

# A longitudinal, prospective study on emotional adjustment before, during and after consecutive fertility treatment cycles

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**BACKGROUND:** A longitudinal study into the course of the emotional response to IVF from pre-treatment to 6 months post-treatment and factors that contributed to that course. **METHODS:** A total of 148 IVF patients and 71 partners completed self-report questionnaires on anxiety, depression, personality characteristics, meaning of fertility problems, coping, marital relationship and social support at pre-treatment. Assessments of anxiety and depression were repeated immediately following the final treatment cycle and again 6 months later (follow-up). **RESULTS:** Women showed an increase of both anxiety and depression after unsuccessful treatment and a decrease after successful treatment. Men showed no change in anxiety and depression either after successful or after unsuccessful treatment. In the 6 months after unsuccessful treatment, women showed no recovery. At follow-up, >20% of the women showed subclinical forms of anxiety and/or depression. Personality characteristics, meaning of the fertility problems, and social support determined the course of the emotional response. **CONCLUSIONS:** Most women adjusted well to unsuccessful treatment, but at follow-up, a considerable proportion still showed substantial emotional problems. Personality characteristics, pre-treatment meaning of the fertility problems and social support have demonstrated the adjustment to unsuccessful IVF in women. This allows early identification of women at risk as well as tailored interventions.

*Key words:* anxiety/depression/IVF/longitudinal study/prospective study

## Introduction

Fertility problems consist of both medical and emotional aspects. While the physical impact of the medical treatment is considerable (Evers and Te Velde, 1999), couples considered emotional aspects more stressful (Kopitzke *et al.*, 1991). For most couples, unsuccessful IVF or ICSI treatment means the end of further medical treatment possibilities. This does not, however, signal the end of emotional suffering. How do couples adjust emotionally to unsuccessful fertility treatment? Despite a great deal of research into the emotional aspects of IVF and ICSI treatment, there are still few longitudinal studies on emotional adjustment before, between and after different consecutive treatment cycles. These types of studies would provide insight into the course and intensity of emotional response to treatment. In addition, the study would make it possible to identify those factors that contribute to the course of emotional adjustment. This would enable couples at risk of developing severe emotional problems as a result of one or more unsuccessful treatment cycles to be identified in time and offered counselling.

The stressor of fertility problems comprises various elements: the threat of treatment and possible childlessness,

uncertainty and uncontrollability of treatment outcome, and the loss of hopes of pregnancy and creating a family with one or more children (Dunkel-Schetter and Lobel, 1991). Threatening situations with much uncertainty about the course they will take can evoke anxiety. A sense of loss, and loss of control, can evoke feelings of depression. Differentiating between anxiety and depression is important because they both require different psychosocial interventions (Hawton *et al.*, 1989).

Previous cross-sectional studies on the course of emotional response to fertility problems in general have compared groups of patients in different phases of fertility treatment. These studies revealed curvilinear relationships between length of treatment and emotional adjustment in women before they started IVF or ICSI treatment with most distress in those with moderate length of treatment compared to those with less and more length of treatment (Berg and Wilson, 1991; Boivin *et al.*, 1995). After the start of IVF or ICSI, a positive relationship between distress and the number of unsuccessful treatment cycles was found (Beaurepaire *et al.*, 1994; Slade *et al.*, 1997). After ceasing fertility treatment, however, negative emotional response seems to decrease as

time passes, indicating that couples seem to eventually adjust to their infertility (Weaver *et al.*, 1997; Leiblum *et al.*, 1998; Daniluk, 2001; Hammerberg *et al.*, 2001). However, there is a lack of longitudinal studies that supported these findings.

A few prospective studies have been carried out to predict emotional response to fertility treatment (Litt *et al.*, 1992; Terry and Hynes, 1998). These studies supported the idea that optimism and acceptance of fertility problems are protective factors in adjustment to unsuccessful fertility treatment. Both studies predicted emotional response to only one treatment cycle and did not differentiate between anxiety and depression.

