

Psychosocial characteristics of infertile couples: a study by the 'Heidelberg Fertility Consultation Service'*

T.Wischmann^{1,3}, H.Stammer¹, H.Scherg¹, I.Gerhard² and R.Verres¹

¹Department of Medical Psychology, Psychosomatic Hospital and ²Department of Gynaecological Endocrinology and Reproductive Medicine, Women's Hospital, University of Heidelberg, Heidelberg, Germany

³To whom correspondence should be addressed at: Department of Medical Psychology, Psychosomatic Hospital, University of Heidelberg, Bergheimer Straße 20, D-69115 Heidelberg, Germany. E-mail: tewes_wischmann@med.uni-heidelberg.de

BACKGROUND: The aim of the study was to identify differences in psychological characteristics between couples with fertility disorders, especially idiopathic infertility, and a representative sample. **MATERIAL AND METHODS:** A total of 564 couples was examined using psychological questionnaires pertaining to sociodemographic factors, motives for wanting a child, dimensions of life satisfaction and couple relationships, physical and psychic complaints, and a personality inventory. **RESULTS:** Specific to our sample was the high educational level of the couples, and the large number with idiopathic infertility (27% of all diagnoses). There were no remarkable differences in psychological variables between the infertile couples and a representative sample, except that the infertile women showed higher scores on the depression and anxiety scales. Couples with idiopathic infertility showed no remarkable differences in the questionnaire variables compared with couples with other medical diagnoses of infertility. **CONCLUSIONS:** A typical psychological profile for infertile couples could not be identified using standardized psychometric rating methods. This may be an effect of the specific characteristics of our sample. For some couples, the infertility crisis can be seen as a cumulative trauma, which indicates that these couples have a marked need for infertility counselling.

Key words: idiopathic infertility/infertility/life satisfaction/negative life events/psychosocial factors

Introduction

In a comprehensive survey of empirical research results on involuntary childlessness (Dunkel-Schetter and Lobel, 1991), it was concluded that there is no clear general indication 'that negative effects accompany infertility, although there is some evidence of adverse effects in a few studies'. According to these authors' analysis, the more sophisticated the studies were methodologically (in terms of sample size and the use of standardized techniques), the fewer the specific psychological reactions shown to be present. Others (Burns and Covington, 1999) added in their review, that 'much of the research was exploratory, relied on researcher-designed instruments rather than standard measures, lacked control or comparison groups, and were plagued with small numbers'. A major research lacuna is also found for male partners. Criticism was lodged (Daniluk, 1997; Dunkel-Schetter and Stanton, 1991) that only a few studies included the male partners in their research design—a surprising point in view of the fact that many single-case studies concluded that covert marital or couple conflicts might cause infertility.

Systematic studies with control or comparison groups did not detect any significant psychopathology in the population of infertile couples (Wright *et al.*, 1989; Dunkel-Schetter and Lobel, 1991; Morrow *et al.*, 1995; Leiblum and Greenfield, 1997; Burns and Covington, 1999). For many couples, infertility is undeniably a major life crisis and psychologically stressful (Leiblum and Greenfield, 1997; Brkovich and Fisher, 1998; Burns and Covington, 1999). The literature suggests that infertility is more stressful for women than for men (Berg and Wilson, 1991; Wright *et al.*, 1991; Nachtigall *et al.*, 1992; Daniluk, 1997; Jordan and Revenson, 1999).

These findings contrast starkly with the German psychosomatic literature, which had accorded a significant status to psychological factors in the aetiology and persistence of fertility disorders, notably in couples diagnosed for idiopathic (medically unexplained) infertility. Notably, the psychodynamically-derived concepts pertaining to fertility disorders have been largely developed with reference to couples with idiopathic infertility [(‘Psychogenic Infertility Model’); Burns and Covington, 1999]. The frequency of this diagnosis is typically thought to be <15% (Keye, 1999).

The comparison between couples with idiopathic infertility and couples from other diagnostic groups is inconclusive. Some studies were unable to identify any differences between

*Presented in part at the 14th Annual Meeting of the European Society of Human Reproduction and Embryology, Göteborg, Sweden, June 21–24, 1998

the groups (Adler and Boxley, 1985; Edelman and Connolly, 1986; Paulson *et al.*, 1988). Others indicated that women with idiopathic infertility are more anxious and dissatisfied with self and life-style than women in the other groups, but also reported greater marital satisfaction and greater satisfaction in other areas of life than controls (O'Moore *et al.*, 1983; Callan, 1987; Callan and Hennessy, 1988). In one study (Stauber, 1988), the 39 functionally infertile couples were judged by the authors to be 'anxious and depressive persons' typically displaying a 'symbiotic and clinging' relational pattern. Furthermore, the author stated that many women suffered from dysmenorrhoea, functional sexual disorders, functional disorders in the gastrointestinal area and cardiovascular problems, all of which may have a psychosomatic component. Others (Schmidt *et al.*, 1994) compared 23 idiopathically infertile couples with 75 non-idiopathically infertile couples by using the same instruments. However their study was unable to replicate the findings of Stauber. In a comparison of idiopathically infertile female patients with a group of patients with miscarriages in their medical history, one author (Knorre, 1991) examined a group of 83 couples and, while unable to identify any such accumulations of negative experiences in childhood and youth in the couples without any organic disorders, he did find such an accumulation for the group as a whole. When comparing 16 organically infertile and 14 functionally infertile women, above-average neuroticism scores were found for the functionally infertile group (Morse and Dennerstein, 1985). In a group of idiopathically infertile women (the study size was not reported), increased depression scores were found in the Giessen test (a personality inventory, widely used in Germany) (Kemeter, 1988).

The findings were summarized by one author (Strauß, 1991) as follows: 'In the studies on psychic characteristics in connection with specific causes of infertility, there are some weak indications that functionally infertile women may be regarded as more emotionally unstable, more anxious and somewhat more depressive than their organically infertile counterparts, and that they have greater difficulty in accepting their female role. In view of the fact that psychological abnormalities are anticipated in this particular group, the differences are slight'. In summary, it can be said that the literature contains no well-founded indications of relevant psychological differences between idiopathically infertile and non-idiopathically infertile couples.

On the basis of these research findings, the following questions are addressed: (i) Do couples with an unfulfilled wish for a child differ from a representative sample of the German population with respect to specific psychosocial characteristics? (ii) Are there differences in psychosocial variables between couples with idiopathic infertility and couples with other infertility diagnoses?

