SHORT THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (PHD)

Psychological characteristics of Hungarian infertile couples on personal, couple and sociocultural levels

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The Examination takes place at the Department of Preventive Medicine, Faculty of Public Health, University of Debrecen, on the 27th April, 2015 at 11 am.

Head of the Defense Committee: Róza Ádány PhD, DSc
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The PhD Defense takes place at the Lecture Hall of Bldg. 'A', Department of Internal Medicine, Faculty of Medicine, University of Debrecen at 27th April, 2015 at 1 pm.

INTRODUCTION

The topic of reproductive problems has nowadays a high of interest because the prevalence of infertility is quite high (9% worldwide) and the number of diagnosed cases is rising. A couple is considered to be infertile if they fail to conceive while having regular, unprotected sexual intercourse at least for a year. A great proportion of couples with fertility problems seek medical care and receive a kind of assisted reproduction treatment. The current law in Hungary provides the patients having health insurance with diagnostic procedure, five times with IVF-cycle, six times with insemination treatment free of charge.

Several scientific areas are involved in the topic of infertility to explore new knowledge about its causes, consequences, and treatment possibilities. These areas include first of all gynaecology, endocrinology, andrology, genetics, psychology, anthropology and ethics. In the context of population decline, psychosocial consequences of medically determined reproductive problems provide a special field for scientific inquiry. The biopsychosocial theoretical model of infertility provides a good base to understand unwanted childlessness not only as a physiological disorder from the medical perspective but also as a psychosocial phenomenon that exists on personal, (couple) relational and brighter social levels.

Lack of transition to parenthood is a paranormative crisis evoking more depressive and anxious symptoms in the given population. Experiencing infertility can lead to fertility specific negative emotions, different types of cognitions and behaviours, which influence not only personal but also couple relational and other social areas of one's life. Social concerns regarding involuntary childlessness are negatively related to self-esteem and resilience, and correlate positively with self-compassion and self-judgement.

Infertility as a joint experience of the couple can strengthen the relationship, but on the other hand, the failure in fulfilling child wish, gender roles, and burdens of the reproductive interventions can generate conflicts and communication problems between the members of the couple. Couples show a kind of reciprocity in experiencing infertility, so in this sense, depression, coping style, attachment style and perceived social support of one partner were proven to influence the infertility specific distress in the partner.

Most of the qualitative and quantitative psychological studies in reproductive medicine focus on gender differences considering emotional reactions to infertility. The main results summarize that women show an expanded emotional sensitivity while facing their infertility and express more depressive, anxious and negative feelings about their status than do men.

Traditional “masculinity” correlated with emotional stability and marital satisfaction and less anxiety than “femininity”. Moreover, positively valued instrumental (“masculine”) attributes in infertile women were described as predictors of lower distress and negative valued masculine attitudes related to higher distress. At the same time, women in an infertile group tend to have more “feminine” attributes than women in the general population.

STATEMENT OF THE PROBLEM

Reproductive problems have a great of importance in Europe because population decline could lead to drastic demographic changes. To help more babies to the world, the technology in reproductive medicine and assisted reproduction has been developed to a great extent. On the other hand, we have to be careful to see infertility not only a medical condition but also as an experience of human beings.

There is no protocol in Hungary for providing psychosocial counselling for couples recoursing to assisted reproduction technologies covered by health insurance. In this situation, a study investigating psychological responses of infertile couples has deep significance. The topic of this thesis is an investigation of psychosocial aspects of couples facing infertility. By planning the study, our aim was to investigate aspects from the health psychological approach – including couples’ shared reactions and culturally determined importance of becoming a parent – in the field of gynecological and reproductive health care.

Experiencing involuntary childlessness affects personal, relational and social levels as described in the literature of infertility. Because of our interdisciplinary point of view, the focus of the thesis was put on all the three levels. We wanted to concentrate personal psychological adjustment to infertility, couple-levelled psychological reactions and society-based or culturally impacts on experiencing infertility.

AIMS

(1) Our aim is to conduct an investigation on psychosocial aspects in experiencing infertility in Hungary. In order to investigate better the Hungarians’ psychosocial characteristics and reactions which may have been influenced by special cultural factors, international comparisons are used as well.

(2) We want to get a general and widespread view of psychological factors of Hungarian infertile individuals. In our studies, we concentrated on the psychological

consequences of involuntary childlessness like infertility-specific stress and infertility specific quality of life. We examine the couples together to be able to measure their shared reactions.

