ASSISTED CONCEPTION IS A RISK FACTOR FOR POSTNATAL MOOD DISTURBANCE AND EARLY PARENTING DIFFICULTIES

Jane R W Fisher, PhD

Karin Hammarberg, M Women's Health

H W Gordon Baker, PhD ^a

Key Centre for Women's Health in Society, School of Population Health, The University of Melbourne, Victoria, Australia, 3010

^a Department of Obstetrics and Gynaecology, The University of Melbourne, Royal Women's Hospital, 132 Grattan Street, Carlton, Australia, 3053

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Reprint requests: Jane Fisher, Key Centre for Women's Health in Society, School of Population Health, The University of Melbourne, Victoria, Australia 3010

Fax: 61 3 9347 9824

Email: jrwf@unimelb.edu.au

Capsule: An audit of 745 consecutive medical records revealed that assisted conception was associated with increased risk of early parenting difficulties requiring in-patient treatment in a specialist mother-baby unit.

Abstract

Objective: To investigate whether assisted conception is associated with an increased risk of admission to a residential early parenting program for treatment of maternal mood disorder or infant feeding or sleeping disorders in the postpartum year.

Design: Systematic audit of consecutive medical records.

Setting: Masada Private Hospital Mother Baby Unit (MPHMBU), Melbourne, Australia

Patients: Medical records of all mother-infant dyads admitted to MPHMBU between July 2000 and August 2002.

Main outcome measures: Modes of conception and delivery of index infant, maternal and infant age on admission, multiplicity of birth, infant birthweight and Edinburgh Postnatal Depression Scale scores.

Results: A total of 745 records were audited and mode of conception was recorded in 526 (70.6%) of records. Overall 6% (45 / 745) of the admitted infants had been conceived through ART compared to 1.52% in the general population (RR 4.0, 95% CI 3.0 - 5.4). Mothers who had conceived with ART were older and more likely to have had caesarean and multiple births than those who conceived spontaneously.

Conclusions: Assisted conception appears to be associated with a significantly increased rate of early parenting difficulties. Women who experience assisted conception may require additional support after their babies are born.

Key words: ART conception, postpartum depression, parenting difficulties

Introduction

In 1996 Masada Private Hospital in Melbourne opened a Mother Baby Unit (MPHMBU). It provides clinical assessment of and treatment for women referred with infant sleeping and feeding disturbance and a range of maternal health problems including: mild to moderate depression; anxiety disorders; clinically significant maternal exhaustion in the first twelve months postpartum. Treatment involves individualized supported education in infant care and participation in a structured psycho-educational program during a five-night residential stay. Approximately 375 mother-infant dyads are admitted annually (1).

To obtain more comprehensive knowledge of the health needs of these mothers and infants, a systematic survey was undertaken in 1997. A consecutive cohort of women admitted to the Unit was invited to complete a detailed self-report questionnaire about their health and social circumstances (1). It included a question about conception of the index pregnancy because a previous descriptive study of mothers and infants admitted to a New South Wales residential early parenting center reported that 9% of these women had *previous infertility*, but mode of conception of the infants was not described (2). In all 109 / 146 (75%) eligible patients in the 1997 study completed the questionnaire; of whom 7/107 (6.5%) had conceived with the assistance of reproductive technologies (ART) an apparent five-fold over representation compared to the national rate of 1.2% assisted conception births at that time (3, 4). As a result of this unexpected finding, a new question about mode of conception was added to the MPHMBU nursing admission assessment form in June 2000.

The primary aim of this study was to investigate whether the apparent elevated rate of assisted conceptions in the population of women admitted with their infants to MPHMBU observed in

1997 was a consistent or a chance finding. The second aim was to assess whether women admitted to the Unit with infants conceived by ART differed from other admitted mothers in rates of other risk factors for perinatal psychological adjustment difficulties or severity of self-reported mood disturbance.

