Psychological reactions during in-vitro fertilization: similar response pattern in husbands and wives

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The purpose of this study was to examine differences in daily emotional, physical and social reactions among husbands and wives during in-vitro fertilization (IVF) or intracytoplasmic sperm injection (ICSI). Forty couples about to undergo ICSI or IVF at a private infertility clinic monitored their emotional, physical and social reactions daily for one complete treatment cycle from the first day of stimulation until the outcome of treatment was known (approximately 35 days). The results showed that men and women had a similar response pattern to oocyte retrieval, fertilization, embryo transfer and the pregnancy test. These stages were associated with the most significant changes in reactions for both spouses. The pattern of results suggested that the most important psychological determinant of reactions during IVF was the uncertainty of treatment procedures. Spouses appeared to be equally sensitive to this uncertainty and both appeared to respond to it with ambivalent feelings involving emotional distress and positive feelings of hope and intimacy.

Key words: infertility/intracytoplasmic sperm injection/in-vitro fertilization/psychology/stress

Introduction

A number of studies carried out in recent years have examined gender differences in reactions to in-vitro fertilization (IVF) and related reproductive procedures. Most of these studies have examined reactions before or after IVF with relatively few prospective studies examining reactions during each stage of the IVF cycle. Moreover, those prospective studies which have examined reactions during IVF have focused almost exclusively on women. As a result, most of what we know about gender differences to oocyte retrieval, fertilization or most other stages of IVF is based on either anecdotal reports or recall data obtained after the results of IVF were known. Both these methods of assessment can be biased. The aim of the present prospective study was to provide one of the first accounts of husbands’ and wives’ daily reactions to each stage of IVF using a multi-symptom inventory.

There is much evidence to suggest that women react much more intensely to IVF than men (Edelmann, 1990; Mazure et al., 1992). Previous studies have found that prior to treatment women report more anxiety and depression (Newton et al., 1990; Slade et al., 1997), less life satisfaction (Newton et al., 1990), less self-esteem (Shaw et al., 1988) and anticipate experiencing more stress during IVF (Collins et al., 1992) than men. The few studies that address reactions during treatment show that men and women may also differ in terms of their assessment of the stress of IVF. Leiblum et al. (1987) asked men and women who had completed at least one cycle of IVF to recall the stress of the complete IVF cycle. The results showed that more women than men reported that the treatment had been ‘very stressful’. Anecdotal reports from men and women would suggest that treatment stress fluctuates depending on the success or failure of the various stages of treatment (Seibel and Levin, 1987). The extent of distress reported after a treatment failure also appears to be greater for women than men. Newton et al. (1992) found that 25% of women had mild or moderate depression 3 weeks after a failed IVF cycle while this level of depressive symptoms was less common among men (i.e., 12%). Slade et al. (1997) found that gender differences in depression persisted up to 6 months after the failed IVF cycle. Finally, Baram et al. (1988) reported that 13% of the women but none of the men in their sample of 86 patients had had some thoughts of suicide after their failed IVF cycle.

There is also some evidence to suggest gender differences in social and physical reactions to IVF. As expected oocyte retrieval has generally been associated with more physical distress in women than men (Leiblum et al., 1987; Boivin and Takefman, 1996). Women have also been reported to be more concerned about their oocytes than men (Seibel and Levine, 1987). In terms of patients’ recall of embryo transfer, Leiblum et al. (1987) found that women were more likely than men to emphasize contentment and feelings of intimacy with their partner during this stage of IVF whereas men were more likely to focus on feelings of hope for a pregnancy. In another retrospective study, Baram et al. (1988) found that women were more likely than men to seek support from family and friends during treatment especially during the days prior to the pregnancy test.

