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ASSISTED REPRODUCTION TECHNOLOGIES

Resilience in infertile couples acts as a protective factor against infertility-specific distress and impaired quality of life

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Abstract
Objective Our hypothesis was that resilience (=psychosocial stress-resistance) reduces infertility-specific distress and maintains quality of life of infertile couples.
Methods Questionnaire data of WHO Quality of Life assessment (WHOQOL; domains: 'physical', 'psychological', 'social relationships' and 'environment'), Fertility Problem Inventory (FPI; scales: 'social concern', 'sexual concern', 'relationship concern', 'rejection of childfree lifestyle' and 'need for parenthood'), Resilience Scale (RS), as well as sociographic and medical data were available for 199 infertile couples.
Results Age, medical diagnosis and 'intensity of desire for a child' had no influence on quality of life. High scores on 'suffering from childlessness' went along with less satisfaction on 'physical' and 'psychological' domains for the women only. For both partners, high scores on 'suffering from childlessness' went along with higher scores on all FPI scales. High resilience was associated with high scores on all WHOQOL domains for both partners, also with low scores on all FPI scales except for 'need for parenthood' for the women and with a low score only on 'relationship concern' for the men.
Conclusions For infertile couples, resilience can be considered as an unspecific protective factor against infertility-specific distress and impaired quality of life. When offering counselling to involuntarily childless couples, awareness should be raised for resilience as a couple's resource and a "generic" factor of coping.

Keywords Psychological factors · Infertility-specific distress · Resilience · Quality of life · Infertility · Protective factor

Capsule Resilience acts as a protective factor against infertility-specific distress and impaired quality of life for infertile couples

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Introduction

It is beyond dispute that both the diagnosis and therapy of infertility put a heavy psychological and physical burden on most patients [1–4]. Many authors believe infertility causes a life crisis for the couples concerned [1, 5, 6], others consider it the most stressful event in patients' lives, on a par only with divorce or the death of a loved one [7]. In order to overcome the crisis, patients often need to re-orientate themselves and re-organise the situation [8].

Even if the majority of infertility patients show no long-term impact on their life satisfaction, the reduced satisfaction at the time of the diagnosis and of subsequent therapy does seem to be a problem [2, 9]. For example, Wischmann et al. [10] describe unwanted childlessness as causing a major loss in quality of life. For this reason, various authors argue that improved quality of life should be a primary goal of psychosocial counselling, irrespective of whether the desire for a child is fulfilled or not [10–12].

Despite the heavy emotional burden resulting from the infertility diagnosis, it is by no means the case that all couples are emotionally desperate [9, 13, 14]. Only an average of 20–25% of couples makes use of psychosocial

counselling if it is offered at all. For the others, their own coping resources seem to be adequate to survive the infertility crisis unharmed [15]. So far, however, there are no systematic studies into the true nature of these resources. Alongside a better coping mechanism and sufficient social support, some specific psychological strengths could be involved which have not been identified yet.

In this context, "resilience" could be a suitable concept. It is defined as the individual psychological ability to resist and adapt to difficult life events [16] or as a "dynamic process encompassing positive adaptation within the context of significant adversity" [17, p. 543]. Therefore it can be seen as the positive counterpart to vulnerability. Although several definitions of resilience exist [18], resilient individuals can be generally characterised as possessing self-esteem, believing in one's own self-efficacy, having a repertoire of problem-solving skills and satisfying interpersonal relationships [16]. If we transfer this concept to infertility patients, it could mean that couples showing a good quality of life despite infertility have a relatively high psychological stress tolerance [19]. If this hypothesis could be confirmed, especially couples with low resilience combined with reduced quality of life should be offered psychosocial counselling aimed at promoting resilience as a non-specific resource.

On the basis of these considerations, the following questions were formulated:

- Is there a difference in quality of life between infertile couples and a normal sample?
- Are quality of life and infertility-specific distress correlated with the intensity of the wish to have children or rather to the burden resulting from the infertility?
- Is there a positive link between resilience and quality of life or a negative link between resilience and infertility-specific distress?
- Are there links between the occurrence of pregnancy and quality of life, intensity of infertility-specific distress or resilience?

