Anxiety during pregnancy and fetal attachment after in-vitro fertilization conception

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The aim of this study was to compare 70 couples who had conceived by in-vitro fertilization (IVF) with 63 matched controls for the prevalence of anxiety and quality of attachment to the baby during pregnancy. Results for mothers showed no group differences using a global measure of anxiety, the Spielberger State–Trait Anxiety Inventory. However, pregnancy-specific measures revealed significantly higher levels of anxiety in IVF mothers about the survival and normality of their unborn babies, about damage to their babies during childbirth and about separating from their babies after birth. When IVF mothers were differentiated according to the number of treatment cycles, more differences in anxiety level were revealed, with most increases occurring in mothers who had experienced two or more treatment cycles. IVF fathers did not differ from controls on the global anxiety measure. No data on pregnancy-specific anxiety were available for fathers. Neither IVF mothers nor IVF fathers differed from controls on measures of attachment to the baby during pregnancy. Results are discussed in the context of the need for researchers to employ differentiated and issue-specific measures to identify concerns that may be unique to IVF couples. Clinical implications regarding the need for psychological support during pregnancy are also discussed.

Key words: IVF/parental anxiety and attachment/pregnancy-specific measures/psychological support

Introduction

Very little is known about the experience of pregnancy after in-vitro fertilization (IVF). Although previous research has demonstrated that couples attempting to conceive a child through IVF treatment have high levels of state anxiety and depression compared with community norms (Freeman et al., 1995; Newton et al., 1990; Thiering et al., 1993; Harlowe et al., 1996), it is not yet clear how IVF couples adjust once treatment has been successful. There is concern that IVF couples may experience psychological problems during pregnancy which may impact negatively on later parenting (Raoul-Duval et al., 1994).

The purpose of this study was to explore two indices of adjustment to pregnancy after IVF conception: anxiety levels and the quality of parents’ attachment to the fetus. Clinical writings (Garner, 1985; Dettman and Saunders, 1987; Sandelowski, 1987; Lind et al., 1989) have suggested that IVF parents are likely to experience elevated levels of anxiety and consequent anomalous attachment to the fetus during pregnancy because of the juxtaposition of a high psychological investment in having a child and the high-risk status of IVF pregnancies. However, there is as yet no empirical support for this idea. Only two empirical studies assessing anxiety have been reported, and both have found no differences between IVF women and matched controls on global state and trait measures of anxiety (Spielberger et al., 1970) administered during either the first (Reading et al., 1989) or the third trimester of pregnancy (Stanton and Golombok, 1993). The latter study also included the Maternal–Fetal Attachment Scale (Cranley, 1981) and reported no differences between the groups on this measure.

There are, however, significant methodological and conceptual limitations to the existing empirical research. Methodologically, the study by Reading et al. (1989) failed to match groups adequately for multiple pregnancy, parity and gestational age. While Stanton and Golombok (1993) did match for parity, their small sample size (15 IVF and 20 control women) raises concerns about the representativeness of the IVF sample and generalizability of their results. In addition, the reliability and validity of the Cranley (1981) measure of maternal–fetal attachment has been questioned (Condron, 1993; Muller and Ferketich, 1993).

Conceptually, both empirical studies are limited by their global approach to the measurement of anxiety. When attempts to assess pregnancy-specific anxieties have been made, significantly more concerns about problems developing during the pregnancy have been identified in IVF women in the first trimester (Reading et al., 1989). It is not clear to what extent these concerns about pregnancy outcome may persist in the third trimester, by which time there is a reasonably high probability of a viable baby. The present investigation will explore this issue through the assessment of pregnancy-specific concerns of IVF women in their third trimester of pregnancy.

A second conceptual limitation of the existing research has been the failure to take account of the fact that psychological symptoms in pregnancy may vary with the extent of past experience of treatment failure. Boivin et al. (1995) have reported that the highest levels of symptoms during the treatment phase occur after the first failed cycle, and that...
couples on their first treatment cycle are significantly more likely to use avoidant styles of coping suggestive of denial. It is possible that these differences in past experiences of assisted reproduction treatment and the coping strategies associated with them may have an ongoing effect on psychological adjustment to pregnancy and parenthood.