These findings indicate that men and women react differently to IVF and have been interpreted as suggesting that a different approach to psychological care should be taken with husbands and wives. However, two data analytic and methodological issues may obscure the relative similarities between men and women during IVF. First, comparisons of couples’ reactions are usually made at a single point in time, typically before or
after treatment. This type of data analytic strategy may obscure similarities because it does not take into account the pattern of change between these times within each sex. When men’s and women’s reactions are examined across these time points both report a significant increase in depressive symptoms, anxiety and a variety of other negative emotional reactions when treatment fails (Leiblum et al., 1987; Newton et al., 1990). Similarly, when the relative ranking of the stress of each IVF stage is taken into account, results demonstrate a similar pattern for men and women. That is, although women rate each stage of IVF as more stressful than men, couples’ relative ranking of each stage shows that both recall the 2 week waiting period and the beginning of menstruation (or a negative pregnancy test) as having been the most stressful stages of IVF (Baram et al., 1988; Connolly et al., 1993). A second methodological issue relates to the fact that most studies of the stresses of IVF depend on retrospective accounts provided by couples whose treatment has failed. Because women report more intense negative emotional reactions to treatment failure than men, gender differences to retrieval, fertilization and transfer may be amplified using this type of methodology. As these stages of treatment represent the period of time when clinic staff have the most contact with patients it would be important to determine gender differences without the potential biases inherent in the recall of treatment stress.

As part of a larger study on reactions to IVF and intracytoplasmic sperm injection (ICSI) (Boivin et al., 1998), we also examined gender differences in reactions to these treatments taking into account the data analytical and methodological issues mentioned. Husbands and wives monitored their reactions to treatment daily throughout IVF using a multi-symptom inventory designed for use with infertility patients (Boivin and Takefman, 1995). Using this measure, patients rated their emotional, physical and social reactions and each reaction was compared across the different stages of treatment for men and women.

Materials and methods

Sample

The sample consisted of 40 couples about to begin treatment at a private fertility clinic in Sweden (Carl von Linné Kliniken, Uppsala). Men were significantly older (mean ± SD, 34.8, 5.8) than their partners (mean ± SD, 32.1, 4.5) [t(39) = 4.02, P < 0.001]. Couples had been married for 6.8 ± 3.4 years and had been infertile for 4.8 ± 2.9 years. Of the 40 couples, 18 underwent ICSI and 22 underwent IVF. The two treatment groups were collapsed into one group for the following reasons. First, the sample size was too small to be able to examine possible gender differences. Second, the mean age (45.2 ± 2.9 years) and years infertile (4.8 ± 2.9 years) was not significantly different and only minor differences were found in the reactions of men (Boivin et al., 1998). All couples in the ICSI group had received a male factor diagnosis while the cause of infertility in most couples in the IVF group was a female-only factor (77.3%). Only one couple had had previous experience with their treatment. The pregnancy rate was similar in the two treatment groups with 40.9% (n = 9) of IVF patients and 50.0% (n = 9) of ICSI patients subsequently conceiving with treatment (pregnancy rate per transfer).

Materials

During treatment, couples completed the daily record keeping (DRK) chart designed to assess emotional, physical and social reactions to infertility treatment (Boivin and Takefman, 1995). The DRK contains a series of items distributed over two sections. The first section contains emotional (e.g., nervous, irritable) and physical (e.g., fatigue, ovarian pain) reactions while the second section contains items related to marital and social relationships. As reported in Boivin and Takefman (1996) we extracted from these lists four different variables. The distress score consisted of an average of nine emotional items (i.e., nervous, moody, pessimistic). Intimacy with spouse consisted of the average of two items, ‘affection with spouse’ and ‘discussion with spouse’, while ‘optimism about pregnancy’, ‘social contacts’ and ‘fatigue’ were based on single items. Men and women rated the extent to which they experienced each of these reactions on a four point Likert scale from one (‘none’) to four (‘severe’). The only physical factor used was fatigue as other factors (e.g., breast tenderness, ovarian pain) were not applicable to men. While details of the reliability and validity of the DRK can be found in Boivin et al. (1998), the Cronbach alpha calculated on the Swedish translation used in this study was high (i.e., alpha = 0.91) showing that this version was internally reliable.

Procedure

As the procedure and recruitment protocol is described in greater detail in Boivin et al. (1998) only a brief summary will be presented here. One to two months prior to treatment couples participated in an information afternoon at the clinic. During this time a complete description of the psychological study was provided and patients were invited to participate. Of the 89 consecutive couples invited into the study, 40 (44.9%) completed all study materials and were included in this report. The attrition rate was principally due to couples whose treatment was cancelled prematurely (18%) or who refused to participate or withdrew from the study (14.6%). There were no statistical differences between couples who completed the study and those who did not in terms of female age [t(63) = 1.27, P > 0.10], male age [t(63) = 0.30, P > 0.10] or years infertile [t(62) = 0.19, P > 0.10]. Those who agreed to participate completed pre-treatment questionnaires at the clinic and were then provided with the daily record keeping charts to complete at home during treatment.