The aim of the study was to design a counselling framework for couples with an unfulfilled desire for a child, with specific emphasis on couples with idiopathic infertility. Additionally, questions of indication posed in the context of psychosomatic counselling and/or couple psychotherapy were addressed. In the diagnostic part of the study, couples wanting a child were asked to complete a set of detailed psychological questionnaires

designed to find out whether infertile couples—and especially couples with idiopathic infertility—score outside the normal range, as given by a representative sample of the German population. In the intervention-related part of the study, a group of couples was examined who mostly had idiopathic infertility in order to evaluate our two-stage counselling and couple-therapy design (Wischmann *et al.*, 2001 for comparison).

This article reports the most important findings of the diagnostic part of the 'Heidelberg Fertility Consultation Service' study. The results of the part-study, which included counselling and couple-therapy, are currently being prepared for publication.

Materials and methods

Between May 1994 and November 1996, all couples contacting the Department of Obstetrics and Gynaecology of Heidelberg University Hospital for the first time were asked to complete a set of questionnaires comprising the following components:

1. The documentation sheet for sociodemographic data (SOZI-ODAT; E.Brähler *et al.*, 1993, unpublished data) including demographic and sociological information, i.e. questions on age, family status, duration of partnerships, educational and professional status, residential status, religious affiliation, professional stress, sleeping and eating habits, sporting activities and assessment of own state of health. This questionnaire was used for the description of the samples.

2. The German version (Franke, 1995) of the Symptom Check List 90 [SCL-90-R; (Derogatis *et al.*, 1976)] encompasses 90 items assessed for severity on a five-point scale (0 = not at all, 4 = extremely). Evaluation is undertaken in terms of: (i) nine thematic subscales (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, anger/hostility, phobic anxiety, paranoid ideation, psychoticism) and (ii) three global categories comprising the General Symptomatic Index (GSI; fundamental psychic stress), the Positive Symptom Distress Index (PSDI; intensity of response), and the Positive Symptom Total (PST; number of stress-inducing symptoms). Higher scores on the scales of the SCL-90-R mean higher pathology.

3. The questionnaire on partnership (PFB; Hahlweg *et al.*, 1982) was developed for differential assessment of marital quality, and is designed primarily for diagnosis and therapy evaluation in couple therapy. The PFB consists of 30 four-point single items and a six-point item (PFB31) for assessing general quality of partnership (0 = very unhappy, 5 = very happy). The items are grouped into three scales: conflict behaviour; tenderness; and togetherness/communication. All three scales are collated to obtain the PFB total score. Higher scores on the scale 'conflict behaviour' indicate less satisfaction with the partnership. On the scales 'tenderness' and 'togetherness/communication' and on the PFB total score, higher scores indicate more satisfaction with the partnership.

4. The questionnaire on the desire for a child [(FKW); Hölzle, 2001] was designed to identify potential expectations and apprehensions in connection with pregnancy, birth and parenthood documented in the literature on the subject, using 20 rating questions (1 = not at all, 5 = very strong). A factor analysis of the FKW of 2422 patients generated four factors: (i) enhancement of self-esteem (example items: 'I would be proud if I could at last answer yes to the question 'Do you have children?''', or 'I find the idea of being able to create new life wonderful'); (ii) emotional stabilization (example items: 'I would be very lonely without a child', or 'Only if I had a child would I feel that I had a real home'); (iii) ambivalence about parenting

and partnership (parenthood ambivalence) (example items: 'I am afraid of the demands made by a child', or 'I fear that a child might strain my relationship with my partner') and (iv) ambivalence about career and self-realization (career ambivalence) (example items: 'There are other things in life I find just as fulfilling as having a child', or 'A child might interfere with my career prospects').

5. In the questionnaire on the case history of the desire for a child (KWA; Ch.Hözlze, 1992, unpublished data), the patients were asked how long they have been wanting a child, what treatment they have undergone, their acceptance or rejection of various potential kinds of treatment, their subjective assessments of the prospects of different kinds of treatment and the participation of their family doctor in fertility treatment. The inquiry into the case history of the desire for a child was supplemented with the following question: 'How stressed do you feel by the unfulfilled desire for a child?' (a seven-point rating scale with possible responses ranging from 0 = not stressed at all to 6 = extremely stressed).

6. The personality questionnaire 'Giessen test' (GT) (Beckmann *et al.*, 1991; Brähler and Brähler, 1993), is geared to partner assessment, inquiring after self-image concepts ('How I see myself') and image of the partner ('How I see my partner'), and correlating them to arrive at assessments of the relational structure of partnership. The GT consists of 40 bipolar seven-point items (-3 to +3) grouped into five scales: 1. Social response, where low scores indicate negative social response (e.g. unattractive) and high scores indicate positive social response (e.g. attractive); 2. Dominance with the poles dominant (e.g. likes domineering) and submissive (e.g. likes subordinating); 3. Self control with the poles uncontrolled (e.g. able to let go) and compulsive (e.g. unable to let go); 4. Basic mood with the poles hypomanic (e.g. lets anger out) and depressive (e.g. suppresses anger); and 5. Permeability with the poles permeable (e.g. trustful) and retentive (e.g. mistrustful).

7. The questionnaire on life satisfaction (FLZ) (Fahrenberg *et al.*, 2000) serves to capture those aspects of life satisfaction of major significance in connection with subjective experience of illness and illness behaviour. Information on satisfaction in different areas of life is elicited by means of 63 seven-point items on the scales Health, Professional and Vocational Life, Financial Situation, Leisure and Hobbies, Marriage and Partnership, Self-esteem, Sexuality, Living Situation. Higher scores on the scales indicate more satisfaction with the different areas of life.

The questionnaires mentioned above were administered to the participants in most of the studies of the German infertility research network. The selection of these questionnaires was the result of several consensus meetings of the members of this network.

A questionnaire on stress-inducing events in the couples' lives (FLS) (Wischnann, 1998) was included. Alongside various sociodemographic features of the parents (age, education, profession) and siblings (sex, age, education, profession, number of children), this questionnaire also inquired into specifics of the family status of the parents (separation, divorce, death, the year in which these occurred). Three open-response questions were included, each with example items, related to (previous and present) stressful events in the (extended) family of origin, in the respondents own childhood and to instances of in-family stress in connection with the desire for a child (e.g. stillborn children, unwanted child, abortion). In each of these open-response questions the patients were asked to indicate duration (from-to), intensity (on a scale 1 = little stress to 7 = strong stress) and person affected.

Medical data were documented according to a common standard used throughout the German infertility research network, which also included definitions of the various causes of infertility (H.Kentenich, 1992, unpublished data; cf. Table I).