Materials and methods

A systematic audit of consecutive medical records of mother-infant dyads admitted to MPHMBU between July 1st 2000 – August 31st 2002. Each record was drawn and reviewed on site by two midwife researchers who were independent of the clinical treatment team. Non-identifying data including maternal and infant age, modes of conception and delivery, infant birth weight and singleton or multiple birth were collected from the nursing admission form and the clinical notes. Mode of conception was recorded as spontaneous; by ovulation induction or artificial insemination or ART, which included all procedures involving oocyte retrieval. Mode of delivery was categorized as vaginal or by caesarean section. Scores from the 10-item self-report Edinburgh Postnatal Depression Scale (EPDS) (5) that is routinely completed on Days 1 and 5 of the treatment program were also recorded. The EPDS yields both a continuous measure of emotional distress and clinical categorization with a score of > 12 indicating likely Major Depression with a sensitivity of 100%, specificity of 95.7% and positive predictive value of 69.2% (6). Records were surveyed a single time in an irreversible process.

State-based perinatal data services gather obstetric information about every birth in Australia. In addition, all ART centers in Australia and New Zealand are required to submit data on pregnancy rates, pregnancy outcomes, multiple birth and infant health to The Australian Institute of Health and Welfare's National Perinatal Statistics Unit (NPSU). The NPSU produces annual summaries on all pregnancies and infants conceived through in-vitro fertilization (IVF),

intracytoplasmic sperm injection (ICSI) and gamete intrafallopian transfer (GIFT). It does not collect data about other forms of fertility treatment including ovulation induction and artificial insemination.

Australia is divided into districts that are identified by postcodes, which are a reliable indicator of socioeconomic status. The postcodes of all women admitted to the MPHMBU in 2000 were collected from the hospital's database. Total births to women in these postcodes in 2000 were obtained from the Victorian Perinatal Data Collection Unit (VPDCU) and the number of these that followed assisted conception was obtained from the NPSU. Rate of births after assisted conception in the background population was calculated as a proportion of total births.

Data was entered into a password protected SPSS (reference) spreadsheet and analysed using univariate measures of association.

Approval to conduct this study was obtained from the University of Melbourne's Human Research Ethics Committee and the Avenue Hospital Research and Ethics Committee

Results:

In all 745 records were drawn and scrutinized. Mode of conception was recorded as spontaneous in 469 (63%) cases, ART in 45 (6%) and assisted with ovulation induction or artificial insemination in 12 (1.5%). In 219 (29.4%) records mode of conception was not documented. The ART conception rate was similar to that found in the original study and suggests that it was a consistent and not a chance finding.

The clinical team in reviewing the inadequate recording of mode of conception revealed in this study, found that some members of staff were unaware of the changed admission assessment

requirement. The rates of all forms of assisted conception reported here might therefore be underestimates, but for further analyses it was presumed that all unrecorded conceptions were spontaneous.

Women were admitted to the MPHMBU from 107 different Victorian postcode districts in 2000. A total of 24,059 live births were recorded by the VPDCU to women residing in these postcode districts in 2000 and the NPSU recorded that 366 of these followed assisted conception. The rate of live births following ART in this population of 1.52% was comparable to the national rate in that year of 1.9% (8). There was a significant difference between rates of admission of mothers conceiving through ART and those conceiving spontaneously ($\chi^2_1 = 91.77$, $p < 0.001$) and the relative risk of admission to MPHMBU associated with ART conception was 4.0 (95% CI 3.0 - 5.4). Only limited additional sociodemographic data were available on the medical records, but women in the ART conception group were as likely to be multiparous as the rest of the admitted population.

The severity of self-reported mood disturbance in women is summarized in [Table 1](#). In a longitudinal study of a community population of >12,000 parturient women by Evans et al. (9) in 2001, mean (SD) EPDS scores were reported as 5.84 (4.65) at 8 weeks and 5.25 (4.61) at 8 months postpartum. The mean admission EPDS scores of the sample described here are significantly higher than both the 8 weeks ($t = 36.7$; $P < .0001$; 95% CI, 6.16–6.86) and the 8 months scores ($t = 40.0$; $P < .0001$; 95% CI, 6.75–7.45). In the current study there were no differences in mean EPDS scores or in the proportion scoring in the clinical range of >12 by mode of conception.