A further limitation of the existing research on psychosocial adjustment after IVF conception has been a failure to take account of a tendency to positive self-reporting in the IVF group (Reading et al., 1989; Halasz et al., 1993). This bias may be one explanation for the lack of difference in self-reported anxiety between IVF and control women. Finally, despite increased recognition in the psychological literature of the father’s role throughout the transition to parenthood, no data on either anxiety or fetal attachment have been reported for IVF fathers.

The primary aim of this study was to compare IVF parents with matched controls at 30 weeks of pregnancy for their levels of anxiety and the quality of their attachment to the fetus. A second aim of the study was to provide more clinically meaningful information on how IVF couples experience pregnancy. To this end, we developed and incorporated a range of specific questions regarding concerns about pregnancy and childbirth which may be particularly pertinent to IVF couples.

Recognizing that IVF parents are not a homogeneous group, we have included analyses which take account of within-group variability on reproductive history and experience of treatment failure. In view of concerns regarding the validity of the Maternal–Fetal Attachment Scale (Cranley, 1981), we have used a different measure of attachment to the fetus, and have included measures for fathers as well as mothers. Finally, we have included a measure which assesses reported emotional control so as to take account of positive self-reporting in the IVF group. High levels of reported emotional control have been shown to be associated with positive self-reporting in other clinical samples (Watson and Greer, 1983).

Materials and methods

Subjects

The IVF subjects in this study were recruited from the IVF unit at the Royal North Shore Hospital (St Leonards, Australia). Only couples who were both genetically related to the child were included in the study. Couples were first contacted and given information about the study by mail, and then recruited with a follow-up telephone call. The acceptance rate for the IVF group was 80% (n = 70). A control group was recruited through an obstetrician at the same hospital. The acceptance rate for the control group was 70% (n = 63). Women in both groups met the following inclusion criteria: primiparous, living with the father of the child, and command of English adequate to complete the questionnaires and interviews.

Assessments of the couples were conducted at ~30 weeks of pregnancy (range 28–33 weeks gestation), and subsequently at 4 and 12 months postpartum. This paper reports only the pregnancy data, which include both questionnaire and interview measures. Questionnaires were mailed to the couples and collected at the time of interview. Each member of the couple was instructed to complete the questionnaires independently at home. Women then attended for a 1 h structured interview at ~30 weeks of pregnancy.

Measures

Anxiety was assessed by a combination of global anxiety questionnaires, a questionnaire focusing on more specific anxieties about survival and possible defects in the baby, and open-ended and forced-choice interview questions tapping anxieties regarding pregnancy outcome and childbirth.

Global anxiety

Global anxiety was measured for mothers and fathers using the State–Trait Anxiety Inventory (Spielberger et al., 1970). The anxiety scales each consist of 20 items assessing feelings of tension, nervousness, worry and apprehension. The A-State scale assesses current feelings of anxiety, while the A-Trait scale asks people to report how they feel in general. Both are rated on a four point Likert scale, where high scores indicate high state or trait anxiety. These scales are widely used and have been shown to have high reliability and validity (Spielberger et al., 1970).

Specific anxiety

A number of measures of specific pregnancy-related anxieties were included for mothers, but not fathers.

Baby schema (Gloger-Tippelt, 1991)

This questionnaire measure explores the cognitive representation the mother has of her baby during pregnancy. It consists of five factors, two of which will be presented here. These include the factor assessing anxieties concerning health and defects in the child (five questions), which will be discussed in the context of anxiety, and the factor assessing the extent to which the child is seen as an independent being to whom a relationship is established (10 questions), which will be discussed in the context of attachment. Responses are rated on a six point Likert scale ranging from 1 (= strongly agree) to 6 (= strongly disagree), with high scores indicating high anxiety and a greater tendency to see the child as an independent being, respectively.