Next to optimism and acceptance, there are other factors that might predict emotional response to unsuccessful fertility treatment. Selection of possible predictors can be based on stress vulnerability models (e.g. Ormel and Wohlfart, 1991; Costa *et al.*, 1996; Holahan *et al.*, 1996). Neuroticism, cognitions of helplessness when faced with a stressor, avoidant coping and dissatisfaction with the marital and sexual relationship are identified as risk factors, whereas optimism, acceptance of the stressor, and the perceived availability of social support are identified as protective factors for the development of emotional problems as the result of a severe stressor (see e.g. Cohen and Wills, 1985; Carver *et al.*, 1993; Aldwin, 1994; Costa *et al.*, 1996; Terry and Hynes, 1998; Alloy *et al.*, 1999; Evers *et al.*, 2001).

In previous studies (Verhaak *et al.*, 2001, 2005), we have investigated short-term emotional response to the first IVF or ICSI treatment cycle (assessments took place 4 weeks after the pregnancy test following the first cycle). In addition, we have investigated a comprehensive model that incorporates several important risk and protective factors in order to predict the short-term emotional response to the first unsuccessful treatment cycle. These studies revealed an increase in anxiety and depression after the first unsuccessful cycle. In addition, they supported the importance of neuroticism, cognitions of helplessness when faced with fertility problems and dissatisfaction with the marital relationship as risk factors for the development of higher levels of anxiety and depression. In addition, acceptance of fertility problems and perceived social support were indicated as protective factors for the development of higher levels of both anxiety and depression.

In the present paper, we examined long-term emotional response of women to consecutive treatment cycles and tested the validity of the comprehensive model for investigating factors that contributed to the course of the emotional response to repeatedly unsuccessful IVF or ICSI treatment cycles 6 months after the final cycle. We were interested in the set of factors that account for the most explained variance in long-term changes in anxiety and depression. In addition, we explored the long-term emotional response to consecutive treatment cycles in men.

## Materials and methods

### Participants

Participants were recruited at a university hospital in a medium-sized city in The Netherlands. Inclusion criteria: Dutch-speaking

and about to start their first cycle of a new IVF or ICSI treatment. A total of 375 women and 340 of their partners agreed to participate. Of these, 288 women responded to questionnaires after the first treatment cycle (77%). After the last cycle, 205 of these 288 women (71%) completed all the questionnaires and 147 of these 205 women (72%) also took part in the follow-up assessments. From the total of 340 men, 222 (65%) responded after the first treatment cycle. After the last treatment cycle, 125 of these 222 (56%) responded and 71 of these 125 also took part in follow-up assessments (57%). Complete data sets for three measurement points were received from 148 women (40%) and 71 of their partners (21%). Demographic characteristics for these women and their partners are presented in Table I.

The course of the emotional response was investigated for women and men after both unsuccessful and successful treatment. Factors that contributed to the course of the emotional response were only investigated in women after unsuccessful treatment.

Differences in response between women and men were due to the last recall procedure that focused on women only.

### Design

Data were collected before the start of medication, i.e. 5–10 days before the start of the first IVF/ICSI treatment cycle, 4 weeks after the pregnancy test subsequent to this and possible next treatment cycles, and 6 months after the last cycle. For the present study, data were used from pre-treatment assessments (T1), assessments made just after the final cycle (T2) and follow-up assessments (T3). To obtain information about how women coped with the unsuccessful treatment cycle 4 weeks after the pregnancy test following the first cycle, the women were asked to complete a coping questionnaire focusing on that treatment cycle.

A cycle was retrospectively defined as a 'final' cycle when couples did not start further treatment within 1 year subsequent to the previous cycle. Exclusive criteria for the last treatment cycle are unobtainable, as women may again consider participation in treatment options even years after ceasing treatment (Leiblum *et al.*, 1987; Van Balen and Trimbos-Kemper, 1995). Psychological and clinical parameters were assessed at T1, before the start of the first treatment cycle. Anxiety and depression assessments were repeated at T2 and T3.