For purposes of this study the couples were instructed to begin daily monitoring on the first day of stimulation and to complete the inventory daily until the beginning of menstruation or the pregnancy test (i.e. a total of 35.6 ± 3.9 days). Couples were also instructed to complete the charts separately, at night, before going to bed and to return them once a week in the stamped, pre-addressed envelopes provided. For each day of the cycle, patients filled out the day of the cycle, the date and whether treatment had involved a medical intervention that day [e.g. human menopausal gonadotrophin (HMG), oocyte retrieval] based on the list of treatment codes provided. Patients then rated the extent to which they had experienced each of the reactions listed on the sheet. Patients carried out a home pregnancy test 21 days after transfer and informed clinic staff of the test results.

Data analysis

As there were no differences between daily reactions within a stage, the daily scores for days of HMG and the waiting period were averaged to create stage scores as described previously (Boivin and Takefman, 1996). Ratings were thus available for each stage of IVF: HMG, HCG (human chorionic gonadotrophin), day before (–1 retrieval) and day of oocyte retrieval, day before (–1 transfer) and day of embryo transfer, week 1 of waiting (days 1–7), week 2 (i.e. days 8+) and outcome (beginning of menstruation or outcome of pregnancy test). All emotional, physical and social reactions during IVF were examined using a series of 2 (sex)×9 (stage) analyses of
variance (ANOVA) with both factors as repeated measures. Based on Stevens (1992) [and using: \( n = 40, \) alpha = 0.05, effect size \( f = 0.25 \), and moderate correlations between levels of the repeated measures], power for the ANOVA used in this study was reasonable. Greenhouse–Geisser adjusted probability values were used where violations of sphericity occurred. Significant interactions were followed up with simple main effects tests and simple comparisons.

**Results**

The results with the five variables extracted from the daily record keeping chart are presented in Figures 1–5. The ANOVA results for the *distress* subscale (Figure 1) showed a significant main effect of sex \( [F(1, 39) = 4.37, P < 0.05] \) and a significant main effect of stage \( [F(9, 351) = 10.10, P < 0.05] \). The sex main effect showed that overall women reported significantly more distress during the treatment cycle than did their partners. However, post-hoc tests for the stage main effect showed that the most distressing stages of treatment for both men and women were the active stages of oocyte retrieval and embryo transfer and the pregnancy test day. Although gender differences appeared more pronounced during the initial stages of treatment, the sex by stage interaction was not significant \( [F(9, 351) = 1.36, P > 0.10] \).

In terms of optimism the main effect of sex \( [F(1, 39) = 0.39, P > 0.10] \) and the interaction between sex and stage \( [F(9, 351) = 0.96, P > 0.10] \) were not significant showing that men and women reported a similar level of optimism throughout the treatment cycle. As shown in Figure 2, there was a significant main effect of stage \( [F(9, 351) = 2.92, P > 0.10] \) with post-hoc tests showing that optimism was higher on the day of retrieval and transfer than on other days. The
results for intimacy, presented in Figure 3, were similar to those of optimism. The stage main effect $F(9, 351) = 34.11$, $P \leq 0.001$ showed that spouses reported more intimacy on the day of retrieval and the day of transfer than on other days. However, it should be noted that a significant sex by stage interaction $F(9, 351) = 30.23$, $P \leq 0.001$ indicated that women reported significantly less intimacy with their spouse during the last days of the waiting period ($P < 0.01$).

All effects were significant for fatigue (see Figure 4). The main effect of sex $F(1, 39) = 13.93$, $P < 0.001$ showed that overall women reported more fatigue than their partner. However, the significant interaction $F(9, 351) = 5.31$, $P < 0.001$ showed that this difference was most pronounced on the day of retrieval ($P < 0.001$). A marginal sex main effect for social contacts (see Figure 5) also showed that overall women reported more contact with family and friends than men $F(1, 39) = 3.39$, $P < 0.10$. However, a significant sex by stage interaction showed that women reported more contacts than men during the initial and last stages of treatment with the difference in social contacts being less significant prior to and during retrieval ($P < 0.10$).