Interview questions

The interview covered a wide range of issues to do with adjustment to pregnancy, attitudes to the unborn baby and expectations about the birth and parenthood. Only those questions relevant to anxiety are reported here. In this context the following issues were addressed: (i) time at which the mother trusted the pregnancy would result in a healthy baby (coded according to the trimester of pregnancy); (ii) time at which the mother told others about the pregnancy (coded according to the trimester of pregnancy); (iii) attitudes to childbirth, including fears about the baby’s safety during the birth process and tolerance for medical interventions [both coded on a seven point Likert scale assessing the extent of agreement with specific statements (1 = strongly disagree to 7 = strongly agree), where high scores represented high levels of concern for the baby’s safety and high tolerance for interventions, respectively]; and (iv) attitudes to the possibility of separation from the baby after the birth which included separate questions about how the mother would feel when separated from her child and her perceptions of the effect of the separation on the child. Responses were rated on a seven point Likert Scale [assessing the extent of agreement with specific statements as noted in (iii) above], with high scores indicating high levels of concern in both domains.

Attachment

Maternal and paternal fetal attachment were measured using the Antenatal Bonding Questionnaire, for which there are normative data on an Australian sample (Condon, 1993). The Antenatal Bonding Questionnaire consists of two factors: ‘quality of attachment’, which
represents the quality of the parents’ affective experiences such as closeness/distance and tenderness/irritation, and ‘time spent in the attachment mode’, which represents an intensity of preoccupation with the fetus according to the amount of time parents spend thinking about, talking to and palpating the fetus. Responses are rated on a five point rating scale, with high scores reflecting a positive quality of attachment and a high intensity of preoccupation with the fetus. Factor scores are not directly comparable for mothers and fathers because maternal and paternal scales have different numbers of items. A subscale from the ‘Baby Schema’ questionnaire described above was also employed as a measure of attachment to the fetus.

**Emotional control**

The Courtauld Emotional Control Scale (Watson and Greer, 1983) is a questionnaire that measures the extent to which individuals report or professional certificate, and 40.0% of IVF and 51.6% of control group mothers having a university or college degree.

For fathers, age and education were used as covariates while scores in normal samples can be interpreted with some confidence as being largely free of social desirability response bias, there is some indication that scores derived from clinical groups are influenced by a ‘faking good’ response bias. High scores then indicate either a high level of control of emotional responses to stress or a desire to appear to be very controlled in a clinical context. Measures of emotional control were collected for mothers and fathers.

**Obstetric history**

Data were also collected during the interview on aspects of previous obstetric history which could conceivably influence anxiety levels over the course of the pregnancy. These included miscarriages, terminations, bleeding in pregnancy, number and timing of ultrasound scannings and amniocenteses. Whether or not the couples knew the sex of the baby during pregnancy was also included because it may be relevant to fetal attachment.

**Results**

Analyses were carried out in three stages using the statistical package SPSS for Windows 6. First, the IVF and control groups were compared for relevant demographic and obstetric history variables. Where group differences on these variables were found, they were then included as covariates in the subsequent analyses comparing the groups on the anxiety, emotional control and attachment measures. Finally, in recognition of the heterogeneity of the IVF group, IVF couples were grouped according to the number of treatment cycles they had experienced. These subgroups were then compared with the control group on the major dependent variables using MANOVA analyses with relevant covariates. Results for the demographic and obstetric history variables will be presented first, followed by findings on the anxiety, emotional control scale and attachment measures.

**Demographic and obstetric history variables**

**Maternal age and education**

The difference in mean age between the IVF and control groups was significant for both mothers ($t = 5.6$, df = 131, $P = 0.000$) and fathers ($t = 2.9$, df = 131, $P = 0.005$). The mean ± SD age for mothers in the IVF group was 34.6 ± 3.0 years (range 28–42) and for the control group mothers was 31.9 ± 2.4 years (range 28–39). The mean ± SD age for fathers in the IVF group was 37.5 ± 5.8 years (range 28–56) and for control group fathers was 34.9 ± 4.6 years (range 27–55). Consequently, age was fitted as a covariate in all analyses. Both groups were significantly older than the median age of women (28.0 years) and men (31.8 years) at first nuptial birth in Australia in 1992 (Australian Bureau of Statistics, 1993). The educational level of the mothers in both groups varied broadly, with 35.7% of IVF and 17.7% of control group mothers having a secondary school qualification or less, 24.3% of IVF and 30.6% of control group mothers having a diploma or professional certificate, and 40.0% of IVF and 51.6% of control group mothers having a university or college degree. There was a non-significant trend [c$^2$ (Pearson) = 5.38, df = 2, $P = 0.067$] for more mothers with lower educational levels to be represented in the IVF group. Consequently maternal education level was also included in analyses as a controlling variable. For fathers, age and education were used as covariate and controlling variables respectively.