### Procedure

Women and their partners were asked to participate in the study when at the hospital for an intake interview with their physician prior to their first IVF or ICSI treatment cycle. A long protocol (3 weeks) was used. After obtaining written

**Table I.** Participants' demographic characteristics ( $n = 148$  women;  $n = 71$  men)

Cause of fertility problems (%)	
Women	23
Men	40
Both	8
Idiopathic	29
Already having children (%)	20
Duration of fertility problems (%)	
< 3 years	26
3–5 years	54
> 5 years	20
Mean age of women (years)	34.1 (range: 21–43)
Mean age of men (years)	36.3 (range: 26–54)

informed consent, questionnaires were sent to their homes. Women and their spouses were asked to complete the questionnaires separately before the start of medication and return them to the hospital in a pre-paid envelope. In addition, participants received a questionnaire 4–6 weeks after the pregnancy test for each cycle. A final questionnaire followed 6 months after the last treatment cycle. If a new cycle was started within 6 months after this time (12 months after the last cycle), this questionnaire was not taken into account. The study was approved by the hospital ethical research committee.

### Measures

Demographic (age, educational level, number of children) and gynaecological (duration of fertility problems) background characteristics were assessed with a self-report questionnaire.

State anxiety and depression were assessed with two standardized questionnaires, validated for the Dutch population. State anxiety was measured with the 'State and Trait Anxiety Inventory' (STAI; Spielberger, 1983; Dutch translation: Van der Ploeg *et al.*, 2000; 20 items, possible range 20–80). Cronbach's alpha was 0.90 for state anxiety. The score of 1 SD above the mean for the norm group was used as the threshold for clinically relevant forms of anxiety; this was 48.

Depression was measured with the 'Beck Depression Index – PC' (BDI: Beck *et al.*, 1997; seven items, possible range 0–28). Cronbach's alpha was 0.84. This is a short version of the BDI, consisting of items referring only to cognitive aspects of depression. This makes it possible to assess depression in a medical population without confounding between medical problem characteristics and vital aspects of depression (Verhaak *et al.*, 2001). The threshold score for subclinically relevant forms of depression was 4 (Beck *et al.*, 1997).

Two personality factors were measured, neuroticism and optimism. Neuroticism was measured with one subscale of the Dutch version of the 'Eysenck Personality Questionnaire' (Sanderman *et al.*, 1995; six items). The possible range of the scale was 0–12. Cronbach's alpha in the present study was 0.81. Optimism was assessed with the optimism scale of the 'Life Orientation Test' (LOT: 12 items, possible range 0–32), developed by Scheier and Carver (1985) and translated into a Dutch version by Vinck *et al.* (1998). Cronbach's alpha in the present sample was 0.81.

Infertility-related cognitions of helplessness and acceptance were measured with the 'Illness Cognitions Questionnaire' (Evers *et al.*, 2001), which was adjusted to the situation of women facing fertility problems. The possible range of both the helplessness and acceptance scales, each consisting of six items, was 6–24. An example of a helplessness item is: 'I felt overwhelmed by my fertility problems'. An example of the acceptance scale is: 'I can handle the problems related to my infertility'. In the present study, Cronbach's alpha was 0.86 for the helplessness scale and 0.89 for the acceptance scale.

Coping was assessed with the 'Cope' (Carver *et al.*, 1989; 39 items). The Cope factors were clustered in four groups, resembling factors used by Terry and Hynes (1998) in their

study on coping with infertility: problem management (Cope factors 'active coping' and 'planning'; Cronbach's alpha = 0.76), problem appraisal ('behavioural disengagement' and 'positive reinterpretation'; Cronbach's alpha = 0.58), emotional approach ('seeking instrumental support', 'seeking emotional support' and 'venting emotions'; Cronbach's alpha = 0.86), and cognitive avoidance or escapism (Cope factor 'denial'; Cronbach's alpha = 0.75). The reliability of the problem appraisal scale was too limited and we did not use it in our analyses.