Table I. Definition of various causes of infertility

Hormonal causes of female infertility

- Hyperprolactinaemia (prolactin >500 mIU/l)
- Hyperandrogenaemia (testosterone >600 pg/ml and/or DHEAS >3500 ng/ml, with and without polycystic ovaries)
- Thyroid function disorders (if patient on levothyroxin therapy still fails to conceive, this does not count as a hormonal cause of infertility): manifest hypothyreosis or hyperthyreosis or latent hypothyreosis (basal TSH >4 mIU/l)
- Primary ovarian insufficiency (oestradiol <30 pg/ml, FSH >20 mIU/ml)
- Hypothalamic-hypophyseal regulation disorder (oligoamenorrhoea over 35 days, hormones normal, gestagen test positive or negative)
- Preclimacteric situation (FSH >20 mIU/ml, oestradiol >30 pg/ml)
- Luteal phase deficiency (all hormones basally normal, but progesterone twice <10 ng/ml and/or oestradiol <80 pg/ml)

Uterus factors causing infertility

- Uterus malformations, established via sonography or hysterosalpingography
- Uterus myomatosis (myoma with impairment of tubes and/or mucosa)

Tube factors causing infertility

- Complete occlusion both sides/no tubes both sides
- Tube disorder factor (including condition following unilateral ovariectomy, tubectomy, adhesions and/or endometriosis grade 3 or higher)

Andrological causes of infertility

- Spermioigrams (one of two spermioigrams must be pathological) pathological (if density <20×10⁶/ml, global motility <50%, morphology (normal forms) <30%)

If all else normal: idiopathic infertility

DHEAS = dehydroepiandrosterone sulphate; TSH = thyrotrophin-stimulating hormone.

The data were evaluated using the statistic programme SAS for Windows 6.12. The *t*-test was used to check differences between two group means, and the χ^2 -test for frequency differences. The specific statistical methods used for each section are described below.

Results

Description of the total sample

A total number of 1170 questionnaires was given to all couples contacting the Department of Obstetrics and Gynaecology of Heidelberg University Hospital for the first time. Some 564 couples were involved in the study, 545 of which returned all questionnaires suitable for evaluation. Complete sets of GT data (self-image/partner-image from both partners) were available for 500 couples (GT data were collected only during the first 2 years of the study). The percentage of returned questionnaires was ~50%. A detailed comparison between the couples who did not return the questionnaires and those who did was not possible. The analysis of a subpopulation of this sample showed that questionnaire return was very low from couples whose mother tongue was not German, and also from couples who discontinued the medical diagnosis process at the Women's Hospital. A selection bias may be present due to the sample's higher educational level.

Medical diagnosis groups

Some 38 (7%) of the 564 couples had not completed the medical diagnostic process within the duration of the study. There were medical findings pertaining to the woman alone

in 189 couples (36%), and to the man alone in 86 couples (16%). In 111 couples (21%), medical findings (one or more) had been established for both partners. There was a remarkably high proportion of couples diagnosed as idiopathically infertile in the sample, 140 in all (27%). Some 67.6% of the couples displayed primary infertility, i.e. there was no history of previous pregnancies, while 32.4% displayed secondary infertility (record of prior pregnancies); 8% of the couples already had children.

Sociodemographic characteristics of the total sample

Most of the couples were married (90.9%) and of German nationality (94.4%). The average age of the women was 32.1 years (range 21–45), and that of the men 34.3 years (range 21–54) ($P < 0.001$). The mean partnership duration was 9.2 years (range 1–23), and on average the couples had been wanting a child for 4.3 years (range 1–22). There was a high proportion of university graduates among the sample: 26.8% of the women and 39.5% of the men had university degrees or equivalent ($P < 0.01$), while 40.2% of the women and 49.2% of the men had advanced-level school-leaving qualifications ($P = NS$).

Other characteristics of the sample

In comparison with their partners, the women had undergone more frequent and earlier medical treatment in connection with their infertility problem. Before their initial contact with the Women’s Hospital, 78.4% had been in medical care, compared with 56.3% of the men ($P < 0.0001$). The average duration of care for the women was 2.7 years (range 0–15), as opposed to 1.3 years (range 0–15) for the men ($P < 0.001$). In response to the question, ‘How strong is your desire for a child at the moment’ (scale 0–4), the average self-assessment for women was 3.3, and for men 3.1 ($P < 0.001$). In response to the question, ‘How stressed do you feel by the unfulfilled desire for a child?’ (scale 0–6), the average assessment was 4.1 for women and 3.0 for men ($P < 0.001$).

A further notable characteristic of our sample was the couples’ markedly affirmative attitude towards non-invasive treatment methods in connection with the unfulfilled desire for a child. Some 82.5% of the women and 75.1% of the men were favourably disposed towards naturopathy, acupuncture and homeopathy ($P < 0.05$). For 72.5% of the women and 61.8% of the men, psychological counselling as an aid to coping with involuntary childlessness was considered a viable proposition ($P < 0.001$), while 51.7% of the women and 38.9% of the men said that they would not be averse to psychotherapy ($P < 0.001$). The acceptance of IVF was much lower: only 31.8% of the women and 34.9% of the men said that they could accept such a course for themselves ($P = NS$). (Results of significance tests are reported for illustration only. There were no hypotheses pertaining to the differences between male and female partners.)

Comparison of total sample mean scores with reference scores from the psychosocial questionnaires

Our question was whether the sample examined belonged to a subpopulation displaying any deviation in their mean scores from that of the reference population.

Table II. Differences from reference population in Life Satisfaction Questionnaire (FLZ)

Life Satisfaction Questionnaire Scales	Women (n = 536)	Men (n = 512)
Health	-0.12 ± 0.83**	0.22 ± 0.68***
Professional/Vocational	0.22 ± 0.78***	0.23 ± 0.72***
Financial Situation	0.59 ± 0.66***	0.58 ± 0.63***
Leisure	0.05 ± 0.90	0.06 ± 0.81
Marriage and Partnership	0.50 ± 0.69***	0.40 ± 0.64***
Self-esteem	-0.09 ± 0.90*	0.17 ± 0.78***
Sexuality	0.45 ± 0.79***	0.39 ± 0.74***
Friends, Acquaintances, Relatives	-0.06 ± 0.93	0.01 ± 0.86
Living Situation	0.35 ± 0.82***	0.34 ± 0.81***

Values are mean ± SD.
 * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$; reference population: mean = 0, SD = 1.