**Obstetric history**

The groups did not differ on past history of miscarriage, number of terminations, number of ultrasound scans or bleeding during pregnancy. They did differ on experience of ectopic pregnancy [c$^2$ (Pearson) = 9.27, df = 3, $P = 0.026$], but this was not included as a covariate because it did not constitute a threat to the current pregnancy during the third trimester. More of the IVF mothers had experienced amniocenteses [c$^2$ (Pearson) = 4.63, df = 1, $P = 0.032$] and knew the sex of the baby [c$^2$ (Pearson) = 8.45, df = 1, $P = 0.003$], which was largely attributable to the age difference between the groups. As the experience of amniocentesis may influence anxiety levels, and knowledge of the sex of the baby may influence attachment, these variables were included as controlling variables in all analyses.

**Anxiety measures**

**Group comparisons for state and trait (global) anxiety**

The multivariate test showed a tendency for the IVF mothers to differ from the control group mothers on state and trait anxiety ($F = 2.57$, df = 1123, $P = 0.080$). Univariate tests indicated that the effect was the result of somewhat elevated scores on state anxiety for IVF mothers ($F = 3.36$, df = 1123, $P = 0.047$). Similarly for fathers, the multivariate test showed a non-significant tendency ($F = 2.23$, df = 1111, $P = 0.11$) for IVF fathers to differ from the control group fathers, but univariate tests in this case showed a tendency to higher scores on trait anxiety ($F = 2.92$, df = 1111, $P = 0.09$). (There was no relationship between trait anxiety and male factor infertility.) These results are summarized in Table 1.

**Group comparisons for specific anxiety measures**

The eight measures of specific anxiety were tested against the assumptions of multivariate normality using the Multinor (Thompson, 1990) program which implements a test for multivariate normality developed by Stevens (1992). The plots produced by this program showed no systematic departure
Anxiety in IVF pregnancies

Table I. In-vitro fertilization and control group comparisons for Anxiety State and Anxiety Trait (Spielberger et al., 1970)

<table>
<thead>
<tr>
<th></th>
<th>Mothers (n = 70)</th>
<th>Control (n = 62)</th>
<th>P value</th>
<th>Fathers (n = 51)</th>
<th>Control (n = 53)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety Trait</td>
<td>34.72</td>
<td>35.55</td>
<td>NS</td>
<td>34.60</td>
<td>32.01</td>
<td>0.09</td>
</tr>
<tr>
<td>SD</td>
<td>9.32</td>
<td>7.00</td>
<td></td>
<td>7.66</td>
<td>6.15</td>
<td></td>
</tr>
<tr>
<td>Anxiety State</td>
<td>32.23</td>
<td>30.12</td>
<td>0.07</td>
<td>32.29</td>
<td>32.49</td>
<td>NS</td>
</tr>
<tr>
<td>SD</td>
<td>10.62</td>
<td>6.67</td>
<td></td>
<td>8.98</td>
<td>7.86</td>
<td></td>
</tr>
</tbody>
</table>

from a linear plot for either the IVF or the control group for each of the eight specific anxiety measures. Therefore, the use of multivariate analyses was justified.

