



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

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1993 to 9.0% (123/1373) in 1998, an adjusted average decrease of 9% a year (95% confidence interval decrease 1% to 16%). When specimens from men known to be HIV-1 positive were excluded there was no adjusted trend in prevalence, which was 4.9% (64/1314) in 1998. The adjusted decline in prevalence of HIV-1 among homosexual and bisexual men presenting with non-acute sexually transmitted infections was significant: 17% a year (12% to 21%) overall and 11% a year (7% to 16%) when men known to be HIV-1 positive were excluded.

Outside London, the observed prevalence of HIV-1 among homosexual and bisexual men was lower (figure), and the adjusted decrease in prevalence overall was significant only in men presenting with non-acute sexually transmitted infections (average decrease of 11% a year (4% to 18%)).

The proportion of all attenders with an acute sexually transmitted infection increased over time in London, but not outside London. This trend was less apparent when attenders known to be HIV-1 positive were excluded.

Comment

In 1993-8 the prevalence of undiagnosed HIV-1 infection in homosexual and bisexual men presenting with acute sexually transmitted infection did not fall, which indicates a high level of continuing transmission. The smaller increase in this group of men in London is consistent with a progressive drawing away of men infected with HIV from participating clinics or a reduction in syphilis testing of HIV infected attenders without an acute infection.

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.⁴ The facilitatory effect of many acute infections on HIV-1 transmission⁵ 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 CAMcG and LFJ. CAMcG and LFJ coordinated the study. CAMcG interpreted the data together with MAC and PAR. MAC, CAMcG, and ONG prepared the paper in consultation with the other authors. MAC is the guarantor for the paper.

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

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Being underweight or overweight has an adverse effect on reproduction.^{1,2} 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 luteinising hormone and also because of altered insulin resistance. The prevalence of obesity in infertile women is high, but there is no conclusive evidence that extremes of weight are associated with a low rate of pregnancy in women receiving assisted reproduction treatment. This study examined whether body mass index (weight (kg)/(height (m)²)) is associated with reduced fecundity (the probability of achieving at least one pregnancy during treatment) in women receiving assisted reproduction treatment.

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.

Treatments included in vitro fertilisation (n=1972), intracytoplasmic sperm injection (n=1040), and gamete intrafallopian transfer (n=574). Patients underwent 8822 embryo transfer cycles. The overall implantation rate was 12.0%, and the clinical pregnancy rate was 24.1% in the study population. Causes of infertility included tubal blockage (34%), semen defects (35%), unexplained infertility (16%), and endometriosis (9%). Age of participants, treatment modalities, location of the treatment, number of embryos transferred, number of cycles of embryo transfer, and number of oocytes recovered were analysed to eliminate possible confounding effects. Polycystic ovarian syndrome was diagnosed, using normal criteria, in 25% (881/3586) of the women.³

Participants were stratified into five groups according to body mass index: "underweight" (<20), "moderate" (20.0-24.9), "overweight" (25.0-29.9), "obese" (30.0-34.9), and "very obese" (≥35). Fecundity was defined as the probability of achieving at least one pregnancy throughout the treatment. Pregnancy was determined by ultrasonography of the embryonic sac (or sacs) in the womb at 4-6 weeks after embryo transfer.

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

Category	Body mass index	No of women (n=3586)	Age (years)*	No of embryos transferred	No of cycles	% achieving at least one pregnancy†	Odds ratio‡
Underweight	<20	441	31.6 (4.5)	2.4 (0.8)	2.3 (1.5)	45	0.81 (0.65 to 1.01)
Moderate	20-24.9	1910	32.9 (4.7)	2.4 (0.7)	2.3 (1.7)	48	1
Overweight	25-29.9	814	33.0 (4.8)	2.4 (0.8)	2.2 (1.5)	42	0.81 (0.68 to 0.97)
Obese	30-34.9	304	32.8 (4.7)	2.4 (0.7)	2.1 (1.4)	40	0.73 (0.57 to 0.95)
Very obese	≥35	117	32.7 (5.1)	2.4 (0.7)	2.0 (1.3)	30	0.50 (0.32 to 0.77)

*P=0.004.

†P=0.001.

‡Estimated by multivariate logistic regression model.

The clinical protocols have been described elsewhere.⁴ We compared the groups by using analysis of variance and a χ^2 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,⁵ 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.

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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; 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 and each time I walked past her she would ask how I was feeling, making sure that I’d taken a break and had something to drink.

About 15 hours had passed without any break and I was writing up notes when there was a little commotion among the nurses, something about a patient fainting. The second-on house

officer was called and he asked me for my advice about the patient.

The patient hadn't fainted; she'd had a stroke—and this was the woman who had been so kind to me. I spoke to her: “Do you remember who I am?” She stared at me blankly and asymmetrically, her dense rightsided weakness obvious to all.

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 *senior house officer in paediatrics, Birmingham*

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