Infertility treatment and marital relationships: a 1-year prospective study among successfully treated ART couples and their controls

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BACKGROUND: Evidence about the effects of infertility and assisted reproduction technique (ART) on marital relationships is discrepant. Here, we examined the impact of ART on marital relationships. The roles of life stressors, infertility and treatment characteristics in predicting marital relations were also evaluated. METHODS: Subjects: 367 couples with singleton IVF/ICSI pregnancies. Controls: 379 couples with spontaneous singleton pregnancies. Women and men were assessed when the child was 2 months (T2) and 12 months old (T3). They further reported stressful life events at T2 and depression in pregnancy. RESULTS: No between-group differences were found in marital satisfaction and dyadic cohesion. Dyadic consensus deteriorated from T2 to T3 only among control women. Sexual affection was low among control men at T2 and stressful life events decreased it further. Depression during pregnancy predicted deteriorated marital relations only in control couples. Several unsuccessful treatment attempts were associated with good dyadic consensus and cohesion among ART women. Spontaneous abortions and multiple parity predicted poor marital satisfaction in ART women, whereas long duration of infertility and multiple parity predicted poor marital relations in ART men. CONCLUSIONS: Successful ART does not constitute a risk for marital adjustment. The shared stress of infertility may even stabilize marital relationships.

Key words: ART/early parenthood/infertility/marital relationship

Introduction

Having a baby is a welcome experience, especially so for formerly infertile couples. The lifetime incidence of infertility is estimated to be between 10% and 17% (Snick et al., 1997). According to a recent Finnish Health 2000 survey, 17.6% of women aged 20–54 had experienced a period of involuntary childlessness sometime during their lives (Health 2000, 2004). Infertility is regarded as a major life crisis (Burns and Covington, 1999) that has the potential to threaten the stability of individuals and relationships. During recent years, the development of assisted reproduction technique (ART) methods has made parenting possible for a substantial number of infertile couples. For the majority of infertile couples successful treatment outcome results in improvement in emotional wellbeing (Leiblum et al., 1998; Repokari et al., 2005), but less is known about how a previously infertile couple, as a unit, is affected during the transition to parenthood.

Social, psychological and infertility-related issues as well as gender may be of relevance in determining the impact of infertility on marital relationships. Several studies have agreed that women experience infertility as being more stressful than men (Henning and Strauss, 2002). Depression, anxiety and health complaints are more commonly seen in infertile women than men (Abbey et al., 1994; Demyttenaere et al., 1998; Adashi et al., 2000). Women experience marital and sexual relationships less positively than men after infertility diagnosis and during infertility treatments (Bringhenti et al., 1997; Slade et al., 1997; Leiblum et al., 1998; Newton et al., 1999; Monga et al., 2004). The ability to reproduce is intimately tied to sexuality, self-image and self-esteem. Sexuality and sexual activity are also important means of expressing feelings of closeness and intimacy in partnership. During infertility treatments, the pleasurable experience of sexual intimacy may be negatively affected and this may contribute to marital distress.
Women with idiopathic infertility have been reported to be more anxious and dissatisfied with themselves than women with an identified cause of infertility (Oddens et al., 1999; Wischman et al., 2001). Nachtigall et al. (1992) found a negatively affected gender identity among infertile women, no matter whether they had diagnosed female infertility or not. Men have reported lower overall life satisfaction, heightened distress and higher treatment-related stress after being diagnosed as responsible for the couple’s infertility (Connolly et al., 1992; Beutel et al., 1999). A recent study revealed a reduction in sexual desire and satisfaction in men after infertility diagnosis, regardless of the cause of infertility (Ramezanzadeh et al., 2006).

A long duration of infertility (Berg and Wilson, 1991) and repeated experience of treatment failure (Guerra et al., 1998) appear to be important risk factors in predicting distress, which may lead to relationship dissatisfaction as well. The effect of infertility on marital relationships can also be modified by personal coping strategies, sharing and communication between spouses and partners’ involvement in infertility treatment (Pasch et al., 2002; Schmidt et al., 2005). On the basis of infertility-related multiple risk models (Sameroff, 1999), it can be expected that other life stressors would have a stronger effect on marital relations in previously infertile couples than in control couples.