The assessed indicators of social support were satisfaction with the marital and sexual relationship as well as general aspects of social support. Marital and sexual satisfaction was measured with the general marital satisfaction scale (10 items, possible range 0–80) and the sexual satisfaction scale (five items, possible range 0–40) from the 'Maudsley Marital Questionnaire' (MMQ: Arrindell *et al.*, 1983). Higher scores are an indication of greater dissatisfaction. Cronbach's alpha in the present study was 0.85 for general marital satisfaction and 0.70 for sexual satisfaction.

General aspects of social support were measured with a Dutch self-report questionnaire 'Inventory for Social Support' (Van Dam-Baggen and Kraaimaat, 1992), which measures the size of the social network (in terms of the number of friends and acquaintances) and perceived social support (20 items, possible range 5–20). In the present study, Cronbach's alpha was 0.87 for perceived social support.

Demographic aspects, anxiety, depression and marital satisfaction were assessed in both women and men; the other variables were assessed in women only.

### Statistical analyses

Multivariate analysis of variance (MANOVA) with repeated measures and *post hoc* one-way analyses of variance were performed to examine differences in the course of anxiety and depression between pregnant and non-pregnant participants. Analyses were carried out separately for women and men, because of the discrepancy in participation between men and women. MANOVA for repeated measures were performed separately after successful and unsuccessful treatment to analyse possible differences in the course of anxiety and depression with respect to the number of treatment cycles and having children.

McNemar's non-parametric test for repeated samples was used to investigate differences in the proportion of subclinical forms of anxiety and depression between different measurement points.

Pearson's correlation coefficients (in the event of nominal variables, Kendall's rank correlation coefficient was used) were calculated between the vulnerability factors and anxiety and depression change scores to explore the relationship between background characteristics and vulnerability factors assessed prior to treatment and changes in emotional status between pre-treatment (T1) and follow-up (T3) assessments. Residual gain scores were used as change scores (Kerlinger, 1975). Residual gain scores are chance scores in which the influences of pre-test scores are removed. They were calculated by regressing T3 scores onto T1 scores, creating a new

variable: Time 3 with the effect of Time 1 removed. The regression analyses were sequentially performed for anxiety and depression at T3, as dependent variables. Levels of anxiety and depression at T1 were entered as first predictors. Personality characteristics are relatively stable and have been shown to determine characteristics such as cognitions, coping and social support (Clark *et al.*, 1994). For that reason, we entered them in the second step. In the third step, the additional predictors that significantly correlated with change scores in anxiety or depression were entered. This procedure provided an opportunity to examine the additional predictive value of cognitions, coping and social support, in addition to pre-treatment anxiety and depression and to relatively stable personality characteristics.

## Results

*t*-Tests did not reveal any pre-treatment differences in anxiety [ $t(1,147) = -0.21$ ;  $P = 0.83$ ], depression [ $t(1,147) = 0.48$ ;  $P = 0.63$ ], marital dissatisfaction [ $t(1,147) = 0.50$ ;  $P = 0.62$ ] or sexual dissatisfaction [ $t(1,147) = 0.74$ ;  $P = 0.46$ ] between women whose spouses did or did not participate in the study at all or dropped out during the study. However, 6 months after the last treatment cycle, women whose spouses did not participate showed higher levels of depression [ $t(1,147) = 3.17$ ;  $P = 0.002$ ] and a trend of higher levels of anxiety [ $t(1,147) = 1.79$ ;  $P = 0.08$ ] than women whose spouses did participate in the study.