The thesis is based on a Hungarian pilot-study (study I.) and a couple-level analysis of Hungarian participants (study II.) nested in an international comparison study (study III.) In this sense, we address *specific aims* to each study:

SPECIFIC AIMS OF THE STUDY I (EXPLORATORY ANALYSIS WITH PSYCHOSOCIAL ASPECTS IN HUNGARIAN INFERTILE MEN AND WOMEN):

(1) We want to see if Hungarian infertile people show the same characteristics, reactions in gender and reference group compared with their fellows in other Western countries do. (e.g. Levels of depression, infertility-related stress are higher in women than in men).
(2) We want to investigate biopsychosocial relationships on the basis of experiencing infertility and explore if gender roles, child wish motives, subjective well-being and marital satisfaction are predictors of infertility-related stress.

SPECIFIC AIMS OF THE STUDY II (DEPRESSION AND PSYCHOSOCIAL CONSEQUENCES OF INFERTILITY ON THE LEVEL OF HUNGARIAN COUPLES):

(1) We aimed to detect (a) the prevalence of depressive symptomatology and severe depression in a Hungarian infertile population. We investigate (b) if infertility specific stress is associated with the severity of depression so that a person with severe depression experience also more concerns connected to infertility and (c) if infertility specific stress is related to the partner`s depression level, so that the person report about more fertility problems if the partner has severe depression.
(2) The other aim is to investigate a relation between depression and fertility specific quality of life (a) at the level of person and also (b) at the level of partner.

SPECIFIC AIMS OF THE STUDY III (FERTILITY SPECIFIC QUALITY OF LIFE IN INTERNATIONAL SETTING):

(1) We want to describe differences in sociodemographic variables, infertility specific quality of life and gender role attitudes in German and Hungarian infertile samples of couples.

(2) We want to examine the differences concerning infertility-related quality of life among persons with different gender role attitudes.

MATERIALS AND METHODS

STUDY POPULATIONS AND SETTINGS

For all studies, the following criteria were laid down for the participation: (i) meet the diagnosis of infertility stated by International Committee for Monitoring Assisted Reproductive Technology; (ii) having sufficient knowledge in Hungarian (or in German language according to the place of data collection) to be able to complete the questionnaires.

For the study I., 53 participants attending fertility consultation were recruited at the Fertility Unit of Department of Obstetrics and Gynaecology of University of Debrecen (Hungary) between April and July 2011. For study II. and III., data was collected first in five Hungarian fertility clinics (Clinic of Obstetrics and Gynaecology, University of Debrecen – Debrecen; Department of Obstetrics and Gynaecology, Jósa András Teaching Hospital – Nyíregyháza; Kaáli Institute – Győr; Kaáli Institute – Budapest; Róbert Károly Private Clinic – Budapest) between February 2012 and March 2013. 126 couples waiting for their first medical consultation participated in the study. For the German part of the study III., couples attending the first infertility medical consultation in one German fertility clinic (Department of Gynecological Endocrinology and Fertility Disorders, Ruprecht-Karls University of Heidelberg) were recruited during the same time period.

MEASUREMENTS

We assigned in all studies self-report questionnaires to measure the proposed variables.

Socio-demographic characteristics were obtained by using questions about age, education level, duration of partnership, and duration of infertility in all studies.

Questionnaires used in the study I (Exploratory analysis with psychosocial aspects in Hungarian infertile men and women):

Gender roles

Masculinity-femininity scale (MF) is one of the scales of the Minnesota Multiphasic Personality Inventory (MMPI) measures in a general sense how rigidly a person conforms to very stereotypical masculine or feminine roles, interests, or behaviours. *Marital Roles subscale* is a part of the Male-Female Relations Questionnaire (MFRQ-MR) developed to assess specific personal attitudes about gender roles in marital/couple relationships, domestic work, and child rearing.

Social and personal child wish motives

The Leipzig Questionnaire on Motives to have a Child (LKM-20) assesses with two motives for wanting a child (LKM1: Desire for emotional stabilization and finding meaning, LKM3: Desire for social recognition) and with two scales the motives against it (LKM2: Fear of personal constraints, LKM4: Fear of financial constraints).