The transition to parenthood is a period of intra- and interpersonal changes and may bring up unexpected problems. The first child’s birth has a significant effect on marital relations because the relations change from dyadic to triadic (Perren et al., 2003). In general, marital relationships seem to be especially vulnerable during the transition to parenthood, and several studies have revealed a decline in marital satisfaction and an increase in marital conflict among parents (Belsky, 1990; Andrews et al., 1992; Cowan and Cowan, 2000; Shapiro et al., 2000; Rholes et al., 2001). However, during recent years, it has been shown that there is a great variability in the way the marital relations change during transition to parenthood (Bradbury et al., 2000). It has been suggested that babies do not create distress between couples nor bring couples closer together but rather amplify already existing difficulties, which can be seen as deterioration of the relationship (Cowan and Cowan, 1988). Comparisons of marital relations between couples who conceived either spontaneously or via ART have shown great variation. Couples with successful ART have been reported to show greater marital cohesion (e.g. a mutual feeling of being a couple, sharing things and ideas) (Slade et al., 1997), less marital distress (Benazon et al., 1992), to experience their relationships with their partners in a more positive way (Strauss et al., 1992) and to have more stable relationships (Sydsjö et al., 2002) than couples experiencing spontaneous pregnancy. Some studies have revealed no difference in marital satisfaction between ART and control couples (Colpin et al., 1995; McMahon et al., 1997; Klock and Greenfeld, 2000) and between ART couples and those couples who had children through adoption (Leiblum et al., 1998). In contrast, there are also reports of more marital conflicts among ART parents than controls (Gibson et al., 2000; Hahn and DiPietro, 2001). The majority of research on the impact of infertility and successful ART on marital relationships is cross-sectional and based on relatively small sample sizes. Again, previous longitudinal follow-up studies show somewhat contradictory findings. Sydsjö et al. (2002) followed ART couples and their controls from pregnancy until the children were 1 year old. They found that during the child’s first year ART couples did not experience a decrease in their marital satisfaction, as was the case among spontaneously conceiving couples. Hjelmstedt et al. (2004) followed ART couples and their controls from early pregnancy to 6 months post-partum. They found no difference between groups in marital satisfaction.

The first aim of the present controlled, prospective longitudinal study was to assess whether ART couples with singleton pregnancies differed from fertile controls with spontaneous singleton pregnancies in the quality and change of marital relations during the first year of parenting. The second aim was to evaluate whether psychosocial stressors differently influence the quality and change of marital relationships in the ART and control groups. The third aim was to analyse, in the ART group, how infertility- and treatment-related factors predicted the quality of marital relationships.

Materials and methods

Participants

The study sample consisted of 746 voluntarily participating married or cohabiting couples with singleton pregnancies. Of these, 367 pregnancies had started after successful ART, whereas 379 control couples had conceived spontaneously. All Finnish-speaking couples who had viable pregnancies after ART (fresh or frozen embryo transfer after IVF or ICSI treatment with their own gametes) during 1999 at five infertility clinics in Finland (Helsinki University Central Hospital, the Family Federation in Helsinki, Oulu and Turku—representing South, West and North Finland, respectively—and Helsinki Deaconess Institute) were offered information about this study. The control group was recruited from consecutive Finnish-speaking couples participating in a routine ultrasonographic examination offered at 16–18 weeks of gestation at Helsinki University Central Hospital the same year. These control couples reported no history of infertility and the age of mother was over 25 years.

The couples in both groups who were willing to participate signed an informed consent document, and filled in a questionnaire during the second trimester (T1; 18–20 weeks of gestation; mean 19.7; SD 3.5), when the child was 2 months (T2) and 12 months old (T3). Questionnaires from the women and men were returned separately in prepaid envelopes to the research nurse, who contacted every couple before sending the questionnaires at T2 and T3 to make sure they still wanted to participate. This study was approved by the Ethics Committees of the participating clinics.