Of the questionnaires used, mean and SD values were available for men and women of representative samples of the German population for the FLZ, the PFB, the SCL-90-R, and the GT. The size of the reference samples was $n > 2500$ for FLZ, SCL-90-R and GT, and $n = 235$ for the PFB. Before the statistical analysis, scores from the FLZ and PFB were transformed into z-values [$z = (x-m)/s$] and scores from the SCL-90-R and GT were transformed into T-values [$T = (x-m) \times 10/s + 50$], where x is the individual score, m and s are the sex-specific mean and SD from the reference population. Hypotheses were tested using a previously described procedure (Bortz, 1993) for comparing a sample mean with a population parameter. The difference between observed sample mean and mean of reference population was converted into a standardized normal deviate, and the significance consulted in the table of areas under the normal distribution.

Evaluation of the Life Satisfaction Questionnaire produced the results shown in Table II. In the Life Satisfaction Questionnaire (FLZ), the women in our sample displayed on average somewhat greater satisfaction than the reference population on the scales Professional and Vocational Life, Financial Situation, Marriage and Partnership, Sexuality, and Living Situation ($P < 0.001$) and a marginally lower satisfaction for Health ($P < 0.01$) and Self-esteem ($P < 0.05$). On the scales Leisure and Friends/Acquaintances/Relatives, there were no differences between the women in the sample and the reference.

Male partners showed on average a higher life satisfaction ($P < 0.001$) on almost all the scales (Health, Professional and Vocational Life, Financial Situation, Marriage and Partnership, Self-esteem, Sexuality, Living Situation). As in the case of the women, there were no differences in comparison with the reference population for Leisure and Friends/Acquaintances/Relatives.

Two points should be borne in mind when interpreting these (and the following) findings. First, in a sample of this large size even slight deviations from the ‘normal’ reference become significant (Rogers *et al.*, 1993). Second, as has been pointed out (Berg, 1994), responses to psychological questionnaires at the beginning of infertility treatment are frequently influenced by social desirability.

Table III. Differences from reference population in Partnership Questionnaire (PFB)

Partnership Questionnaire Scales	Women (n = 520)	Men (n = 502)
Conflict Behaviour	-0.09 ± 0.97*	0.17 ± 1.02***
Tenderness/Sexuality	0.06 ± 1.04	-0.19 ± 0.96***
Togetherness/Communication	-0.13 ± 1.08**	0.08 ± 0.91
PFB Total Score (PFB31)	0.01 ± 1.10	-0.13 ± 1.03**

Values are mean ± SD.
*P < 0.05; **P < 0.01; ***P < 0.001; reference population: mean = 0, SD = 1.

For assessment of the ‘clinical’ relevance of these differences, effect sizes were calculated by the difference between the mean of the study group and the mean of the reference population divided by the SD of the reference sample. Effect sizes between 0.20 and 0.50 were designated as small, between 0.50 and 0.80 as medium, and >0.80 as large (Cohen, 1988). For the FLZ, there were no large effect sizes, but there were medium effect sizes on the scales Financial Situation (for both partners) and Marriage and Partnership (for the women). The effect sizes on the scales Professional and Vocational Life, Sexuality, and Living Situation were small.

Overall, the couples with unfulfilled desire for a child displayed a slightly higher degree of life satisfaction as compared with the reference population in five of the nine FLZ scales (Professional and Vocational Life, Financial Situation, Marriage and Partnership, Sexuality, Living Situation).

Evaluation of the Partnership Questionnaire (PFB) provided the results shown in Table III. Compared with the reference population, the women displayed a minimally greater degree of satisfaction on the scale Conflict Behaviour (P < 0.05), and a minimally lower degree of satisfaction for the scale Togetherness/Communication (P < 0.01). The assessment from the men was rather less positive; compared with the reference group they were slightly higher on Conflict Behaviour (P < 0.001), and slightly lower on Tenderness (P < 0.001). For the men, the overall score for the PFB indicated a slightly below-average degree of happiness in their couple relationships (P < 0.01), though all effect sizes were small.

In summary, it is possible to say that the assessment of partnership as shown in the PFB responses by the couples in our study group were not indicative of the above-average satisfaction frequently described in the literature.

The female responses to the Symptom Checklist (SCL-90-R) were similarly unremarkable. While for seven of the nine scales the T scores were statistically significant (see Table IV), the differences were very slight. The highest mean scores were those for the scales Anxiety, followed by Somatization and Depression (P < 0.001). Of all these, only the value on the Anxiety scale reached a small effect size. The scales Psychoticism, Phobic Anxiety, Anger/Hostility and Interpersonal Sensitivity displayed only minimally higher values than the female reference population.

On average, the men in our study sample presented a less divergent picture for the SCL-90-R questionnaire. The highest

Table IV. Differences from reference population in Symptom Checklist (SCL-90-R)

Symptom Checklist 90-R Scales	Women (n = 562)	Men (n = 539)
Somatization	51.9 ± 12.2***	51.4 ± 11.5***
Obsessive/compulsive	50.3 ± 11.4	48.9 ± 10.1*
Interpersonal sensitivity	51.1 ± 11.8**	49.7 ± 11.5
Depression	51.9 ± 12.2***	49.3 ± 10.6
Anxiety	52.7 ± 13.4***	50.7 ± 10.7
Anger-hostility	51.2 ± 11.9**	50.8 ± 11.2
Phobic anxiety	51.5 ± 14.7***	50.1 ± 11.7
Paranoid ideation	50.8 ± 11.9	50.9 ± 11.8*
Global severity index	51.1 ± 12.7*	49.2 ± 11.7
Positive symptom distress index	51.6 ± 10.2***	49.7 ± 7.8
Positive symptom total index	51.2 ± 12.4**	50.6 ± 12.0

Values are mean ± SD.
*P < 0.05; **P < 0.01; ***P < 0.001; reference population: mean = 50, SD = 10.
Psychoticism scale disregarded.

mean score was found on the Somatization scale (P < 0.001). Also statistically significant were the higher score for Paranoid Ideation (P < 0.05) and the lower value for Obsessive/Compulsive (P < 0.05); however, here again the effect sizes were small. The sex-specific differences can also be partly attributed to the fact that the women showed a somewhat higher intensity than the men for all the single items; the global Positive Symptom Distress Index (PSDI) was higher in the women than in the men (P < 0.01).

In summary, the responses to the SCL-90-R indicate a somewhat higher degree of stress for the women. Compared with the reference group, they displayed somewhat higher anxiety and depression and also listed somewhat more physical complaints. Given the slight differences over and against the reference mean values, the higher values on the other scales and the higher values for the men are not interpreted any further. One group (Berg and Wilson, 1990) pointed to the strongly limited utility of the SCL-90-R in the study of couples with fertility problems, and warned of the danger of overestimating the presence of ‘psychiatric cases’ in such study groups. In line with their proposal, the assent displayed for the items of the SCL-90-R Psychoticism scale was analysed. The results showed that the frequency of assenting responses to the item ‘Feeling lonely even when you are with people’ (25.7% of the women and 17.5% of the men marked a value of 1 or more) and to the item ‘The idea that something serious is wrong with your body’ (54.3% of the women and 34.6% of the men marked a value of 1 or more) was striking as compared with assent to the other items on the Psychoticism scale. As we did not interpret these affirmative responses as indicating an above-normal degree of psychoticism in the women and men of the study group, but rather as an expression of the subjective experience of involuntary childlessness in many couples, the Psychoticism scale was left out of account.