In addition, *t*-tests did not reveal any significant difference in pre-treatment anxiety [ $t(1,375) = -0.20$ ;  $P = 0.84$ ] and depression [ $t(1,375) = -0.29$ ;  $P = 0.78$ ] between women who completed all questionnaires and women who did not. This was the same for anxiety [ $t(1,205) = -0.68$ ;  $P = 0.50$ ] and depression [ $t(1,205) = -0.13$ ;  $P = 0.91$ ] just after the last treatment cycle.

Eighty-three women (56%; with 54 partners included in the study) became pregnant after one or more treatment cycles, 66% of these 83 after one cycle, 25% after two cycles, 6% after three cycles and 3% after four or more cycles. The other 65 (44%; with 17 partners included in the study) did not become pregnant; 27% of these 65 completed one treatment cycle, 26% two cycles, 35% three cycles and 12% four or more cycles. The average time between T1 and T2 was 3 months (range 2–4). The average time between T1 and T3 was 16 months (range 8–36).

### Course of anxiety and depression

The descriptive results of anxiety and depression levels at the various assessment points are presented in Table II. The correlation between anxiety and depression was 0.62 at T1, 0.73 at T2 and 0.76 at T3.

MANOVA for repeated measures were performed in order to investigate the differences in the course of anxiety and depression between T1, T2 and T3 for women and men after successful and after unsuccessful treatment.

The results of the MANOVA for women did not reveal any significant effect for time for either anxiety or depression. However, a significant interaction effect for

**Table II.** Mean (SD) scores for state anxiety and depression in women after successful ( $n = 83$ ) and unsuccessful ( $n = 65$ ) treatment and in men after successful ( $n = 54$ ) and after unsuccessful ( $n = 17$ ) treatment at T1 (pre-treatment), T2 (after the final treatment cycle) and T3 (6 months after the final treatment cycle)

	Pregnant women	Non-pregnant women	Men with pregnant women	Men with non-pregnant women
State anxiety T1	36.7 (10.1)	37.3 (11.7)	32.8 (6.8)	33.5 (11.7)
State anxiety T2	33.5 (8.7)	40.2 (11.8)	32.3 (6.9)	34.9 (10.2)
State anxiety T3	34.2 (8.5)	39.0 (13.6)	32.3 (8.6)	32.4 (8.0)
Depression T1	1.5 (1.8)	1.5 (2.3)	0.7 (0.9)	1.0 (1.3)
Depression T2	0.8 (1.3)	2.3 (2.7)	0.6 (0.9)	1.5 (2.2)
Depression T3	0.5 (0.9)	2.3 (2.9)	0.4 (1.1)	0.8 (1.0)

time  $\times$  treatment outcome was indicated for anxiety [ $F(2, 146) = 6.5$ ;  $P < 0.01$ ] and for depression [ $F(2,146) = 12.9$ ;  $P < 0.01$ ]. In addition, there were significant effects for treatment outcome for both anxiety [ $F(2,146) = 7.5$ ;  $P = 0.01$ ] and depression [ $F(2,146) = 16.1$ ;  $P < 0.01$ ]. *Post hoc t*-tests for non-pregnant women revealed a significant increase in both anxiety [ $t(1,64) = -2.5$ ;  $P = 0.02$ ] and depression [ $t(1,64) = -2.9$ ;  $P = 0.01$ ] between T1 and T2, whereas pregnant women showed a decrease in anxiety [ $t(1,82) = 3.2$ ;  $P = 0.00$ ] and depression [ $t(1,82) = 3.4$ ;  $P = 0.00$ ] in the same period. *Post hoc t*-tests did not reveal any change in anxiety [ $t(1,64) = -0.74$ ;  $P = 0.46$ ] or depression [ $t(1,64) = 0.18$ ;  $P = 0.86$ ] between T2 and T3 in both pregnant and non-pregnant women.