Measures

Both partners reported their socioeconomic status (SES), parity, number of earlier marriages/cohabiting partnerships and depressive symptoms during the second trimester of pregnancy (T1) and stressful life events when the child was 2 months old (T2). Information about the quality of marital relations was collected at T2 and when the child was 12 months old (T3).

Quality of marital relationship. Women’s and men’s perceptions of their marriage were assessed twice: when the child was 2 months (T2)
and 12 months old (T3), by means of the dyadic adjustment scale (DAS) (Spanier, 1976) which is a 32-item self-report questionnaire. This scale yields an overall score and has four subscales: dyadic consensus (agreement on spending spare time, financial matters, general view of life), dyadic cohesion (having discussions together, having interests in common), marital satisfaction (the amount of quarrels, trusting one another, general happiness in relationship) and sexual affection (sexual desire, expressions of love). The spouses were asked to assess their marital relationships on a six-point scale ranging from 0 to 5. High total and subscale scores indicate positive appraisal of the marriage. The DAS has proved to be a reliable and valid scale designed to detect changes in marital relationships (Spanier and Rovine, 1983), and it has been widely used in studies related to post-partum adjustment (Booth et al., 1999; Misri et al., 2000; Elek et al., 2003). The T2/T3 reliabilities of wives’ perceptions were good (dyadic consensus, \( \alpha = 0.86/0.88 \); marital satisfaction, \( \alpha = 0.85/0.84 \); dyadic cohesion, \( \alpha = 0.76/0.80 \) and sexual affection, \( \alpha = 0.72/0.65 \)), as were those of the husbands (dyadic consensus, \( \alpha = 0.88/0.88 \); marital satisfaction, \( \alpha = 0.78/0.80 \); dyadic cohesion, \( \alpha = 0.73/0.73 \) and sexual affection, \( \alpha = 0.75/0.61 \)).

Depressiveness was measured by means of a shortened (13-item) version of Beck’s depression inventory during pregnancy. Both women and men estimated how frequently they experienced the described feelings by using a six-point scale ranging from not more than usual (0) to much more than usual (5). Reliability was 0.75 for women and 0.80 for men. To distinguish individuals with a significant amount of depressive symptoms, indicating probable depression, a cut-off point of 14 was applied. This cut-off point has been shown to exhibit good specificity and sensitivity and a low rate of misclassification (Furlanetto et al., 2005).

SES (both partners) was assessed according to education, profession and jobs in five categories: (i) high professional: director, manager, professionals in leading positions, (ii) low professional: entrepreneur, works manager, trade, nurse and so on, (iii) skilled worker: shop assistant, clerk, nursing assistant and so on, (iv) unskilled worker, and (v) no paid job outside the home and students. This categorization is derived from the Finnish Statistical Office and has been widely used in Finnish epidemiological studies (Almqvist et al., 1999).

Stressful life events were assessed in terms of nine changes and stressors in life as conceptualized by Holmes and Rahe (1967). The events were related to family health (own illness and partner’s), changes in residence, work and family relationships (e.g. divorce). Both partners reported whether they had experienced the stressor since pregnancy: yes = 1; no = 0. The distribution of the scale was skewed, and a dichotomy sum variable was constructed indicating the number of stressful events: 0 = not at all and 1 = one or more.

Infertility and treatment characteristics. The recruiting infertility doctor or the research nurse collected information on background infertility characteristics from the clinics’ patient registries and from structured questionnaires. The data collected included: number of miscarriages (0 = none, 1 = one, 2 = more than one), number of couple’s children (categorized as 0 = none, 1 = one, 2 = two or more), and years of infertility (categorized as 1 = ≤3 years, 2 = 4–6 years, 3 = 7–9 years, 4 = ≥10 years). Furthermore, the cause of infertility was categorized as 1 = female, 2 = male, 3 = combined and 4 = unknown. Treatment variables were number of previous unsuccessful treatments (fresh or frozen embryo transfers, categorized as 0 = none, 1 = 1–3, 2 = 4–6, 3 ≥6 attempts). Type of treatment was categorized as 1 = fresh IVF, 2 = fresh ICSI, 3 = frozen IVF and 4 = frozen ICSI.