In evaluation of the GT, the women’s self-images displayed on average rather more deviations from the reference population than did those of the men (see Table V). Apart from the higher score for depression (scale 4) with a medium effect

Table V. Differences from reference population in Giessen test (GT)

Giessen test	Women (n = 500)		Men (n = 500)	
	Self-image	Partner image	Self-image	Partner image
1 Social response	48.6 ± 9.7***	51.2 ± 9.0**	49.8 ± 8.1	52.8 ± 9.4***
2 Dominance	48.2 ± 10.3***	48.7 ± 10.4***	49.5 ± 9.1	47.7 ± 10.4***
3 Self control	51.2 ± 9.6**	53.6 ± 9.7***	51.5 ± 8.6***	51.8 ± 10.2***
4 Basic mood	55.1 ± 10.6***	61.2 ± 9.8***	48.8 ± 9.9**	43.6 ± 10.6***
5 Permeability	45.9 ± 10.3***	44.5 ± 10.1***	49.5 ± 9.4	48.5 ± 11.1**

Values are mean ± SD.
 P < 0.01; *P < 0.001; reference population: mean = 50, SD = 10.

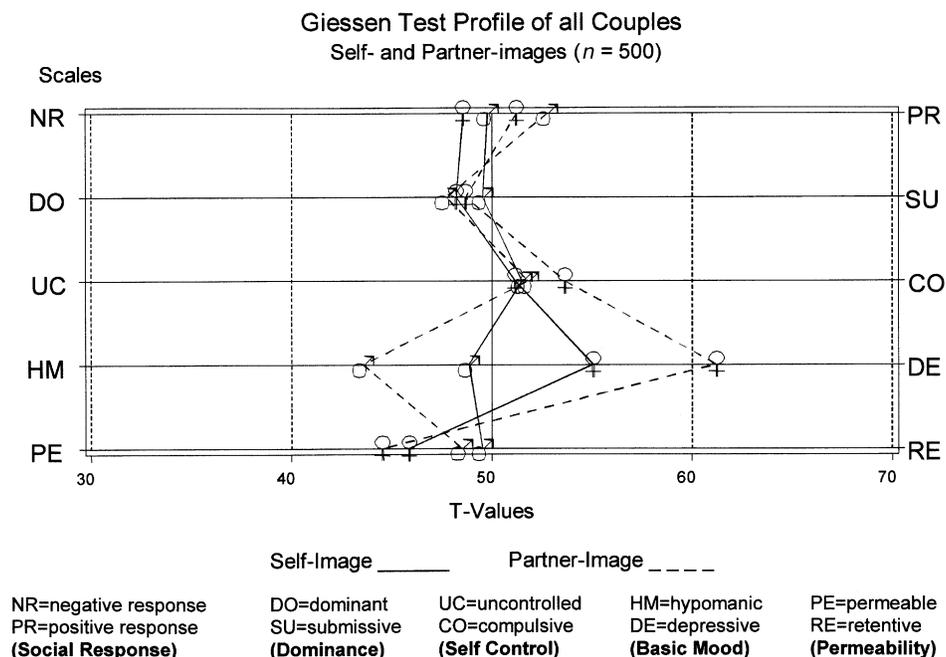


Figure 1. Giessen test profile of all couples.

size ($P < 0.001$) and the somewhat higher degree of permeability (scale 5) with a small effect size ($P < 0.001$), the women’s self-images showed on average no remarkable deviations in the GT scales. Compared with the reference population, the men’s self-images showed slightly higher values for scale 3 (Self Control; $P < 0.001$) and slightly lower values for scale 4 (Basic Mood; $P < 0.01$). Here again, the effect sizes were small.

In the partner images there was a notable polarization on scale 4 (Basic Mood) (see Figure 1). The women were seen as being significantly more depressive in the partner images than in their self-assessment. By contrast, the carefreeness of the men was emphasized in the women’s images of them (scale 4). Scales 4 and 5 showed marked differences in the self-images of men and women, with the women on average seeing themselves as more depressive and more permeable than the men. There were also slight differences on scales 1 and 2, the women seeing themselves as slightly more negative for social response and slightly more dominant than males.

Overall, in an otherwise unremarkable couple profile, evaluation of the GT displayed a clear accentuation of depression,

plus a slightly higher indication of permeability among the women, and an accentuation of carefreeness for the men.

To summarize, comparison of the sample with a representative sample of the German population, questionnaire scores presented an overall picture of couples with a high degree of life satisfaction, but with no tendency to idealize their partnerships. The women displayed a markedly higher score for depression (in SCL-90-R and GT), and also greater anxiety and higher somatization tendencies. In all questionnaires the score differences between men and the reference population were unremarkable.

Comparison between idiopathically infertile and non-idiopathically infertile couples

The group of couples with idiopathic infertility [‘Idiopathic Sterile (IS) group; $n = 140$] were compared with the group of couples with other diagnoses [‘Non-Idiopathic Sterile (NIS) group; $n = 386$] for all medical and psychosocial variables. In the IS group, there was a higher number of couples with secondary infertility (38.6%) compared with the NIS group (29.5%; $P < 0.01$). The two groups were identical in terms

of the number of children. For other medical variables (e.g. previous artificial abortions), there were no differences between the two groups. Some 15.1% of the IS women reported previous artificial abortions, as opposed to 19.2% of the NIS women ($P = \text{NS}$). By contrast, 32.1% of the idiopathically infertile couples were undergoing naturopathy, compared with 15.9% of the NIS couples ($P < 0.001$). Before admission for treatment at the clinic, 82.7% of the IS women had already undergone medical diagnosis and/or therapy, compared with 53.8% of the IS men ($P < 0.0001$). The average length of prior treatment was 2.6 years for the IS women, and 1.2 years for the IS men ($P < 0.0001$).