The results of the MANOVA for men did not reveal any significant time, interaction or treatment outcome effects for anxiety or any interaction and outcome effects for depression. They did reveal, however, a significant time effect for depression [ $F(2,69) = 5.1$ ;  $P = 0.01$ ]. *Post hoc t*-tests for men after successful treatment revealed a significant decrease in depression [ $t(1,53) = 2.7$ ;  $P = 0.01$ ] between T2 and T3. The *post hoc t*-tests did not reveal any other significant results.

### Differences in the course of anxiety and depression with respect to number of treatment cycles and already having children

Additional MANOVA were performed for women who did not become pregnant in order to investigate possible differences in the course of anxiety and depression with respect to the number of unsuccessful treatment cycles undergone. These MANOVA did not show any differences in the course of anxiety and depression between women who ceased treatment after two or fewer cycles versus three or more [interaction effect time  $\times$  number of cycles:  $F(2,63) = 1.06$ ;  $P = 0.35$  for anxiety and  $F(2,63) = 0.24$ ;  $P = 0.78$  for depression; time effect:  $F(2,63) = 0.02$ ;  $P = 0.83$  for anxiety and  $F(2,63) = 1.19$ ;  $P = 0.28$  for depression]. In addition, MANOVA performed in order to investigate differences in the course of anxiety and depression between women with and without children did not reveal any significant difference in the course of anxiety [time  $\times$  children  $F(2,63) = 0.18$ ;  $P = 0.83$ ; children  $F(2,63) = 0.00$ ;  $P = 0.96$ ] or depression

[time  $\times$  children  $F(2,63) = 1.13$ ;  $P = 0.33$ ; children  $F(2,63) = 0.00$ ;  $P = 0.99$ ]. MANOVA for men were not performed because of insufficient sample size ( $n = 17$ ).

### Subclinical forms of anxiety and depression

At T1, before the start of the first treatment cycle, 13% of the women in the unsuccessful group scored above the threshold scores for subclinically relevant forms of anxiety. This was 23% at T2 and 20% at T3. Six per cent showed subclinical levels of anxiety at T2 as well as at T3. With respect to subclinical forms of depression at T1, 12% of the women who did not become pregnant scored above the threshold. This was 20% at T2 and 25% at T3, being a significant increase from T1 to T3 (McNemar:  $P = 0.04$ ). Again, 6% showed subclinical levels of depression anxiety at T2 as well as at T3. At all measurement points, the percentage of men of both pregnant and non-pregnant wives who scored above the threshold for clinically relevant forms of anxiety and depression varied from 0 to 2%.

### Factors that contributed to the course of anxiety and depression after unsuccessful treatment

In Table III, correlations of change in scores for anxiety and depression between T1 and T3 with background variables and predictors are presented.

In predicting the change in anxiety from T1 to T3, factors which correlated significantly with the change in score of anxiety were selected for the regression model: neuroticism, general marital dissatisfaction and perceived social support. Correlations between the different predictors are presented in Table IV.

T1 levels of anxiety (delta  $R^2 = 0.27$ ;  $P < 0.001$ ), neuroticism (delta  $R^2 = 0.08$ ;  $P < 0.01$ ) and perceived social support, together with general marital dissatisfaction (delta  $R^2 = 0.07$ ;  $P < 0.05$ ), produced significant additional variance in anxiety levels at T3. The model with these factors fully explained 42% of the variance in anxiety at T3 ( $R^2 = 0.42$ ;  $P < 0.05$ ).

In predicting depressed mood at T3, the six factors that correlated significantly with the change score were taken into account and entered in the regression analysis: baseline levels of depression in the first step, personality characteristics neuroticism and optimism in the second step, cognitions of infertility (helplessness and acceptance) in the third step and social support (general marital dissatisfaction and perceived social support) in the last step. The results revealed that baseline levels of depression (delta  $R^2 = 0.09$ ;  $P < 0.05$ ) and personality characteristics (delta  $R^2 = 0.22$ ;  $P < 0.001$ ) produced significant additional variance in depression levels at T3. The model that explained the most variance ( $R^2 = 0.36$ ;  $P < 0.000$ ) consisted of baseline levels of depression, neuroticism, optimism, helplessness, acceptance, perceived social support and general marital dissatisfaction. However, cognitive and social support factors did not significantly explain additional variance.