Subjective well-being

Beck Depression Inventory (BDI) is used widely to measure the intensity of depression. A short-form of the inventory covers the following cognitive and affective areas: loss of interest, indecision, sleep disturbance, fatigability, hypochondria, difficulty on the job, pessimism, negligence, and feeling of failure. *Life Meaning subscale* from the Brief Stress and Coping Inventory (LM) examines one component of spirituality. Short form of *General Health Questionnaire* (GHQ-12) is aimed at the severity of mental problems, particular symptoms or behaviours, in the past few weeks.

Marital adjustment

Dyadic Adjustment Scale (DAS) measures the overall adjustment couples experience in their relationship with dimensions of dyadic consensus, dyadic satisfaction, dyadic cohesion and affectional expression.

Infertility-related stress

The *Fertility Problem Inventory* (FPI) measures the level of a couple infertility-related stress. Social concerns subscale (FPI1) asks about sensitivity to comments, reminders of infertility, feelings of social isolation, alienation from family or peers. Sexual concern subscale (FPI2)

considers diminished sexual enjoyment or sexual self-esteem, scheduled sexual relations difficult. FPI3 is the relational concerns subscale relating to difficulty talking about infertility, understanding/accepting sex differences, concerns about impact on relationship. Rejection of childfree lifestyle subscale (FPI4) asks about close identification with role of parent, parenthood perceived as primary or essential goal in life. Need for parenthood subscale (FPI5) relates to negative view of childfree lifestyle or status quo, future satisfaction or happiness dependent on having a child.

Questionnaires used in study II (Depression and psychosocial consequences of infertility on the level of Hungarian couples):

Depression

Aspects of depression were measured with *Beck Depression Inventory* (BDI) (s. Questionnaires used in study I). We added the participants to the following groups according to their BDI-scores: no depression (0-9 points), mild depression (10-18 points), moderately severe depression (19-25 points), severe depression (above 26 points).

Infertility-related stress

Fertility Problem Inventory (FPI) is a multidimensional measure to assess infertility-related stress in five subscales (s. Questionnaires used in study I).

Fertility specific quality of life

The Core module of the internationally developed and validated *FertiQoL* asks about fertility specific quality of life in *emotional* (absence of negative feelings), *mind/body* (absence of cognitive and physical burdens), *relational* (good relational adjustment) and *social* (perceived support from family, friends) domains.

Questionnaires used in the study III (Fertility specific quality of life in international setting):

Gender role attitudes

Personal Attribute Questionnaire (PAQ) was used to assess personal gender roles attitudes. Two scales of the measure address desirable instrumental, acting (”masculine) (I scale) and expressive, communicating (“feminine”) (E scale) attitudes, respectively.

Fertility specific quality of life

FertiQoL was assessed to measure emotional, mind/body, relational and social domains of fertility specific quality of life (s. Questionnaires used in study II).

STATISTICAL ANALYSIS

For statistical analysis, SPSS for Windows release 17.0 and 22.0 (Chicago, IL, USA) were used. Statistical significance was set in all cases at $p<0.05$. Firstly in all studies, each scale was tested for internal consistency and normality. If the value of Cronbach's alpha remained below the cut-off point of 0.60, we deleted the scale.

In the study I, differences of parametric scales between men and women in the sample were calculated by independent t-tests. Mann-Whitney tests were used in nonparametric data to find mean differences between the gender groups. The comparison of the questionnaires with the standard scores was made by transforming our scores into z-scores according to the standard normal distribution (Hungarian population, reference population of origin) and then one-sample t-tests were conducted with them.

In order to test which variables have an effect on global infertility-related stress and its domains, regression models were used separately for each dependent variable (FPI, FPI1, FPI3, and FPI5).

In the study II, odds ratio was used to compare the prevalence of depression-categories in our sample and in the general population. Logistic regressions were performed to test demographic and personal differences of members in different depression categories. Multivariate analyses of variance were carried out to see differences in quality of life according to severity of personal and partners' depression. Correlations between FertiQoL-scales, depression and demographic variables were tested with Pearson-coefficients.

In the study III, t-tests were used to calculate differences between German and Hungarian participants and between genders in some continuous variables and the scales of FertiQoL and PAQ. As FertiQoL has a correlation with higher level of education what could also determine cross-country QoL-differences, so we carried out MANOVA to test main effect and post hoc test for education. In order to identify interdependent correlations between gender role attitudes and quality of life, we constructed a four-fold typology of the two PAQ-scales with two-step cluster analysis, resulting in four groups ("combined" = high I and E scores, "instrumental" = high I and low E scores, "expressive" = high E and low I scores, and "neutral" = low I and E scores). In order to find differences among gender role attitude

groups, MANCOVAs were calculated with FertiQoL-scales as dependent variables, gender and education as covariates.