Materials and methods

Between March and August 2003, all couples presenting to the Fertility Consultation Service of the Women's Hospital of Heidelberg University were asked to complete the following standardised questionnaires:

1. **The World Health Organisation quality of life assessment (short version)** (WHOQOL BREF: [20], German version: [21]). The WHOQOL consists of 24 five-point items allocated to the 4 domains "physical" (7 items), "psychological" (6 items), "social relationships" (3 Items) and "environment" (8 items) as well as two items on global quality of life. High scores signify a high quality of life. The WHOQOL was standardised based on a representative German sample of 2432 persons. For all domains, internal consistency ranges clearly above 0.70.
2. **The Fertility Problem Inventory** (FPI: [22]). The FPI consists of 46 six-point items to evaluate the distress caused specifically by the fertility disorder. The items are allocated to six scales: social concern, sexual concern, relationship concern, rejection of childfree lifestyle, need for parenthood and a sum scale on global distress. A high score means high distress caused by infertility. The FPI was standardised based on a Canadian sample of 2302 childless patients whose scores were used as a reference. For all scales, the reliability values range between 0.77 and 0.93, suggesting good reliability. In our study, a German translation of the FPI made by Newton and Wischmann was used (available from the last author). As there is no German standardisation of the FPI, its reliability cannot be quantified yet.
3. **The Resilience Scale** (RS: [16], German version: [23]. We used the original version of the RS with 25 seven-point items (RS-25). In the statistical analysis of the German version of the RS by Schumacher et al. [24], the two-dimensional structure ("personal competence" and "acceptance of self and life") postulated by the authors could not be replicated. In our study, we therefore only calculated the total score. A high score suggests high resilience. The German translation [24] used in this study was standardised based on a representative German sample. Example items of the RS are "I usually manage one way or another", "I do not dwell on things that I can't do anything about" and "My life has a meaning".

In addition, a number of **sociobiographical data** were gathered (age, educational level, duration of infertility, treatment and partnership), and couples were asked about their **intensity of the desire for a child** (five-point scale 0–4) and **suffering from childlessness** (seven-point scale 0–6) in one item each. The levels of intensity of the desire for a child and suffering from childlessness were then each meaningfully reduced to two levels (a group with high and a group with low scores). Because of the severe skewness of the distributions, care was taken to have equal group sizes as far as possible. For intensity of the desire for a child, scores of 0–3 were therefore considered "low", while a score of 4 was "high". For suffering from childlessness, a score of 0–4 was considered "low", while a score of 5 or 6 was "high". Subjects assigned to the groups "high" versus "low" on the item intensity of the desire for a child could be

differentiated on the FPI scales rejection of childfree lifestyle and need for parenthood, whereas those scoring "high" versus "low" on the item suffering from childlessness could be differentiated on the FPI scales social concern, sexual concern, relationship concern and global distress (data not shown). Finally, **medical data** were derived from the patients' medical records, which made it possible to subdivide the couples based on the cause of infertility. After three months, couples who had given their written consent were asked again about their current situation (pregnancy, spontaneous abortion, break in therapy, end of therapy). Furthermore, a sample of 126 randomly selected non-responders were also analysed for their medical and sociobiographical data based on medical records in order to test for a possible selection of study subjects. The study was carried out with permission from Ethics Committee of the Medical Faculty of Heidelberg University.

In order to test the hypotheses, the following methods were used: The degree of difference between two groups in terms of the observed mean scores was reviewed using the *t*-test for independent samples (in the case of unequal variances, the *t*-test for unequal variances was used). The degree of difference between more than two groups was tested using analysis of variance. The comparison of the questionnaires with the standard scores was made by transforming them into a *z*-score of the standard normal distribution. To assess the significance of differences with respect to the reference group, effect sizes were calculated from the difference between the mean of the study group and the mean of the reference group, divided by the standard deviation of the reference group. Effect sizes (ES) between 0.20 and 0.50 are regarded as small, between 0.50 and 0.80 as medium and above 0.80 as large [25]. Correlations between the scales of the questionnaires are expressed by Pearson's correlation coefficient.

Results

Description of the total sample

436 out of 930 questionnaire sets were returned the same day or mailed back some days later (=46.9%). After excluding couples who were already pregnant when filling out the questionnaires and subjects who had returned incomplete questionnaires, the total sample size finally ready for evaluation encompassed 199 couples (=398 questionnaire sets).