**Table III.** Pearson correlation coefficients between predictors and change scores for anxiety and depression between T1 (pre-treatment) and T3 (6 months after the final treatment cycle)

	Total course (T1–T3)	
	Anxiety	Depression
Demographic		
Age	0.08	0.15
Educational level		
Clinical		
Duration of infertility	–0.20	–0.17
Personality characteristics		
Neuroticism	0.31*	0.47**
Optimism	–0.22	–0.34**
Infertility-related cognitions		
Helplessness	0.10	0.32*
Acceptance	–0.17	–0.31**
Coping		
Problem management	0.06	–0.01
Emotion approach	0.22	0.11
Cognitive avoidance	0.08	–0.15
Social support		
General marital dissatisfaction	0.30*	0.28*
Sexual dissatisfaction	0.15	0.23
Perceived social support	–0.37**	–0.34**

\* $P < 0.05$ ; \*\* $P < 0.01$ .

### Discussion

One apparent result of the present study is the lack of emotional recovery in the 6 months after the end of treatment. Following theories on cognitive adaptation (Taylor, 1983; Folkman, 1984), one might expect a decrease in distress after abandoning treatment. This lack of recovery in the present study might be explained by the length of recovery period that was taken into account. Six months could be too short to identify beneficial effects of changing the meaning of infertility (Bonanno and Kaltman, 2001). Another explanation might be found in the continuation of uncertainty about the definitive character of the childlessness, which is in line with studies indicating that couples still keep new treatment possibilities in the back of their minds for a considerable time after the end of treatment (Leiblum *et al.*, 1987; Van Balen and Trimbos-Kemper, 1993). This seems to interfere with the cognitive adaptation necessary to adjust to definitive childlessness (Taylor, 1983; Folkman, 1984).

The next apparent finding is the importance of a wide range of factors determining the emotional adjustment to infertility. Personality characteristics, cognitive factors and social support were found to be important in this process. By investigating the predictive power of these factors in a stress vulnerability model, their relative importance could be studied. The importance of neuroticism is in line with theories and empirical evidence regarding the interrelationship between anxiety, depression and neuroticism. Both emotions share the central aspect of negative affectivity or neuroticism (Clark *et al.*, 1994). The present study also supported the importance of social support as a buffer in the relationship between the stressor of unsuccessful treatment and emotional response. With respect to fertility problems, the spouse seems to be the most important source of social support (Laffont and Edelmann, 1994).

**Table IV.** Intercorrelations for predictor variables

	1	2	3	4	5	6	7
1. Neuroticism	–	–0.35**	0.31*	–0.34**	0.46**	0.21	–0.41**
2. Optimism		–	–0.14	0.11	–0.39**	–0.08	0.06
3. Helplessness			–	–0.60**	0.13	0.12	–0.19
4. Acceptance				–	–0.09	–0.27*	0.30*
5. Marital dissatisfaction					–	0.30*	–0.38**
6. Sexual dissatisfaction						–	–0.20
7. Perceived social support							–

\* $P < 0.05$ ; \*\* $P < 0.01$ .

After controlling for personality characteristics and social support, cognitions of acceptance and helplessness determined the course of depression. The importance of cognitive adaptation in terms of changing meaning in the adjustment to unsuccessful IVF is expressed in higher levels of acceptance as assessed in the present study and related to a more favourable adjustment to unsuccessful treatment. A lack of adaptation in terms of the inability to regain control, as assessed in higher levels of helplessness, is related to poorer outcome. Women have to make a shift from active, treatment-focused ways to deal with the fertility problems to cognitive ways of adjustment in terms of changing the meaning of childlessness. This is in accordance with theories stressing the importance of changing meaning in long-term adjustment to severe health problems (Rothbaum *et al.*, 1982; Taylor, 1983; Folkman, 1984, 2001). The importance of personality characteristics, meaning of infertility and social support as predictors of the emotional adjustment to unsuccessful IVF is in line with the results of a previous study into the adjustment to one unsuccessful treatment cycle on the present sample (Verhaak *et al.*, 2005).