The participation rate was 69.8% (full response rate, T1 + T2 + T3). Drop-out analysis (attrition analysis) revealed that the parents in the ART group had a greater full response rate than those in the control group (73.6% versus 66.2%, \( P = 0.001 \)). Among men, lower SES \( \chi^2 (6, 724) = 18.39, P < 0.05 \) and multiple earlier marriages/cohabiting partnerships \( \chi^2 (6, 724) = 28.30, P < 0.01 \) were associated with lower participation rate. None of the demographic factors were associated with the participation rate among women.

Statistical analyses

(i) Chi-square statistics were used to compare categorial variables between groups and paired t-tests were used to compare linear variables within couples.

(ii) To examine the impact of ART on the quality and change in marital relations from T2 (child’s age 2 months) to T3 (child’s age 12 months), we conducted repeated-measurement MANCOVAs with ART versus control group as a between-subject variable, and number of couple’s children as a covariant. The dependent variables were dyadic consensus, marital satisfaction, dyadic cohesion and sexual affection measured at T2 and T3. The analyses were separately run for women and men.

(iii) To examine whether couple-related (number of children, length of partnership and number of previous partnerships) and psychosocial stress (SES, stressful life events and depressive symptoms in pregnancy) factors differently predict the quality and change of marital relationships among ART and control groups, we added corresponding two-way interactions into the main effect repeated-measure MANOVAs. The interaction terms included group (ART versus control) × number of children (none versus one or more), group × length of partnership (1–5 versus 6–20 years), group × stressful life-events (none versus 1–4 events) and group × depressive symptoms in pregnancy (none and mild versus moderate and severe). The dependent variables were the four dimensions of marital relationship at T2 and T3 (dyadic consensus, marital satisfaction, dyadic cohesion and expression of affection). Again, analyses were separately run for women and men. Significant between-subject interaction ANOVA effects indicate that the couple-related and psychosocial stress factors have a different impact on the quality of marital relations in the ART and control groups, and significant repeated-measure MANOVA interaction effects indicate that these factors have a different impact on the changes in marital relationships during the first year of parenting.

(iv) To examine how infertility and treatment characteristics predict the quality and change of marital relationships within the ART group, we conducted repeated-measure MANOVAs on dyadic consensus, marital satisfaction, dyadic cohesion and expression of affection at T2 and T3. The independent between-subject variables were duration of infertility, number of earlier spontaneous abortions, cause of infertility, number of unsuccessful treatments and nature of the successful ART treatment.

(v) To clearly define the impact of first-time parenting on marital relations, we reanalysed the data among first-time parents (n = 274 for ART couples and n = 172 for control couples). We replicated the analyses about the role of couple-related (length of partnership and number of earlier partnerships) and psychosocial stress factors in first-time parents.

Results

Descriptive statistics

The frequencies and percentages of couple-related and psychosocial stress variables in the ART and control group women and men are given in Table I. The control couples had more children than the ART couples, and the ART couples had
been in their relationships for longer than the controls. The control group women reported more previous partnerships (divorces) than the ART group women. The groups did not differ in SES, stressful events and depressive symptoms in pregnancy. About one-third of the women and men in both the ART and control groups were high professionals, which is slightly more than the Finnish average, and 10–13% were unskilled workers, which corresponds with the national statistics (Statistics Finland, 1999). The percentages of cases of probable depression during pregnancy in our sample were 8.2% for ART women, 9.1% for control women (ns), 5.5% for ART men and 7.4% for control men (ns).

### Quality and change in marital relations during the first year of parenting

Table II presents the results regarding quality and change of marital relations among ART and control women and men.

#### Women

No group differences were found among women in the quality of marital relations. The groups differed, however, in the change of women’s experiences of dyadic consensus across the child’s first year. Dyadic consensus decreased substantially among control women, but not among ART women during the first year of parenting (Figure 1). In the subgroup of first-time parents, there was a difference between ART and control groups in the level of women’s dyadic consensus, $F(1,306) = 5.11, P < 0.02$. Dyadic consensus was higher among ART than control women.