There was no difference between responders and non-responders in terms of their medical variables. An age comparison revealed that both men and women were significantly older in the group of non-responders (data not shown). We can only speculate here whether the higher age of non-responders compared to responders kept them from participating in the study. However, this does probably not constitute a selection of the sample which would result in lack of representativeness.

Medical diagnoses

In about a quarter of the couples, the diagnostic work was incomplete for at least one partner. For this reason, we differentiated the subjects according to whether or not they had a "confirmed diagnosis". This differentiation revealed that the sample included many men diagnosed infertile (63% of the men). The share of couples with primary infertility was 71%.

Sociodemographic criteria

The average age of the women was 33.0 years (range 21–45). The average age of the men was slightly higher at 35.6 years (range 21–51). Except for two couples, all subjects were German nationals (99%). The average duration of partnership was 9 years and 10 months (range 2–27 years). The average duration of the wish for a child as indicated by men and women was 4 years and 5 months (range 5 months to 14 years). The average duration of treatment was 2 years and 4 months for women and 2 years and 2 months for men (range 0 months to 10 years).

Pregnancies

After three months, 28 out of the 199 couples studied refused further study participation. We were unable to contact four of the 171 couples remaining. The residual 167 couples were asked whether a pregnancy had occurred. 64 women (38%) had become pregnant, two of them "spontaneously".

Further characteristics of the sample

The number of people with a university education was more than three times the national average for men (41%) and more than 3.5 times the average for women in the year 2003 (29%); [26].

Group comparisons

Quality of life results (WHOQOL)

Positive values in Table 1 mean a positive deviation from the norm (higher quality of life) while negative values suggest a lower quality of life. For the "psychological" domain, women in our study considered their quality of life significantly worse than the normal sample ($p \leq .001$, with small ES). For

Table 1 Differences from reference population in WHOQOL-Bref

WHOQOL-Domains	Women (N=199)	Men (N=199)
Physical	−0.07±0.73	−0.01±0.80
Psychological	−0.38±0.78***	−0.07±0.75
Social Relationship	−0.11±0.71	−0.05±0.75
Environment	0.42±0.75***	0.50±0.71***
Global	0.04±0.86	0.07±0.90

Values are mean±SD (z-transformed)

***$p \leq .001$; reference population: M=0, SD=1

the "environment" domain, women (with small ES) and men (with medium ES) reported a significantly better quality of life than the reference population ($p \leq .001$).

Results regarding intensity of wish for a child/suffering from childlessness and quality of life

Comparing the quality of life of subjects with a strong wish for a child with those with a less strongly felt wish yielded no differences. However, women suffering a lot from childlessness rated their quality of life as significantly worse than women suffering less on all domains except "social relationship" (s. Table 2). In the results of the men, no relationships were observed (data not shown).

Results regarding infertility-specific distress (FPI)

On the basis of the FPI questionnaire, infertile (German) women showed no difference from the reference group of Canadian infertile women (s. Table 3). However, the men had higher scores on the scale "rejection of childfree lifestyle" ($p \leq .001$) and on the scale "need for parenthood" ($p \leq .01$), indicating a higher infertility-specific distress (however, with only small effect sizes). The assumption that this difference could be due to the high amount of men with an andrological factor finding in this study was not confirmed. The comparison between men with and without a medical diagnosis revealed no difference (data not shown).

We also investigated the link between duration of treatment and infertility-specific distress as measured by the FPI. The analysis of variance showed significant differences on the scale "relationship concerns" for women. Their dissatisfaction with the relationship rose in parallel with increasing duration of treatment (up to 1 year: M=19.07; up to 2 years: M=20.65; up to 4 years: M=20.64; more than 4 years: M=25.07; $p \leq .05$). In this respect, men showed no differences on the FPI scales.

Results regarding resilience (RS) and quality of life/ infertility-specific distress

Compared to the normal sample women (0.19±0.70; $p \leq .01$, no ES) and men (0.70±0.58; $p \leq .001$, medium ES) in our sample showed higher resilience scores. A higher resilience correlated with higher quality of life scores on all WHOQOL domains for men and women (see Table 4). Furthermore, in women, a high resilience was associated with low infertility-specific distress on all FPI scales. In men, the correlation levels were lower on all FPI scales, and did not get significant in the scales "rejection of childfree lifestyle" and "need for parenthood".