When IVF and control group mothers were compared for the specific measures of anxiety, the multivariate test significantly differentiated the groups ($F = 4.34, df = 8113, P = 0.000$). Univariate $F$ tests showed significant differences on five of the eight measures, with all results indicating higher levels of anxiety for mothers in the IVF group. IVF mothers scored higher on the Baby Schema questionnaire factor ‘anxieties concerning health and defects in the child’ ($F = 7.23, df = 1,120, P = 0.008$) and reported during interview that they trusted the survival of the pregnancy later ($F = 14.2, df = 1,120, P = 0.000$) and delayed telling others about their pregnancy longer ($F = 4.59, df = 1,120, P = 0.034$) than control group mothers. Interview questions also revealed significantly higher anxieties for IVF mothers about threats to the child during the birth process ($F = 12.93, df = 1,120, P = 0.000$) and more negative feelings about childbirth ($F = 8.99, df = 1120, P = 0.003$). This was associated with a tendency to higher tolerance for medical interventions during the birth ($F = 3.16, df = 1120, P = 0.078$). Questions tapping anxiety about the effect on the mother of possible separation from the child postnatally also revealed a tendency towards higher anxiety in the IVF group ($F = 3.20, df = 1120, P = 0.076$). There were no group differences in anxiety about the effects of separation on the child.

**Group comparisons for the Courtauld Emotional Control Scale**
The multivariate test for the 3 subscales on the Courtauld Emotional Control Scale showed that the IVF group scored significantly higher than the control group ($F = 3.52, df = 3118, P = 0.017$). Univariate analyses revealed that the IVF group mothers scored significantly higher than the control group mothers on two of the three subscales: anxiety ($F = 6.95, df = 1,120, P = 0.009$) and depression ($F = 9.34, df = 1,120, P = 0.003$), with these results indicating a lesser tendency for IVF mothers to report feelings of anxiety and depression respectively. Group differences also approached significance on the anger subscale ($F = 3.27, df = 1,120, P = 0.073$). There is some indication that high scores derived from clinical groups may reflect positive self-reporting (Watson and Greer, 1983). There were no differences between IVF and control group fathers on any of the subscales.

**Comparisons of groups differing on the number of treatment cycles**
In recognition of the variability within the IVF group in the number of treatment cycles women had experienced before conceiving, all multivariate analyses were repeated with the IVF group subdivided into those who had experienced one, two or three or more treatment cycles. The control group was classified as having no (‘0’) treatment cycles. Where significant multivariate effects were found, these were followed up with planned comparisons comparing the control group separately with each of the three treatment cycle groups for the relevant individual measures. $\alpha$ levels were adjusted to 0.01 to control for the effect of performing multiple tests on each individual measure.

Although as previously noted there were no differences between the whole IVF group and the control group on either state or trait measures of anxiety, when comparisons of subgroups differing in the number of treatment cycles were made, the multivariate test revealed a significant group effect ($F = 5.80, df = 3,114, P = 0.000$). The planned comparisons showed that the difference was explained by the ‘two-cycle’ mothers having a significantly higher state anxiety than the control group mothers ($F = 14.43, df = 1,122, P = 0.000$), while the other subgroups did not differ from the control group (see Figure 1). Anxiety scores for fathers did not differ according to the number of treatment cycles.

The overall multivariate analysis comparing the treatment cycle and control groups with the specific anxiety measures yielded no significant differences between the groups. However, given our finding of whole IVF and control group differences for these same measures and the somewhat exploratory nature of this component of the research, we went on to

![Figure 1. Treatment cycle group means for anxiety state (Spielberger et al., 1970).](image-url)
conduct comparisons of the individual treatment cycle and control groups. These analyses yielded treatment cycle effects consistent with those observed for the global anxiety measures. In this case, multivariate tests differentiated both the ‘two-cycle’ and ‘three or more cycles’ groups from the control group (F = 3.86, df = 8,111, P = 0.000 and F = 2.8, df = 8,111, P = 0.007 respectively), while the ‘one-cycle’ group did not differ from the control group. Univariate tests for individual measures showed that the ‘two-cycle’ group scored significantly higher than the control group for the questionnaire factor ‘anxieties concerning health and defects in the child’ (F = 9.62, df = 1,118, P = 0.002), fears about damage to the baby during the birth (F = 10.98, df = 1,118, P = 0.001), and negative feelings about the birth (F = 13.98, df = 1,118, P = 0.000), while the ‘three or more cycles’ group differed regarding fears about damage to the baby during the birth (F = 11.39, df = 1,118, P = 0.001) and time at which they trusted the pregnancy outcome (F = 10.58, df = 1,118, P = 0.001) (Figure 2).