Sociodemographic differences

On average, the IS couples were one year older than the NIS couples. The mean age of the women with idiopathic infertility was 32.9 ± 3.7 years, and that of the women in the NIS group 31.8 ± 4.0 years; ($P < 0.01$). The corresponding ages of the IS and NIS men were 35.2 ± 5.2 and 34.0 ± 5.2 years respectively ($P < 0.05$). The IS couples also reported a longer average duration for their partnerships, 10.2 ± 4.9 years versus 9.1 ± 4.7 years ($P < 0.001$). By contrast, there was no difference between the groups in the duration of the desire for a child: 4.2 ± 2.3 years for IS; 4.3 ± 2.7 years for NIS), nor in the duration of infertility care (2.1 ± 2.4 years for IS and 2.0 ± 2.3 years for NIS). Hence, the couples with idiopathic infertility in our sample had set out to realize their desire for a child at a slightly later stage in life.

The high proportion of university graduates identified in the sample as a whole was even more marked in the IS group. Whereas in the NIS group 36% of the men had university degrees or equivalent, this figure reached 50.4% in the IS group ($P < 0.01$). Among the women, the corresponding figures were 25.3% for NIS and 32.8% for IS ($P = \text{NS}$). The higher age at which the idiopathically infertile couples developed a desire for a child may partly be due to the high proportion of university graduates.

Differences in items from the psychosocial questionnaires

Given the age and education differences, the comparison of the groups (IS versus NIS) in the standardized questionnaires was conducted via co-variance analysis with 'age' and 'education' as co-variates.

Life Satisfaction Questionnaire (FLZ)

There were no significant differences between the couples in the two groups on any of the scales.

Partnership Questionnaire (PFB)

The men in the IS group reported lower values for the Tenderness scale than the men in the NIS group: mean difference = -0.39 ± 1.10 versus -0.12 ± 0.89 ($P < 0.01$). The effect size, however, was small.

Symptom Checklist (SCL-90-R)

There were no differences between the groups. Only after controlling for age and education level in an analysis of co-variance did the higher scores for the IS men on the Anxiety scale become significant, though here again the effect size was small: mean difference 52.3 ± 12.1 versus 50.4 ± 10.3 ($P < 0.05$).

Giessen test

There were no differences in the couples' self-images between the IS group and the NIS group. Controlling for age and education, only the difference in scale 5 (partner-image for the women) became significant in an analysis of co-variance: mean difference 46.1 ± 11.2 versus 44.0 ± 9.6 ($P < 0.05$). On average, the IS women were seen by their partners as somewhat less permeable than their NIS counterparts (effect size: small). The couple profile for the couples with idiopathic infertility displayed high similarity to the profile for the total sample (see Table V). The 'clinging and symbiotic' relational pattern frequently alluded to in the German literature as characteristic of idiopathically infertile couples and allegedly borne out by the largely congruent self- and partner-image assessments of both partners was not apparent in our sample.

Questionnaire on the Desire for a Child (FKW)

There was no difference between the couples with regard to intensity of desire for a child, or stress from the unfulfilled desire for a child. On the scale 'Greater self-esteem from having a child', the women in the IS group showed on average lower values than the women in the NIS group: mean difference -0.78 ± 0.93 versus -0.48 ± 0.96 ($P < 0.01$). This difference persisted after co-variance analysis controlling for age and education. On the scale 'Emotional stabilization from having a child', the difference was not significant: -0.48 ± 0.92 versus -0.29 ± 0.92 .

FLS

Women in the IS group indicated stressful life events in childhood more frequently than women in the NIS group. The naming of stressful events was categorized by means of a rating system (Just, 1998; Enders, 1999). Subsequently, responses to the questions on the FLS enquiring into instances of stress in the family of origin and problems in childhood were classified as 'early' stress if such an event occurred before the age of 16 years and a score ≥ 5 was recorded on the 7-point Stress scale. Stress was classified as 'present' if the event took place 2 years before the desire for a child or later, and a score ≥ 5 was recorded on the Stress scale.

Stressful early life events were recorded for 61.8% of the women in the IS group (51.6% of the NIS women; $P < 0.05$), while for the men the score was 38% in both groups ($P = \text{NS}$). Couples who indicated two or more events were classified as 'vulnerable'; 35.9% of the IS women came into this category (26.1% of the NIS women; $P < 0.05$) and 15.9% of the IS men (11.9% of the NIS men; $P = \text{NS}$). Women and men with higher stress scores were more frequent in requesting psychological counselling: 36.2% of the vulnerable women (versus 24.1% of the other women; $P < 0.01$) and 39.2% of the vulnerable men (versus 25.9% of the other men; $P < 0.001$) consulted the psychological counsellor.

Other differences

Only 19.8% of the women in the IS group responded affirmatively to the question 'Cannot imagine living without a child of my own', in contrast to 32.9% of the women in the NIS group ($P < 0.01$). The men in the IS group also responded affirmatively less frequently to this question than those from the NIS group (10.7% versus 18.5%; $P < 0.05$).

Only 22.8% of the IS women had a positive attitude towards 'IVF', compared with 35.0% of the NIS women ($P < 0.05$). This difference persisted in the χ^2 -test stratified according to education status.

In summary, from a psychodiagnostic viewpoint, couples diagnosed as idiopathically infertile did not figure as a specific subgroup of the total sample of infertile couples. Remarkable among these couples was the higher age at which they developed a joint desire for a child. Women with idiopathic infertility reported more often on stressful life events in childhood than the women in the reference group. The 'higher self-esteem' motivation for wanting a child also appeared to be less marked.

Discussion

The findings of this study provide more detailed information of the population of involuntarily childless couples. Conspicuous by their absence were: (i) the tendency to answer the questionnaires in line with social desirability; and (ii) striking psychopathological features. The most remarkable difference was the higher degree of anxiety, depression and somatization in the study group compared with the reference population, though differences were generally small. The men were remarkable only for a slightly higher somatization tendency. The women as a whole appeared to display a higher degree of stress from the infertility problem, indicating a distribution of roles in the couples such that the women carried more of the emotional burden involved in an unfulfilled desire for a child and embarked on medical diagnosis and therapy earlier than the men—findings that are consistent with the results of others (Berg and Wilson, 1991; Wright *et al.*, 1991; Daniluk, 1997; Slade *et al.*, 1997). At the same time, there was also a tendency in both partners to take a significantly more positive attitude than the reference population towards areas of life outside the fertility problem, which can probably be interpreted as a functional coping pattern for dealing with the fertility crisis. We could find no indications of idealization of the partnership either in the overall group of couples, or in the idiopathic infertility subgroup. Nor were we able to identify a 'symbiotic and clinging' relationship pattern in this large sample.