Results regarding pregnancies and psychological variables

Among the couples achieving pregnancy, both women and men specified a significantly better quality of life only in the WHOQOL domain "physical" compared to couples which had not succeeded in getting pregnant (s. Table 5). No further significant differences were found.

Discussion and conclusion

Quality of life, intensity of the wish for a child and suffering from childlessness

The quality of life results in the study sample differed significantly from the normal sample in two areas: On the

Table 2 Differences in quality of life between women with high and with low values on the variable "suffering from childlessness"

WHOQOL-Domains	Women (N=198)		
	Suffering from childlessness		
	high (N=72)	low (N=126)	t (df)
Physical	77.57±12.00	81.86±10.53	−2.61 (194)**
Psychological	63.48±13.09	72.92±10.61	−5.22 (124)[a]***
Social Relationship	70.07±15.91	73.18±12.70	−1.41 (121)[a]
Environment	74.44±9.91	78.92±10.18	−3.01 (196)**
Global	66.32±16.74	74.21±12.92	−3.45 (120)[a]***

Values are mean±SD

**$p \leq .01$ ***$p \leq .001$

[a] t-Test for unequal variances

Table 3 Differences from Canadian reference group in FPI

FPI-Scales	Women (N=199)	Men (N=199)
Social Concern	−0.04±0.77	−0.04±0.79
Sexual Concern	0.07±0.94	0.12±1.06(*)
Relationship Concern	−0.11±0.90	−0.05±0.97
Rejection of Childfree Lifestyle	0.07±0.81	0.24±0.89***
Need for Parenthood	0.07±0.79	0.22±0.87**
Global Stress	0.01±0.82	0.12±0.88(*)

Values are mean±SD (z-transformed)

(*)$p \leq .10$ **$p \leq .01$ ***$p \leq .001$; reference population: M=0, SD=1

"psychological" domain, a significant number of involuntarily childless women described their quality of life as worse, whereas men reported no difference. The results support the view generally held in literature that infertility is a major psychological problem especially for women, whereas involuntarily childless men generally suffer less from psychological distress [3, 27–30]. The significant higher satisfaction with the "environment" can be explained by the above-average number of university graduates in the study sample, as this domain also includes questions about financial resources and use of information.

While there was no link between quality of life and intensity of the wish for a child, women with high levels of suffering from childlessness were significantly less satisfied with their psychological and physical quality of life and environmental conditions than women with a low level of suffering from childlessness. For the "physical" aspect, this may be explained by the physical burden of undergoing infertility treatment.

Table 4 Correlation of WHOQOL-Bref and FPI with the RS

	Women (N=196)	Men (N=199)
WHOQOL-Domains		
Physical	.40***	.34***
Psychological	.61***	.46***
Social Relationship	.41***	.34***
Environment	.38***	.33***
Global	.33***	.28***
FPI-Scales		
Social Concern	–.38***	–.16*
Sexual Concern	–.41***	–.16*
Relationship Concern	–.34***	–.22**
Rejection of Childfree Lifestyle	–.16*	–.01
Need for Parenthood	–.25***	–.07
Global Stress	–.44***	–.17*

Pearson's correlation coefficient

*$p \leq .05$ **$p \leq .01$ ***$p \leq .001$

Table 5 Differences in quality of life of couples that became pregnant (P) and those still infertile (NP)

WHOQOL-Domains	P (N=64)	NP (N=103)	t (df)
Women (N=167)			
Physical	82.76±9.85	79.10±11.88	−2.06 (164)*
Psychological	69.92±11.25	69.72±11.68	−0.11 (165)
Social Relationship	72.79±11.23	72.75±14.57	−0.02 (157)[a]
Environment	77.64±10.09	77.56±10.36	−0.05 (165)
Global	73.24±14.06	71.36±16.01	−0.77 (165)
Men (N=167)			
Physical health	86.61±10.87	82.59±11.61	−2.23 (165)*
Psychological	77.67±11.84	74.47±10.56	−1.81 (165)(*)
Social Relationship	72.27±14.40	71.68±14.59	−0.25 (165)
Environment	78.71±11.63	77.26±10.29	−0.84 (165)
Global	76.56±16.29	71.84±14.61	−1.94 (165)(*)

Values are mean±SD

(*)$p \leq .10$ *$p \leq .05$

[a] t-Test for unequal variances

However, on the "physical" domain of the WHOQOL, there was no difference between women undergoing more invasive therapy and those not currently in a therapy cycle, so that this explanation is not pertinent here. Perhaps the women perceived their physical health as impaired due to the mere fact that they were infertile even if there was no objective (current) physical impairment.