#### Men

Men in the ART group reported a higher level of sexual affection at T2 than control men, whereas no group differences were found at T3 (Figure 2). The results among first-time fathers were similar with the results in the whole group: ART men reported a higher level of sexual affection at T2 than control men, $F(1,297) = 5.04, P < 0.04$. As in the whole sample, sexual affection increased among control men, and thus there were no differences between groups at T3.

### Effects of couple-related and psychosocial stress factors on marital relations

Summaries of interaction effects between groups and couple-related factors and between groups and psychosocial stress factors are reported for women in Table III and for men in Table IV.

#### Women

The results in Table III show that significant depressive symptoms in pregnancy differently predicted marital relations (both

### Table 1. Differences between assisted reproductive technique (ART) and control group women and men in couple-related and psychosocial stress factors: percentages and frequencies

<table>
<thead>
<tr>
<th></th>
<th>ART group</th>
<th>Control group</th>
<th>$\chi^2$-values for group differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women % (n)</td>
<td>Men % (n)</td>
<td>Women % (n)</td>
</tr>
<tr>
<td>Couple-related factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Couple’s number of children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>75.1 (274)</td>
<td>45.4 (172)</td>
<td>83.50 (2,744)****</td>
</tr>
<tr>
<td>One</td>
<td>22.5 (82)</td>
<td>36.4 (138)</td>
<td></td>
</tr>
<tr>
<td>Two or more</td>
<td>2.5 (9)</td>
<td>18.2 (69)</td>
<td></td>
</tr>
<tr>
<td>Length of partnership</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–5 years</td>
<td>16.3 (57)</td>
<td>32.4 (119)</td>
<td>26.35 (2,717)****</td>
</tr>
<tr>
<td>6–10</td>
<td>43.7 (153)</td>
<td>38.4 (141)</td>
<td></td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>40.0 (140)</td>
<td>29.2 (107)</td>
<td></td>
</tr>
<tr>
<td>Number of previous partnerships</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>72.2 (242)</td>
<td>63.9 (237)</td>
<td>5.81 (2,706)*</td>
</tr>
<tr>
<td>One</td>
<td>22.4 (75)</td>
<td>28.3 (105)</td>
<td>3.88 (2,661)</td>
</tr>
<tr>
<td>Two or more</td>
<td>5.4 (18)</td>
<td>7.8 (29)</td>
<td></td>
</tr>
<tr>
<td>Psychosocial stress factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High professional</td>
<td>28.2 (100)</td>
<td>33.4 (126)</td>
<td>4.95 (3,732)</td>
</tr>
<tr>
<td>Low professional</td>
<td>42.3 (150)</td>
<td>34.8 (165)</td>
<td>3.56 (3,695)</td>
</tr>
<tr>
<td>Skilled worker</td>
<td>16.3 (58)</td>
<td>12.5 (47)</td>
<td></td>
</tr>
<tr>
<td>Unskilled worker</td>
<td>13.2 (47)</td>
<td>10.3 (39)</td>
<td></td>
</tr>
<tr>
<td>Stressful life-events</td>
<td>23.4 (75)</td>
<td>29.3 (89)</td>
<td>2.74 (1,624)</td>
</tr>
<tr>
<td>Yes</td>
<td>76.6 (245)</td>
<td>70.7 (215)</td>
<td>1.49 (1,582)</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>71.0 (196)</td>
<td></td>
</tr>
<tr>
<td>Depressive symptoms in pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>18.3 (64)</td>
<td>18.4 (69)</td>
<td>6.69 (3,723)</td>
</tr>
<tr>
<td>Mild</td>
<td>31.2 (109)</td>
<td>36.9 (138)</td>
<td>1.42 (3,688)</td>
</tr>
<tr>
<td>Moderate</td>
<td>46.7 (163)</td>
<td>38.5 (144)</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>3.7 (13)</td>
<td>6.1 (23)</td>
<td></td>
</tr>
</tbody>
</table>

*P < 0.05.