Whether the increased reports of stressful life events in childhood made by women with idiopathic infertility is based on a real difference over and against women diagnosed for organic infertility is something that could only be clarified with the help of prospective longitudinal studies. Another conceivable reason might be internal causal attribution directing the couples' attention to critical life events and potential partnership problems in the absence of 'tangible' organic causes. As stated previously (Blenner, 1990), these couples might be in the stage of 'Facing a new reality', which can precipitate the reaction of accounting and searching for the causes of infertility. In our consultation experience we have found that this kind of coping may tend to induce stress and thus impede active overcoming of the life crisis. Attribution of the idiopathic infertility to unchangeable negative life events as an attempt to achieve 'interpretative control' (Tennen *et al.*, 1991) may be ineffective and even counterproductive because

the couples may miss the opportunity to accommodate to their infertility and therefore miss the preparation for alternative outcomes. We thus feel it important to point out that idiopathic infertility is not synonymous with psychogenic infertility.

Caution is indicated in interpreting the fact that in response to the question about motivation for wanting a child, women with idiopathic infertility referred less often to the increase in self-esteem aspect and were better able to imagine a future without a child of their own than women in other diagnosis groups. Given the higher average age and the higher education status of the women with idiopathic infertility, it is fair to assume a difference in socialization over and against the women in other diagnosis groups, i.e. one conveying other perspectives for a rewarding life than the fulfilment of the desire for a child.

The couples in the 'Heidelberg Fertility Consultation Service' study displayed specific characteristics preventing them from qualifying as representative of the totality of involuntarily childless couples. The sample displayed a disproportionately high number of persons with university education, notably in the relatively large group of couples with idiopathic infertility. These couples were more interested in 'gentle' methods of infertility treatment, especially naturopathy and psychological counselling. A major proportion of the existing studies on the psychosomatics of fertility disorders relate to couples embarking on or undergoing invasive reproductive therapy, so that this study is not directly comparable with them.

Although our findings definitely favour a de-pathologization of the couples all told, the fact remains—as emphasized by others (e.g. Dunkel-Schetter and Lobel, 1991)—that there is a subgroup of seriously stressed couples requiring professional psychological help. Here, qualified further education for gynaecologists is necessary to ensure that such couples can be identified and referred for psychological care where necessary. Psychosocial counselling should be offered at any stage of infertility treatment, and not only when treatment fails. As has been pointed out (Boivin *et al.*, 1999), it might be useful to provide written information on common emotional/psychological reactions to infertility, and information about coping with this condition. For those couples whose coping resources are inadequate and/or depleted, counsellors must make efforts to contact such patients individually to discuss the potential benefits of using counselling and/or participating in support groups. Instructions for psychosocial counselling are given in the 'Guidelines for Counselling in Infertility' (Boivin *et al.*, 2001).

Acknowledgements

This study was funded by the Federal Ministry of Education and Science, Research and Technology in the framework of the research network 'Psychosomatic Diagnosis and Counselling/Therapy for Fertility Disorders'.

References

- Adler, J.D. and Boxley, R.L. (1985) The psychological reactions to infertility: sex roles and coping styles. *Sex Roles*, **12**, 271–279.
- Beckmann, D., Brähler, E. and Richter, H.E. (1991) *Der Giessen-Test* (4th edn). Huber, Berlin.