**Discussion**

There has been an intense interest in gender differences in the area of infertility primarily because cultural expectations (Berg and Wilson, 1991) and anecdotal reports (Seibel and Levin, 1987) would predict such differences. As a result, psychological studies have generally emphasized differences in emotional reactions between men and women rather than any similarities. However, using a daily monitoring methodology we found that while women were more distressed than their partners during IVF, there was remarkable similarity in the type and pattern of couples’ reactions to the different stages of treatment. Specifically, men and women were consistent in their emotional and social reactions to oocyte retrieval, fertilization, embryo transfer and the pregnancy test day, and both reported the most change in reactions at these stages of treatment.

While the similarity in response pattern could be attributed to couples’ reliance on each other when making their own ratings of the effect of IVF, the presence of other gender differences would argue against this explanation. As would be predicted from previous studies women reported more distress, more social contacts and more fatigue than did their partners. Moreover, such differences were consistent with the demands of IVF. For instance, women reported significantly more fatigue than their partners throughout the IVF cycle especially at the time of retrieval when they underwent the medical procedures for egg collection. Such differences would be expected given the schedule of injections, blood tests and scans as well as powerful medication to which only women were exposed. One might expect that if men and women relied primarily on each other’s ratings when making their own that such differences in distress, social contacts and fatigue would not occur. Couples were also specifically asked to complete their ratings separately and given the emphasis placed on the importance of the study there was no reason to believe patients would not follow these instructions.

The similarity in couples’ response pattern to IVF may not have emerged from previous studies because of the nature of assessments and statistical techniques used. Specifically, many studies have focused analyses on gender differences at single time points (before or after treatment) without taking into account the pattern of change across time. It would be difficult to draw any conclusions about the resemblance of couples response pattern from such methodologies. However, when our findings are considered in light of studies that do take these changes into account, our findings are consistent with previous reports (Leiblum et al., 1987; Baram et al., 1988; Newton et al., 1990; Connolly et al., 1993; Slade et al., 1997). Our findings would therefore suggest that men and women are similarly affected by the events of IVF.

Based on the pattern of ratings across the different stages of IVF we found that days surrounding retrieval and transfer were associated with pronounced changes in reactions for both husbands and wives. Interestingly, during these stages couples reported mixed feelings in that heightened intimacy and greater hopefulness for pregnancy occurred alongside greater distress, more social withdrawal and (in women) greater fatigue. While the changes in social contacts and fatigue can reasonably be attributed to the physical demands of treatment as mentioned previously, the more ambivalent feelings appear to be due to psychological factors. Closer examination of daily ratings for the 4 days between the HCG injection and embryo transfer would suggest a pattern of anticipatory distress prior to major events (e.g. retrieval and transfer) with a concomitant increase in more positive reactions (i.e. optimism, intimacy), presumably as these stages were passed. Leiblum et al. (1987) have described couples reactions during these stages as one of ‘cautious optimism’ and our results would support this interpretation. This pattern may be attributed to the significant uncertainty inherent in the stage-like nature of IVF as during these stages patients must temper their elation at the success of each stage with knowledge that treatment may still be unsuccessful. In other infertility studies this cyclic pattern has been expressed in terms of fluctuations between worry–
confidence, frustration–relief and sadness–elation (Mahlstedt et al., 1987; Seibel and Levin, 1987; Harlow et al., 1996). The similarity in couples’ responses to these stages of treatment suggest that both are equally affected by the uncertainty of treatment though women experience the distress component at a more intense level.

The substantial increase in optimism and intimacy during oocyte retrieval and embryo transfer is noteworthy. It would seem that successful transfer of at least some embryos fosters feelings of emotional closeness between husbands and wives and increases the couples’ sense that pregnancy will be achieved. Boivin and Takefman (1996) have suggested that attempts to make patients more realistic about pregnancy should occur at this time rather than, as is usual, before treatment begins (Leiblum et al., 1987). However, our findings indicate that the blissful period is short-lived as couples’ hopefulness eventually decreased during the 2 week waiting period. Leiblum et al. (1987) had also found in their retrospective study that women emphasized more the intimacy aspect of this time period while men emphasized more the renewed hope that transfer brought the couple. Our findings do not support this differentiation as both men and women reported a similar increase in optimism and intimacy. As the study by Leiblum et al. was retrospective, the patients recall of this period may have been biased by the emotions they experienced at the time of treatment failure.