**P < 0.01.

***P < 0.001.

****P < 0.0001.
quality and change) among ART and control women. Depressive symptoms in pregnancy predicted negative changes during the first year of parenting in dyadic consensus (Figure 3), marital satisfaction (Figure 4) and sexual affection, especially among control women. Further, stressful life events were differently associated with the quality of marital relations among ART and control women. Women in the ART group reported lower levels of dyadic consensus and cohesion, marital satisfaction and sexual affection when exposed to stressful life events, whereas among control women, the quality of marital relations was independent of stressful life events. Finally, sexual affection increased from T2 to T3 in both groups, except among ART women with earlier children.

In the subsample of first-time parents, depressive symptoms in pregnancy predicted negative changes during the first year of parenting in dyadic consensus, \( F(1,263) = 5.01, P < 0.05 \) and marital satisfaction \( F(1,263) = 3.87, P < 0.05 \), especially among control women. Also, stressful life events were differently associated with the quality of marital relations among first-time mothers in ART and control groups. When exposed to stressful life events, women in the ART group reported lower levels of dyadic consensus \( F(1,263) = 6.12, P < 0.01 \), dyadic cohesion, \( F(1,263) = 5.05, P < 0.01 \) and marital satisfaction \( F(1,263) = 3.84, P < 0.05 \), whereas among control women, the quality of marital relations was independent of stressful life events.

**Men**

The results in Table IV show that among men significant depressive symptoms in pregnancy and stressful life events...
### Table III. Summary of interaction effects between groups (ART versus control) and family and stress factors among women from T2 to T3

<table>
<thead>
<tr>
<th>Interactions between group and couple-related and psychosocial stress factors</th>
<th>Quality $F$-values for between-subject ANOVA</th>
<th>Change $F$-values for repeated MANOVA from T2 to T3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dyadic consensus</td>
<td>Marital satisfaction</td>
</tr>
<tr>
<td><strong>Couple-related factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of children</td>
<td>0.16</td>
<td>1.15</td>
</tr>
<tr>
<td>Length of partnership</td>
<td>1.49</td>
<td>2.05</td>
</tr>
<tr>
<td>Number of previous partnerships</td>
<td>1.46</td>
<td>1.35</td>
</tr>
<tr>
<td><strong>Psychosocial stress factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>0.53</td>
<td>0.24</td>
</tr>
<tr>
<td>Stressful life events</td>
<td>2.94*</td>
<td>8.56**</td>
</tr>
<tr>
<td>Depressive symptoms in pregnancy</td>
<td>26.07***</td>
<td>23.81****</td>
</tr>
</tbody>
</table>

* $p < 0.05$.  
** $p < 0.01$.  
*** $p < 0.001$.  
**** $p < 0.0001$.  

$n = 443$.  
The interactions models were: group (ART versus control) $\times$ number of children (none versus one or more), group $\times$ length of partnership (1–5 versus 6–20 years), group $\times$ stressful life events (none versus 1–4 events) and group $\times$ depressive symptoms in pregnancy (none and mild versus moderate and severe).  
$^c$ $F$-values for between-subject ANOVA.  
$^d$ $F$-values for repeated MANOVA from T2 to T3.

### Table IV. Summary of interaction effects between groups (ART versus control) and family and stress factors among men from T2 to T3

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<th>Change $F$-values for repeated MANOVA from T2 to T3</th>
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</thead>
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<tr>
<td></td>
<td>Dyadic consensus</td>
<td>Marital satisfaction</td>
</tr>
<tr>
<td><strong>Couple-related factors</strong></td>
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<tr>
<td>Number of children</td>
<td>0.34</td>
<td>1.00</td>
</tr>
<tr>
<td>Length of partnership</td>
<td>0.66</td>
<td>0.75</td>
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<td>Number of previous partnerships</td>
<td>1.13</td>
<td>0.46</td>
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<tr>
<td><strong>Psychosocial stress factors</strong></td>
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<tr>
<td>Socioeconomic status</td>
<td>0.31</td>
<td>0.16</td>
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<tr>
<td>Stressful life events</td>
<td>0.11</td>
<td>2.87</td>
</tr>
<tr>
<td>Depressive symptoms in pregnancy</td>
<td>1.91</td>
<td>0.80</td>
</tr>
</tbody>
</table>