The only area where women were not affected by suffering from childlessness was "social relationship". Authors such as Greil and McQuillan [31] and Newton et al. [32] describe seeking social support as a widespread coping strategy in women. Our results suggest that the social environment of the women studied reacted adequately to her call for help irrespective of the degree of her infertility-specific distress.

In men, there was no difference in quality of life between high and low suffering from childlessness. Newton et al. [22] argue that men tend to underrate their general distress level and explain this by the particular selection of psychological variables (mostly anxiety and depression), where women tend to give higher scores. However the results of our study could also suggest a different explanation: As quality of life is not impaired for men even if suffering from childlessness is acute, the suffering is less relevant for them than for women, where nearly every domain in life is significantly negatively correlated with suffering from childlessness.

According to these results, if women suffer greatly from childlessness, this can be regarded at least as a potential risk factor for reduced quality of life, whereas this was hardly the case in the male study population.

Resilience

The high resilience of the involuntarily childless couples we examined, especially the resilience on the part of the men, suggests a high level of psychological stability. These results are in line with statements by authors such as Greil et al. [4] or Gibson et al. [33], to the effect that only emotionally stable couples can face up to such a distressing procedure as reproductive medicine treatment.

A high resilience correlated with high quality of life on all domains of the WHOQOL in men, and in women it also correlated with low infertility-specific distress on all scales of the FPI. Therefore, there should be a new counselling strategy offering infertile women and men with low resilience that could possibly be regarded as a risk group the opportunity for more psychosocial counselling.

Pregnancies

Current research on prognostic psychological factors for the onset of pregnancy shows ambiguous results (for an overview, see [34]). However, one explanation for the difference on the WHOQOL domain "physical" for both partners could be a kind of "healthy mother bias". This term comes from breast cancer research and describes the fact that mainly women who *feel* healthy after treatment for breast cancer try to have a child [35]. If this idea is transferred to infertile couples, it could mean that satisfaction with one's body or one's health possibly may have a positive influence on the onset of pregnancy whether one is in fact healthy or not. Whether satisfaction with one's physical health (irrespective of the infertility diagnosis) might be a positive prognostic factor for the onset of pregnancy should be investigated in further studies.

Possible limitations of the study

Although no major selection effects became apparent by the comparison between responders and non-responders, some selection effect must be assumed and taken into account when transferring the results to the total group of involuntarily childless couples [36]. For example, we only investigated couples seeking specialised medical treatment for infertility. Furthermore, only 47% of all couples invited had returned questionnaires, so we can assume that the study group was a particularly motivated sub-group. Moreover, the study sample included an unusually high percentage of patients with male factor infertility. The reason could be that outpatient specialists directly referred men with a severely compromised sperm count to the Heidelberg University Hospital for microinjection treatment. The extent to which our study results can or cannot be generalised has to be investigated in further studies examining infertile couples with different medical diagnoses and infertile couples not undergoing assisted reproduction.

Practice Implications

As the study shows, resilience could be a possible protective factor for the couples' quality of life and against infertility-specific distress experienced by women. However, this can only be confirmed by prospective studies into resilience and quality of life before, during and after infertility therapy. Furthermore, prospective psychosocial intervention studies could determine the extent to which resilience can be enhanced by resource-orientated or resilience enhancing psychological counselling or psychotherapy [12, 37] in order to improve quality of life. Resilience may be regarded as a latent and non-specific resource. Promoting it by counselling or psychotherapy is possible both by focusing attention on this comprehensive ability and by problem-specific counselling. When offering counselling to involuntarily childless couples, awareness should be raised for resilience as a "generic" factor of coping.

As the resilience scale—especially the short version RS-11 with 11 items [23]—is a quick and easy tool, routine screening using this questionnaire is conceivable to identify the sub-group of vulnerable couples which need counselling, in addition to screening instruments like IVFSCREEN [38] or FertiQoL [39].

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