Interestingly, women reported less intimacy with their spouse during the week that preceded the pregnancy test day. We do not know what event could have explained this type of withdrawal, but it may possibly be due to the additional physical cues women experience at this time. As Seibel and Levine (1987) have commented women become intensely focused on monitoring their physical condition during the 2 week waiting period. Such vigilance can be distracting and may be associated with a period of withdrawal from the spouse. This may be particularly true if the wife wishes to protect the husband from physical cues which may potentially signal a negative pregnancy test. Indeed, Miall (1986) suggested that women were very protective of their partners even to the point of taking responsibility for a male factor problem.

While there was much similarity in the response pattern of men and women, women did react to treatment with more distress then men, especially at the time of retrieval and at the time of the pregnancy test. Our measure of distress was based on daily ratings of different negative emotions including, for example, sadness, nervousness and tension. Because we did not have a baseline measure it was not possible to determine whether the differences observed between men and women were due to some aspect of undergoing IVF or to emotional differences that existed prior to treatment. While differences in emotional reactions between women and their partners are not consistently found (Freeman et al., 1985), there does seem to be more evidence to support the view that infertility and its treatment have a greater negative impact on women than men (Wright et al., 1989). This gender difference has been attributed to general social and biological factors (e.g. identity issues, maternal instincts) as well as more practical factors (e.g. women undergo most of the intrusive medical procedures) (Wright et al., 1989; Berg and Wilson, 1991). As gender differences in depression and anxiety are a well-established finding in many areas of health and fertility (Edelmann, 1990; Mazure et al., 1992), our findings would seem to reflect a general discrepancy in emotional profile rather than one specific to IVF.

While longitudinal evaluations generally yield more complete assessments of the phenomena under study, they may undermine generalization to other populations especially when attrition is high. While only about 45% of patients completed all study materials we do not feel that attrition affected the validity of study conclusions. First, a number of patients did not complete the study because they failed to complete the treatment cycle. These were patients who had agreed to be part of the study but who, for medical reasons, had their IVF protocol cancelled prematurely due to poor hormonal response, poor quality gametes and/or failed fertilization. While this source of attrition was significant (i.e., 18%) it was expected as cancellation rates in most fertility centres are about this level. A second group of patients, approximately 15%, withdrew from the study because of the demands of participating in it. While this source of attrition could have had a more significant impact on generalizations to other populations, statistical tests showed that the final sample of patients did not differ from those who either discontinued treatment for medical reasons or psychological reasons on medical or demographic variables.

In some respects, withdrawal rate in this study was exceptionally low considering that patients were asked to rate their emotional reactions every day for 35 days. Indeed, much higher withdrawal rates (e.g. 40%) have been recorded in previous studies where reactions were rated only twice, prior to and after IVF (Leiblum et al., 1987; Baram et al., 1988; Newton et al., 1990).

In conclusion, couples responded in a similar way to IVF indicating that different approaches to psychological care for men and women may not be warranted during the actual treatment cycle. We propose that the most important psychological determinant of reactions during IVF is the uncertainty of treatment procedures. That is, waiting to find out whether each stage of IVF has been passed or failed. Spouses appear to be equally sensitive to this uncertainty and both appear to respond to it with ambivalent feelings involving distress and more positive feelings of hope and emotional closeness. From a practical perspective, there is little clinic staff can do to minimize the uncertainty couples experience about the outcome of IVF as relatively few precise predictors of treatment outcome exist. However, clinic staff can help reduce the uncertainty of other aspects of treatment by providing couples with better expectations for medical procedures and by providing results more swiftly, thereby reducing, if not the uncertainty, at least the period with which couples must cope with it.

Acknowledgements

The authors thank Katarena Wesslen for help with the recruitment of patients. This study was supported by a Swedish–British Academic Cooperation grant from the British Council awarded to J. Boivin and T. Bergh.
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Received on April 1, 1998; accepted on August 27, 1998