* $p < 0.05$.  
$n = 443$.  
The interactions models were: group (ART versus control) $\times$ number of children (none versus one or more), group $\times$ length of partnership (1–5 versus 6–20 years), group $\times$ stressful life events (none versus 1–4 events) and group $\times$ depressive symptoms in pregnancy (none and mild versus moderate and severe).  
$^c$ $F$-values for between-subject ANOVA.  
$^d$ $F$-values for repeated MANOVA from T2 to T3.
differently predicted the quality of sexual affection and number of partnerships the change in marital satisfaction. Only among control men did stressful events and depressive symptoms during pregnancy predict a lower level of sexual affection, whereas among ART men, stressors did not have an effect. Group differences in sexual affection are illustrated in Figure 5A and B. Similar to the analysis of the whole sample, the analysis for sub-sample of first-time fathers replicated the result that stressful life events and depressive symptoms in pregnancy differently predicted marital relations among ART and control men. Only among control men did stressful life events \( F(1,245) = 7.07, P < 0.008 \) and depressive symptoms during pregnancy \( F(1,245) = 7.38, P < 0.007 \) predict a lower level of sexual affection, whereas among ART men, stressors did not have an effect on marital relations.

Infertility and treatment-related factors predicting marital relations within the ART group

Infertility and treatment-related factors predicting marital relations within the ART group are shown in Table V. Different characteristics predicted marital relations among women and men: spontaneous abortions and the number of treatments were important factors for women, but length of infertility was important for men. Women who had experienced spontaneous abortions reported lower marital satisfaction than those without spontaneous abortions. Women who had experienced several unsuccessful treatments reported higher dyadic consensus and dyadic cohesion than women after one attempt. Men with a long duration of infertility (>6 years) reported lower levels of dyadic consensus and marital satisfaction than men with a shorter experience of infertility. Multiple parity predicted poor dyadic cohesion and low marital satisfaction in both partners.

Discussion

We studied the quality and change in marital relationships during the first year of parenting among formerly infertile and successfully treated couples and their controls. Our results substantiate earlier research showing neutral or positive impacts of successful ART on marital relations (Slade et al., 1997; Sydsjö et al., 2002; McMahon et al., 2003) and speak against the hypothesis of general vulnerability of ART couples (Andrews et al., 1992). On the basis of the stressful and traumatic nature of involuntary infertility, we expected marital relations to deteriorate when these experiences are combined with other stressors, such as low SES, divorce, stressful life events and psychological distress. In contrast to our expectations, depression in women during pregnancy
resulted in decreased dyadic consensus, marital satisfaction and sexual affection in the control group, but not in the ART group. Sexual affection was very low among control men 2 months after the child was born and stressful life events predicted decreased sexual affection in control men but not in ART men. Slightly positive effects of former infertility and successful ART on marital relations were dominant, as indicated by a decrease in dyadic consensus among control but not ART women during the child’s first year and the higher level of sexual affection among ART men at T2. Moreover, ART couples’ marital relationships turned out to be more resistant to the negative effects of psychosocial stressors. The transition to first-time parenting is a unique psychological event, which thus could be expected to have a more profound effect on marital relations than the birth of other children. In our sample, we found only minor differences between first-time parents and those who already had children. The number of children did not appear to be an important factor in determining the differences in marital relations between ART and control groups.