The measure of emotional control showed a very interesting reversal of the pattern noted for the anxiety measures. In this case, the multivariate test showed a significant group effect (F = 2.85, df = 3,116, P = 0.040), and planned comparisons indicated that the difference was explained by significantly higher scores in the ‘one-cycle’ group for the suppression of anxiety compared with the control group (F = 7.88, df = 1,118, P = 0.006) (Figure 3). This raises the possibility of a positive self-reporting bias for anxiety in this particular treatment group.

**Attachment measures**

**Group comparisons for attachment measures**

There were no differences between the IVF and control groups for mothers or fathers on self-reported ‘time spent in the attachment mode’ or ‘quality of attachment’. Furthermore, the results for all groups were similar to the normative Australian data (Condon, 1993). These results are summarized in Table II. There were also no group differences for IVF and control group mothers on the Baby Schema subscale ‘the extent to which the child is seen as an independent being to whom a relationship is established’.

**Comparisons of groups differing in the number of treatment cycles**

No differences were found between the control and IVF treatment cycle groups for mothers or fathers when they were compared on the two Antenatal Bonding Questionnaire scales, ‘quality of attachment’ and ‘time spent in the attachment mode’. In addition, control and IVF treatment cycle group mothers did not differ on the Baby Schema attachment subscale.

**Discussion**

The results of this study demonstrate that, despite the finding of no group differences in state and trait anxiety using the Spielberger et al. (1970) measure, the IVF mothers were significantly more anxious about the well-being of their unborn babies and about damage to the babies during childbirth (associated with more negative feelings about the birth and a tendency to a higher tolerance for medical interventions during the birth), and tended to be more anxious about the prospect of separating from their baby after it was born. The anxiety about the well-being of the baby was expressed in the IVF group by mothers delaying telling others the news of their pregnancy and by their persistent fear of pregnancy loss. These findings regarding specific concerns during the third trimester of pregnancy are consistent with those reported by Reading et al. (1989) during the first trimester. They confirm that specific anxieties persist throughout pregnancy for IVF mothers, and highlight the need for more differentiated measures of anxiety to identify issues that may be unique to IVF couples. Global state and trait measures may fail to capture unique aspects of the experience of pregnancy for this group of parents.

Our results also support the need to consider differences in past experiences of treatment failure in the IVF group. When IVF mothers were differentiated according to the number of treatment cycles, those who had had only one treatment cycle were similar to control mothers in their lower reporting of both global and specific anxiety. In contrast, mothers who had
Anxiety in IVF pregnancies

Table II. In-vitro fertilization and control group comparisons of group means for factor scores on the Antenatal Bonding Questionnaire (Condon, 1993)

<table>
<thead>
<tr>
<th></th>
<th>Mothers</th>
<th>Fathers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IVF (n = 69)</td>
<td>Control (n = 62)</td>
</tr>
<tr>
<td>Quality of attachment</td>
<td>Mean 39.20</td>
<td>Mean 49.73</td>
</tr>
<tr>
<td></td>
<td>SD 3.42</td>
<td>SD 3.20</td>
</tr>
<tr>
<td>Time in attachment</td>
<td>Mean 17.77</td>
<td>Mean 27.30</td>
</tr>
<tr>
<td></td>
<td>SD 3.34</td>
<td>SD 4.21</td>
</tr>
</tbody>
</table>

Mean factor scores for mothers and fathers cannot be compared directly because they are based on different numbers of items.

experienced two or more treatment cycles reported higher anxiety than controls on a subset of both global and specific measures. These results indicate that failure to consider differences in treatment history in the IVF group may mask symptoms for repeat cycle women.