In this cohort, women who conceived with ART were more likely to be older, have operative and multiple births and to have infants of lower birth weight than those who conceived spontaneously (see Table 2).

Furthermore, the admitted women who had conceived with ART differed from the whole cohort of women who conceived with ART in 2000 (7). Admitted women were older (35.9 years versus 33.6 years, $t_{42} = 4.12$, $p < .001$, 95% CI 1.7 – 3.40) more likely to have had a multiple birth (35.6% vs 21.8%) and to have had a caesarean section delivery (overall 68.9% vs 46.7%, for singletons 44.8% vs 40.2 and for twins 93.8% vs 68.5%).

Discussion

This study reported data about a substantially larger sample of women admitted to a specialist residential early parenting treatment service than has been published to date. It is a limitation of this study that mode of conception was not recorded in almost a third of the nursing admission notes, but it is more likely that this led to an under- than an over-estimate of ART conception in this cohort. The excess of IVF conception in women admitted with their infants to this service is consistent with previous reports in Australian cohorts and suggests that assisted conception may act as a risk factor for early parenting difficulties.

Comparisons of psychological functioning in infertile and presumed fertile populations, including during pregnancy and after childbirth have been characterized by methodological flaws. It has been argued that it is not possible to construct an appropriate control comparison group because infertile populations are sociodemographically heterogeneous and few other stressful life events are as prolonged as infertility, have a comparable low chance of successful resolution and involve invasive procedures (8). Control groups have usually been selected by

matching on a single factor including date of confirmation of pregnancy or by convenience for example in attending a particular service for obstetric care. Even with attempts to match infertile and control samples, women who have conceived with ART are older and have been in a relationship with their partners for longer. Most studies have excluded women who already have a child, have multiple births or conceive with donor gametes.

It has been suggested that women who have utilized ART services might be more active consumers of perinatal health services including mother baby units than women who conceive spontaneously. It was possible therefore that severity of mood disturbance in this group might have been lower than in women who had spontaneous conceptions, but this was not found. Elevated rates of clinically significant depressive and anxious symptomatology are reported in surveys of women seeking fertility treatment (9). This is attributed to the experience of infertility and grief associated with an inability to conceive when parenthood is a highly desired life goal. Although depressive symptomatology increases when pregnancy does not occur (10), it is presumed to remit with successful conception. Similar rates of depression are reported in pregnant women after assisted and spontaneous conception (11). Qualitative investigations have found that after the use of ART to conceive, women may be more anxious during pregnancy, have lower self-esteem and self confidence in relation to parenting, feel less able to show negative emotions and ambivalence, and be ill prepared for the difficulties associated with the care of a newborn. (Bernstein, Mattox et al. 1988; Bernstein 1990; Dunnington and Glazer 1991; Hammer Burns 1999) Systematic evidence is emerging that lends qualified support to these theories. Significantly higher rates of specific anxieties about pregnancy loss and foetal health and greater difficulty in acknowledging ambivalence have been found between women who conceived with ART compared to a group who conceive spontaneously (McMahon). Anxiety in pregnancy is usually obdurate and regarded therefore as having an advantage to women, perhaps as a stimulus to active preparation for a major life change (ref). However, in a single longitudinal

study, anxiety was reported to decrease more as pregnancy progressed in those who had assisted conception than in those who had conceived spontaneously (11).