- Berg, B.J. (1994) A researcher's guide to investigating the psychological sequelae of infertility: methodological considerations. *J. Psychosom. Obstet. Gynecol.*, **15**, 147–156.
- Berg, B.J. and Wilson, J.F. (1990) Psychiatric morbidity in the infertile population: a reconceptualisation. *Fertil. Steril.*, **53**, 654–661.
- Berg, B.J. and Wilson, J.F. (1991) Psychological sequelae of infertility treatment: the role of gender and sex-role identification. *Soc. Sci. Med.*, **33**, 1071–1080.
- Blenner, J.L. (1990) Passage through infertility treatment: a stage theory. *IMAGE: J. Nurs. Scholarship*, **22**, 153–158.
- Boivin, J., Scanlan, L. and Walker, S.M. (1999) Why are infertile couples not using psychosocial counselling? *Hum. Reprod.*, **14**, 1384–1391.
- Boivin, J., Appleton, T.C., Baetens, P. et al. (2001) Guidelines for counselling in infertility. *Hum. Reprod.*, **16**, 1301–1304.
- Bortz, J. (1993) *Lehrbuch der Statistik für Sozialwissenschaftler* (2nd edn). Springer, Berlin, Heidelberg, New York.
- Brähler, E. and Brähler, Ch. (1993) Typische Beziehungsmuster in klinischen Stichproben – eine Metaanalyse. In Brähler, E. and Brähler, Ch. (eds), *Paardiagnostik mit dem Giessen-Test*. Huber, Bern, Göttingen, pp. 134–168.
- Brähler, E., Felder, H., Florin, I. and Tuschen, B. (1993) *Fragebogen zur Erhebung soziodemographischer Daten (SOZIODAT)*. Förderschwerpunkt 'Fertilitätsstörungen' des BMBF (unpublished).
- Brkovich, A.M. and Fisher, W.A. (1998) Psychological distress and infertility: forty years of research. *J. Psychosom. Obstet. Gynaecol.*, **19**, 218–228.
- Burns, L.H. and Covington, S.H. (1999) Psychology of Infertility. In Burns, L.H. and Covington, S.H. (eds), *Infertility Counseling. A Comprehensive Handbook for Clinicians*. Parthenon Publishing, New York, London, pp. 3–25.
- Callan, V.J. (1987) The personal and marital adjustment of mothers and of voluntarily and involuntarily childless wife's. *Journal of Marriage and the Family*, **49**, 847–856.
- Callan, V.J. and Hennessey, J.F. (1988) The psychological adjustment of women experiencing infertility. *Br. J. Med. Psychol.*, **61**, 137–140.
- Cohen, J. (1988) *Statistical Power Analysis for the Behavioural Sciences*. Erlbaum, Hillsdale, New York, pp. 24–27.
- Daniluk, J.C. (1997) Gender and infertility. In Leiblum, S. (ed.), *Infertility: Psychological Issues and Counseling Strategies*. John Wiley & Sons, New York, pp. 103–125.
- Derogatis, L.R., Rickels, K. and Rock, A.F. (1976) The SCL-90 and the MMPI: a step in the validation of a new self-report scale. *Br. J. Psychiatry*, **128**, 280–289.
- Dunkel-Schetter, Ch. and Lobel, M. (1991) Psychological reactions to infertility. In Stanton, A.L. and Dunkel-Schetter, Ch. (eds), *Infertility. Perspectives from Stress and Coping Research*. Plenum Press, New York, London, pp. 29–57.
- Dunkel-Schetter, Ch. and Stanton, A.L. (1991) Psychological adjustment to infertility: future directions in research and application. In Stanton, A.L. and Dunkel-Schetter, Ch. (eds), *Infertility. Perspectives from Stress and Coping Research*. Plenum Press, New York, London, pp. 197–222.
- Edelmann, R.J. and Connolly, K.J. (1986) Psychological aspects of infertility. *Br. J. Med. Psychol.*, **59**, 209–219.
- Enders, N. (1999) *Vergleich von Paaren mit idiopathischer Sterilität zu Paaren anderer Sterilitätsursachen in den Bereichen sozioökonomischer Status, Kinderwunschmotivation, Lebenszufriedenheit, belastende Lebensereignisse, Paarbeziehung und Beschwerden*. Medizinische Dissertation, Universitätsfrauenklinik Heidelberg, pp. 16–18.
- Fahrenberg, J., Myrtek, M., Schuhmacher, J. and Brähler, E. (2000) *Fragebogen zur Lebenszufriedenheit (FLZ)*. Hogrefe, Göttingen, pp. 19–32.
- Franke, G.H. (1995) SCL-90-R. *Die Symptom-Checkliste von Derogatis, Deutsche Version*. Beltz Test, Göttingen, pp. 21–28.
- Hahlweg, K., Schindler, D. and Revenstorff, D. (1982) *Partnerschaftsprobleme: Diagnose und Therapie. Handbuch für den Therapeuten*. Springer, Berlin, Heidelberg, New York, pp. 12–24.
- Hölzle, Ch. and Wirtz, M.A. (2001) *Fragebogen zum Kinderwunsch*. Hogrefe, Göttingen, pp. 11–27.
- Jordan, C. and Revenson, T.A. (1999) Gender differences in coping with infertility: a meta-analysis. *J. Behav. Med.*, **22**, 341–358.
- Just, U. (1998) *Die Bedeutung biographischer Belastungsvariablen für die Sterilitäts-genese*. Diplomarbeit, Psychologisches Institut, Universität Heidelberg, pp. 86–101.
- Kemeter, P. (1988) Studies on psychosomatic implications of infertility – effects of emotional stress on fertilization and implantation in in-vitro-fertilization. *Hum. Reprod.*, **3**, 341–352.
- Kentenich, H. (1992) Richtlinien für die medizinische Diagnostik und Klassifikation. In Strauß, B. (ed.), *Psychosomatische Diagnostik und Beratung/Therapie bei Fertilitätsstörungen*. Antrag auf einen Forschungsverbund im Rahmen des Förderschwerpunktes 'Fertilitätsstörungen' des BMBF (unpublished).
- Keye, W.R. (1999) Medical aspects of infertility for the counselor. In Burns, L.H. and Covington, S.H. (eds), *Infertility Counseling. A Comprehensive Handbook for Clinicians*. Parthenon, New York, pp. 27–46.
- Knorre, P. (1991) Fertilität und Infertilität aus psychosomatischer Sicht. In Brähler, E. and Meyer, A. (eds), *Jahrbuch für Medizinische Psychologie 5*. Springer, Berlin, Heidelberg, New York, S3–S13.
- Leiblum, S.R. and Greenfield, D.A. (1997) The course of infertility: immediate and long-term reactions. In Leiblum, S. (ed.), *Infertility: Psychological Issues and Counseling Strategies*. John Wiley & Sons, New York, pp. 83–102.
- Morrow, K.A., Thoreson, R.W. and Penney, L.L. (1995) Predictors of psychological distress among infertility clinic patients. *J. Consult. Clin. Psychol.*, **63**, 163–167.
- Morse, C. and Dennerstein, L. (1985) Infertile couples entering an in-vitro-fertilisation-programme: a preliminary survey. *J. Psychosom. Obstet. Gynecol.*, **4**, 207–219.
- Nachtigall, R.D., Becker, G. and Wozny, M. (1992) The effects of gender-specific diagnosis on men's and women's response to infertility. *Fertil. Steril.*, **57**, 113–121.
- O'Moore, A.M., O'Moore, R.R. and Harrison, R.F. (1983) Psychosomatic factors in patients with hyperprolactinemia. *Obstet. Gynecol.*, **55**, 591–608.
- Paulson, J.D., Haarmann, B.S., Salerno, R.L. and Asmar, P. (1988) An investigation of the relationship between emotional maladjustment and infertility. *Fertil. Steril.*, **49**, 258–262.
- Rogers, J.L., Howard, K.I. and Vessey, J.T. (1993) Using significance tests to evaluate equivalence between two experimental groups. *Psychol. Bull.*, **3**, 553–565.
- Schmidt, P., Wischmann, T. and Gerhard, I. (1994) Partnerbeziehung bei unerfülltem Kinderwunsch. *Z. Med. Psychol.*, **2**, 64–71.
- Slade, P., Emery, J. and Lieberman, B.A. (1997) A prospective longitudinal study of emotions and relationships in in-vitro fertilization treatment. *Hum. Reprod.*, **12**, 183–190.
- Stauber, M. (1988) *Psychosomatik der sterilen Ehe*. (2nd edn). Grosse, Berlin, pp. 91–94.
- Strauß, B. (1991) *Psychosomatik der Sterilität und der Sterilitätsbehandlung*. Enke, Stuttgart, p. 83.
- Tennen, H., Affleck, G. and Mendola, R. (1991) Causal explanations for infertility: their relationship to control appraisals and psychological adjustment. In Stanton, A.L. and Dunkel-Schetter, Ch. (eds), *Infertility. Perspectives from Stress and Coping Research*. Plenum Press, New York, London, pp. 109–131.
- Wischmann, T. (1998) 'Heidelberger Kinderwunsch-Sprechstunde' – Eine Studie zu psychosozialen Aspekten ungewollter Kinderlosigkeit. Verlag Peter Lang, Frankfurt/Main, pp. 23–24.
- Wischmann, T., Stammer, H., Gerhard, I. and Verres, R. (2001) Couple counseling and therapy for the unfulfilled desire for a child – the two-step approach of the 'Heidelberg Infertility Consultation'. In Strauß, B. (ed.), *Fertility Disorders: Psychological Diagnostic, Counseling and Psychotherapy*. Hogrefe and Huber Publishers, Seattle, in press.
- Wright, J., Allard, M., Lecours, A. and Sabourin, St. (1989) Psychosocial distress and infertility: a review of controlled research. *Int. J. Fertil.*, **34**, 126–142.
- Wright, J., Duchesne, C., Sabourin, St. et al. (1991) Psychosocial distress and infertility: men and women respond differently. *Fertil. Steril.*, **55**, 100–108.

Received on November 1, 2000; accepted on April 12, 2001