The similarity between mothers who have not experienced treatment failure and control group mothers is consistent with the findings of Newton et al. (1990) and Beaurepaire et al. (1994), who report that a significant increase in anxiety and depressive symptoms occurs after the first failed cycle. Furthermore, the pattern of our results for both the global and specific questionnaire measures of anxiety is similar to the Boivin et al. (1995) finding that those mothers experiencing moderate levels of treatment failure showed the most distress. Boivin et al. (1995) also noted a significantly greater tendency to use avoidant coping styles in the ‘one-cycle’ women, which they believe is suggestive of denial of stress. This interpretation is supported by our finding that the ‘one-cycle’ women scored significantly higher than the other groups on the measure of suppression of anxiety. Also consistent with these results is a study by Lindheim et al. (1995) investigating physiological responses to a psychological stress test in women undergoing IVF treatment. Compared with control and oocyte donor groups, IVF women had blunted biophysical and biochemical responses to provoked behavioural stressors. All but one of the IVF women were undergoing their first cycle, so it is not clear whether repeat cycle women would have differed in their responses. Nonetheless, this study provides further support for the notion of ‘avoidant’ or minimizing responses to stress in IVF women on their first treatment cycle.

Taken together, our findings of both low levels of reported anxiety and high levels of reported suppression of anxiety in the ‘one-cycle’ women offer some support for the idea that the low levels of anxiety reported by this group of women may not be an accurate representation of their pregnancy experience. Consequently, our findings regarding anxiety in IVF women may be conservative. It is plausible that the ‘one-cycle’ women, perhaps through a desire to convince themselves and/or others of their normalcy, have adopted a coping strategy involving some denial of stress, as has been suggested by Boivin et al. (1995).

Our failure to find any group differences on maternal and paternal fetal attachment is consistent with the Stanton and Golombok (1993) study. It is possible that this finding is also attributable to a tendency to positive self-reporting, with IVF mothers reluctant to report negative feelings about their long-awaited babies. However, our measure of emotional control does not specifically address positive self-reporting with respect to attachment scores, and it may not be appropriate to generalize this interpretation to this domain. In addition, the finding of no difference on the attachment measure according to the number of treatment cycles does not support a positive self-reporting interpretation.

Another possible explanation for the null finding may relate to unique features of the IVF context. Given the high-risk status of IVF pregnancies, relationships between anxiety and parent–child outcomes, which have been identified in other contexts, may not apply to this group. Where differences in anxiety were found, they were focused around specific issues regarding the outcome of the pregnancy, which were, in fact, reality-based concerns. For example, many IVF mothers expressed concerns about the possibility of premature birth, which is realistic given the relatively high rate of preterm births in singleton IVF pregnancies (Lancaster et al., 1995). Thus, the elevated anxiety of the IVF mothers may not reflect a more general personality trait. It is important to note that the IVF women in our study did not differ from the control group women on trait anxiety, a finding which is consistent with a study by Harlowe et al. (1996) of women undergoing IVF treatment. This context-specific type of anxiety may not constitute a risk factor for later parenting. Longitudinal research is needed to explore relationships between anxiety and parenting quality in IVF mothers.

The psychological adjustment of fathers during IVF pregnancies requires further investigation. We found that, like mothers, there were no differences between IVF and control group fathers on either state anxiety or attachment to the fetus. However, the tendency for a higher level of trait anxiety in the IVF group warrants further study, given the overall tendency for men to under-report such symptoms (Beaurepaire et al., 1994). The inclusion of specific anxiety measures for fathers as well would reveal whether fathers share the specific concerns reported by mothers or, in fact, have a different set of concerns. For example, anecdotal reports from interviews with mothers suggest that for some fathers there is a concern that the test tubes will have been ‘mixed up’ in the laboratory and that the child may not be theirs.

Clinical implications

The experience of pregnancy after infertility and IVF is stressful for most women. Repeat cycle women have clear concerns about the survival and well-being of their baby which
may be alleviated by supportive counselling and by a greater awareness of the fact that their concerns are not unique but are in fact shared by many other women with a similar reproductive experience. Although our results show low reported anxiety during pregnancy for ‘one-cycle’ women, the high levels of reported suppression of anxiety for this group suggest they may be adopting a defensive coping style during pregnancy. While this denial of stress may be functional in coping emotionally with the pregnancy, these women may benefit from opportunities to acknowledge their feelings at a later stage.

The lack of any elevated anxiety in IVF fathers should be interpreted cautiously in the clinical context. Fathers were not interviewed, and therefore did not have the opportunity to express more pregnancy-specific concerns. Until clear evidence to the contrary is produced, it should not be assumed that IVF fathers are without their own concerns, which acknowledges and supportive counselling within a couple context may help to address.

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