Caesarean surgery carries adverse psychological consequences (Fisher, Astbury, & Smith, 1997). These have been variously conceptualised as depression, disappointment, grief and dissatisfaction, but mode of delivery does not appear to make an independent contribution to postpartum depression when other risk factors are taken into account (Johnstone, Boyce, Hickey, Morris-Yates, & Harris, 2001). More recent conceptualisations suggest that emergency surgery during childbirth in particular caesareans can induce post-traumatic stress reactions and are disruptive to the first encounter between mother and infant (Fisher et al., 1997; Righetti-Veltema et al., 1998; Rowe Murray & Fisher, 2001; Rowe-Murray & Fisher, 2002). In addition to prolonged physical recovery and accompanying fatigue, the development of maternal confidence is compromised (Brown & Lumley, 1994; Garel, Lelong, Marchand, & Kaminski, 1990; Rowe Murray & Fisher, 2001). There have been no systematic investigations of the interaction between assisted conception and caesarean surgery in determining maternal mood.

As a result of the complex and consuming demands of caring for more than one infant, multiple birth is associated with increased risk of postpartum depression (15). Women with fertility difficulties may idealize parenthood, including the notion of an instant family created through multiple birth, but underestimate the hazards and difficulties (10). It may also be that women who have conceived through ART have a lowered sense of entitlement to complain or seek help because these are highly desired babies. Together these may lead women to be insufficiently prepared for the social isolation, loss of autonomy and potentially difficult work of infant care.

These findings suggest that ART conception might be associated with an increased rate of early parenting difficulties including mild to moderate maternal depression and anxiety and unsettled

infant behaviour. Postpartum mood disturbance, including depression after childbirth, is known to be governed by the interaction of multiple risk and protective factors, and a recent systematic review concluded that past infertility and assisted conception may constitute risk factors (30). Both multiple birth and cesarean surgery are more likely after assisted conception and appear to amplify the difficulty in establishing a confident maternal identity. It is not possible from these data to separate and quantify the contribution of each of these factors to maternal mood disturbance and early parenting difficulties. Therefore, further research specifically designed to investigate the separate contributions of maternal age and modes of conception and delivery and of multiple birth to postpartum psychological adjustment in women is needed. In practice, however, these data would suggest that obstetricians, pediatricians, and other clinicians caring for pregnant women and mothers and infants after childbirth should be conscious that a previous history of fertility difficulties, advanced maternal age, assisted conception, operative delivery, and multiple birth may heighten risk for postpartum mood disturbance and early parenting difficulties.

Table 1 Self-reported mood during admission by mode of conception

EPDS scores	Spontaneous	OI and AI	IVF	F, df
Day 1 (M, sd)	12.34 (4.8) (n=678)	13.42 (6.9) (n=12)	12.24 (4.6) (n=45)	0.31 _{,2} ns
Day 5 (M, sd)	8.05 (4.5) (n=653)	8.83 (5.9) (n=12)	7.93 (4.4) (n=44)	0.19 _{,2} ns
EPDS scores >12	n (%)	n (%)	n (%)	$\chi^2_{2,}$
Day 1	322 / 678 (47.5)	7 / 12 (58.3)	22 / 45 (48.9)	0.58 ns
Day 5	102 / 653 (15.6)	3 / 12 (25)	6 / 44 (13.6)	0.93 ns

Table 2 Social and obstetric factors by mode of conception

	Spontaneous (n=687)	OI and AI (n=12)	IVF (n=45)	F, 2
Maternal age at admission (years) M (sd)	33.09 (4.01)	33.45 (3.11)	35.88 (3.6)	F=9.95**
Infant age at admission in (weeks) M (sd)	26.22(13.3)	21.50(9.54)	25.44(14.0)	F= 0.81 ns
Mean infant birth weight (grams) M (sd)	3398 (573)	3104 (479)	2900 (669)	F= 16.79**
	n (%)	n (%)	n (%)	χ^2_2
Multiple birth	23 (3.3%)	1 (8.3%)	16 (35.6%)	86.5**
Caesarean birth	233 (33.9%)	3 (25%)	31 (68.9%)	23.1**

** p<.001

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Author/s:

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