Our results suggest an alternative hypothesis for understanding the dyadic experiences of infertility and its treatment: shared stress, bereavement and disappointments can increase a couple’s feeling of cohesion and result in improvement in their marriage. There is evidence showing that congruency of couples’ perceptions of infertility, and sharing their sorrow and consoling each other is associated with good marital adjustment (Peterson et al., 2003). Pasch et al. (2002) found that the quality of marriage was better when both spouses had a common involvement in infertility treatments and both saw having a child as important. On similar lines, our results within the ART group show that treatment success at the first
attempt was associated with poorer dyadic consensus and cohesion among women and marginally lower sexual affection among men. Thus, a couple’s commitment to continue infertility treatment despite failures can increase spouses’ closeness, and shared hardships and disappointments may create a feeling of marital cohesion (Peterson et al., 2003). On the other hand, the decision to continue treatment after failures may lead to selection of couples: those with well-functioning coping styles and good spousal relationships may be more likely to continue than couples that are very vulnerable to life stressors.

Earlier research has shown that infertile women react more strongly to infertility than men (Hjelmstedt et al., 1999) and are more vulnerable than men to mental health problems, to low self-esteem (Dhillon et al., 2000), and to marital dissatisfaction (Slade et al., 1997; Monga et al., 2004). Women’s vulnerability has been attributed to their intense desire for motherhood (Hjelmstedt et al., 1999), and it has been shown in previous studies that infertility has a smaller emotional impact on men than on women (van Balen, 1996; Greil et al., 1997; Leiblum et al., 1998; Beutel et al., 1999, Newton et al., 1999; Peterson et al., 2003). Our results suggest that different aspects of infertility and its treatment are important for marital satisfaction for women and men. Among women undergoing ART, the numbers of unsuccessful treatments and spontaneous abortions were important for their marital relations, whereas among men, the length of infertility was a significant factor. For men, the increasing stress of long-lasting infertility is more wounding, as has been reported earlier (Connolly et al., 1992). Previous research has revealed that during the first 3 years of infertility couples showed stable marital adjustment and sexual satisfaction, which deteriorated after that (Berg and Wilson, 1991). Our results departed from this in that the deterioration happened later, after 6 years of infertility, and only among men. The length of infertility was not salient for women.

Spontaneous abortion can be considered as a traumatic event often followed by depression and anxiety (Beutel et al., 1996; Janssen et al., 1996; Lee and Slade, 1996). A previous follow-up study on women’s mental health revealed increased levels of anxiety even 5 years after spontaneous abortion (Broen et al., 2005). An association between a low level of marital adjustment and difficulty in coping with loss, resulting in prolonged grief in men after spontaneous abortion has been reported (Franche, 2001), but knowledge about the prolonged effects of spontaneous abortions on marital relations is insufficient. Spontaneous abortion may be experienced more as a loss of a child than an unsuccessful treatment cycle. After unsuccessful treatment cycles, sadness, anger and depression are common reactions (Leiblum et al., 1987), but long-lasting negative effects on marital relations have not been reported. On the contrary, in a previous study, the number of IVF cycles significantly predicted positive marital adjustment (McMahon et al., 2003), which is in line with our present findings.

There seems to be great individual variability in the experience of infertility and its effects on life among both women and men (Benyamini et al., 2005; Verhaak et al., 2005), and the effect of infertility on marital relations is modified by factors such as personal coping with infertility, communication between partners and partners’ involvement in infertility treatments (Pasch et al., 2002). Many aspects of infertility may lead to deterioration in marital relationships of infertile couples, including personal reactions such as feelings of guilt (Van Balen and Trimbos-Kemper, 1994), lowered self-esteem (Abby et al., 1992), feelings of inadequacy as a man or a woman (Lee et al., 2001) and interpersonal aspects such as deterioration of sex life (Van Balen and Trimbos-Kemper, 1994; Oddens et al., 1999) and communication (Wright et al., 1991). Our prospective study revealed that infertility and its treatment characteristics were salient for ART couples’ marital relations only in the first 2 months of parenting, but not later when the child was 1 year-old. New challenges of mothering and fathering seemed to sweep away possible earlier sorrows and concerns, giving way to new ones.

Knowledge about the different experiences of infertility among men and women is important for professionals working with ART couples. As our results suggest, infertility, as with any life crisis, may enhance personal growth, activate resources and strengthen marital relationships. Health professionals can potentially encourage that process among infertile couples.

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