and LEJ. CAMG and LEJ coordinated the study; CAMG interpreted the data together with MAC and PAR. MAC, CAMG, and ONG prepared the paper in consultation with the other authors. MAC is the guarantor for the paper. Funding: Department of Health. Competing interests: None declared.


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Influence of body mass on probability of pregnancy during assisted reproduction treatment. Figures are values (SD) unless stated otherwise

<table>
<thead>
<tr>
<th>Category</th>
<th>Body mass index</th>
<th>No of women (n=3586)</th>
<th>Age (years)*</th>
<th>No of embryos transferred</th>
<th>No of cycles</th>
<th>% achieving at least one pregnancy</th>
<th>Odds ratio†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;20</td>
<td>441</td>
<td>31.6 (4.5)</td>
<td>2.4 (0.8)</td>
<td>2.3 (1.5)</td>
<td>49</td>
<td>0.81 (0.65 to 1.01)</td>
</tr>
<tr>
<td>Moderate</td>
<td>20-24.9</td>
<td>1910</td>
<td>32.9 (4.7)</td>
<td>2.4 (0.7)</td>
<td>2.3 (1.7)</td>
<td>48</td>
<td>1</td>
</tr>
<tr>
<td>Overweight</td>
<td>25-29.9</td>
<td>814</td>
<td>33.0 (4.8)</td>
<td>2.4 (0.8)</td>
<td>2.2 (1.5)</td>
<td>42</td>
<td>0.81 (0.68 to 0.97)</td>
</tr>
<tr>
<td>Obese</td>
<td>30-34.9</td>
<td>204</td>
<td>32.8 (4.7)</td>
<td>2.4 (0.7)</td>
<td>2.1 (1.4)</td>
<td>40</td>
<td>0.73 (0.57 to 0.95)</td>
</tr>
<tr>
<td>Very obese</td>
<td>≥35</td>
<td>117</td>
<td>32.7 (5.1)</td>
<td>2.4 (0.7)</td>
<td>2.0 (1.3)</td>
<td>30</td>
<td>0.50 (0.32 to 0.77)</td>
</tr>
</tbody>
</table>

*P=0.004. †P=0.001. ‡Estimated by multivariate logistic regression model.

The clinical protocols have been described elsewhere. We compared the groups by using analysis of variance and a χ² test. We assessed the effect of body mass index, controlling for the confounding factors, by logistic regression.

The number of treatment cycles and embryos transferred per cycle did not differ among the groups, but age varied significantly but unsystematically (table). There was a significant linear reduction in fecundity from the moderate group to the very obese group (P<0.001). The fecundity of the moderate group was almost 60% higher than that of the very obese group, and the fecundity of the underweight group was also significantly lower than that of the moderate group (P<0.05), indicating an “inverted U” relation between body mass index and fecundity.

Logistic regression analysis confirmed the independent effect of body mass on fecundity. When the significant effects of maternal age, number of embryos transferred, number of cycles received, treatment type, and cause of infertility were controlled for, the pregnancy rate among very obese women was half that of the moderate group. Polycystic ovarian syndrome had an independent effect on fecundity.

Commentary

A body mass index that was either high or low was associated with reduced probability of achieving pregnancy in women receiving assisted reproduction treatment. Mechanisms through which body mass affects reproduction that have been cited include menstrual disturbance and anovulation, but these problems can be overcome through assisted reproduction treatment. There is no evidence that body mass affects the quality of the embryo and therefore the pregnancy rate. We propose that other mechanisms, such as altered receptivity of the uterus after transfer of embryos or oocytes, possibly because of disturbed endometrial function, may cause reduced fecundity.

We thank the staff of the Reproductive Medicine Unit in Adelaide for their contribution.

Contributors: JXW and RJN conceived and designed the study, JXW analysed and interpreted the data and wrote the paper. MD assisted in the analysis and interpretation of data, and MD and RJN revised the paper.

Funding: No additional funding.

Competing interests: None declared.


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A memorable patient

Sometimes life isn’t fair

I was working as a locum house officer during my vocational training in a local teaching hospital. The senior house officer and I had split the work between us, he to the accident and emergency department and I had gone to the general practitioner admission unit. As always the flow of patients was relentless, but as the day wore on I became familiar with some of the friendly faces of the patients on the unit. Some were my patients, others were awaiting transfer.

After several hours of work, a charming elderly woman caught my gaze. “I’ve been watching you all day, rushing about. Have you had your lunch? I’m worried about you.” I was quite taken aback; she stared at me blankly and asymmetrically, her dense rightsided weakness obvious to all.

“I've been watching you all day, rushing about. Have you had your lunch? I’m worried about you.” I was quite taken aback; after all she was the one who had been in hospital for a few days. She was the one who needed looking after. The day plodded on after all she was the one who had been in hospital for a few days.

After I gave my advice I returned to my notes and did something I hadn’t done for a long time. I cried. Sometimes life just isn’t fair.

William Murdoch

We welcome articles of up to 600 words on topics such as A memorable patient, A paper that changed my practice, My most unfortunate mistake, or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk. Permission is needed from the patient or a relative if an identifiable patient is referred to.

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