In the present study, coping factors did not determine the adjustment to unsuccessful treatment. The effectiveness of coping partly depends on the characteristics of the stressor (Suls and Fletcher, 1985; Penley *et al.*, 2002). The infertility stressor is highly uncontrollable (Miller-Campbell *et al.*, 1991). Accordingly, ways to actively change the stressor are limited. That is why active and problem-focused coping are assumed to be ineffective. The results of the present study partly support this: no relationship was found between problem-focused, active coping and changes in anxiety or depression. Some studies found support for effective coping being related to what they called emotional approach coping in the event of uncontrollable stressors: minimizing the threatening evaluation of the stressor and accepting its occurrence (Terry and Hynes, 1998; Berghuis and Stanton, 2002; Austenfeld and Stanton, 2004). The negative relationship between cognitions of acceptance of fertility problems and increase in depression between T1 and T3 in the present study is in line with these results. Findings from the present study did not support the expected positive relationship between avoidant coping and anxiety or depression. This might partly be due to the complexity of the stressor, the time lag between coping assessment and emotional response and the general way coping was assessed. Effective coping depends on the characteristics of the stressor. The stressor in

the present study is complex: it is the stressor of the treatment itself, of uncertainty and of a loss of hope for pregnancy and children. All these aspects might require different coping strategies: avoidant coping seems to be efficacious during times of uncertainty (Miller and Mangan, 1983). Re-evaluation of the stressor seems to be important in the event of loss (Davis and Nolen-Hoeksema, 2001). It is possible that a stronger coping effect might have been found if coping efforts related to these aspects of the stressor were separately assessed. In addition, the effectiveness of avoidant coping seems to depend on the time lag between the stressor and emotional response: avoidant coping seems to be more effective in the short term (Suls and Fletcher, 1985). It is possible that avoidant coping could determine short-term emotional response to unsuccessful treatment.

The long period over which assessments took place is a strength of the present study. Nevertheless, prolongation of this period to 2 years after the final treatment cycle would provide more information about the course of emotional adjustment to successful and unsuccessful treatment. This would be particularly interesting for the group of women who only recently (at follow-up) showed clinically relevant forms of anxiety or depression. Previous studies show equivocal results about the course of adjustment to a severe stressor. Some previous studies have indicated that high levels of depression shortly after incidence of the stressor are important risk factors for the development of a major depressive disorder in the near future (Howarth *et al.*, 1994). Other studies, however, have indicated that the adjustment process normally takes 2 years, after which most people seem able to adjust adequately (Janssen *et al.*, 1997; Bonanno and Kaltman, 2001).

A difficult aspect of the study was definition of the final treatment cycle. It hardly seems possible to investigate emotional response to definite infertility. There are couples who take a long break between cycles. Other couples hesitate for a long time before making another attempt. Previous studies have pointed out that half of the women who have stopped fertility treatment would restart if there were new treatment possibilities (Leiblum *et al.*, 1987; Van Balen and Trimbos-Kemper, 1995). It seems as if the hope of ever conceiving a child only diminishes with age. And even this criterion could perhaps change in the near future.

The high percentage of women who display subclinical forms of anxiety and depression even 6 months after the final treatment cycle is clinically important. The present study

provided information for identifying these women before the start of the treatment, which will make it possible to offer these risk groups additional counselling in time. The counselling should be focused on the meaning or the cognitions of fertility problems and on improving social support. Future studies will show whether these counselling efforts prevent the development of severe emotional problems.

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