RESULTS

STUDY I: EXPLORATORY ANALYSIS WITH PSYCHOSOCIAL ASPECTS IN HUNGARIAN INFERTILE MEN AND WOMEN

Sample characteristics

Demographic characteristics of the sample were divided according to gender. The average age of men was 33.5 years and the average age of the women was significantly lower ($t(49)=-2.88$, $p<0.01$): 29.89 years. In the total sample, the subjects live in a marriage or in a common-law marriage (mean duration: 6.87±3.23 years) and have wanted to have a child for 2.75 (±1.54) years. 49.1% of the subjects had reached high educational level, intermediate level counted 49%, and only 1.9% had low educational level.

Gender differences

Regarding subjective well-being, women complained about moderate symptoms of lack of general/mental health ($U=231.5$, $p<0.05$) while men had a stronger belief in meaning of life ($t(49)=-2.57$, $p<0.05$). In the area of depression, individuals did not express any differences according to gender. Another difference was shown on the Masculinity-Femininity scale with women's higher scores as tending to be more feminine ($U=7.5$, $p<0.001$). Fertility problems indicated to have a greater effect on women than on men. Beside the global infertility-related stress (FPI) and on the domain of social concerns (FPI1), women reported a greater level of stress than men ($U=240$, $p<0.05$ and $U=240,5$, $p<0.05$, respectively).

Differences from reference populations

Regarding the gender roles and subjective well-being scales, infertile women had higher scores on the Masculinity-Femininity scale (MF) ($t(26)=5.69$; $p<0.001$) indicating to have more feminine attitudes, and lower scores on the General Health Questionnaire (GHQ-12) ($t(26)=-2.51$, $p<0.05$), so having lower level of general/mental health than the Hungarian reference population.

Infertile men did not show any differences compared with reference population in domains of subjective well-being. Additionally, men in our sample considered to believe deeper in

meaning of life (LM) than infertile women, but moreover than Hungarian men generally did ($t(25)=2.87$, $p<0.01$). Hungarian men scored higher on the global FPI and on its subscale 'need for parenthood' (FPI5) than men from the Canadian reference group ($t(25)=2.84$, $p<0.01$ and $t(25)=4.38$, $p<0.001$, respectively). However, Hungarian infertile women also reported about higher need for parenthood than Canadian ones ($t(26)=5.69$, $p<0.01$). In addition, lower level was shown in Hungarian women regarding relationship concerns (FPI3) than in Canadian women ($t(26)=-2.29$, $p<0.05$). Men in our study population had higher scores on emotional wish to have a child than men in the German reference population ($t(25)=3.12$, $p<0.01$). Both in Hungarian infertile men and women, stronger marital adjustments were detected than in the US-American reference groups ($t(25)=10.46$ and $p<0.001$ and $t(26)=9.81$ $p<0.001$, respectively).

Predictors of fertility problems

For Global Fertility Problems (FPI), only gender did not have a predicting function, but having feminine attitudes was in all the models 2 (ß=0.49, $p<0.05$), 3 (ß=0.48, $p<0.05$), and 4 (ß=0.46, $p<0.05$) a positive predictor for infertility-related stress. In Model 2, child wish motives, with both social (LKM3) and emotional (LKM1) sources, showed a positive correlation with higher stress (ß=0.32, $p<0.05$ and ß=0.30, $p<0.05$, respectively), but their effects were cut out when subjective well-being variables were entered. Particularly, the negative influence of general/mental health (GHQ-12) is remarkable in Model 3 (ß = -0.45, $p<0.05$). In Model 4, marital adjustment (DAS) (ß=-0.25, $p<0.05$) and traditional gender roles (MFRQ-MR) (ß=-25, $p<0.05$) decrease the presence of infertility-related stress as well. Model 4 explained the 48.5% of the infertility-related distress.

For social concerns (FPI1), lower results were indicated only by general/mental health (GHQ-12) (Model 3: ß=-0.73, $p<0.001$, Model 4: ß=-0.75, $p<0.001$). Model 4 was responsible for 56.8% of variance of infertility-related social concerns.

The substantive role of femininity (MF) as a positive predictor remained for relationship concerns (FPI3) as well (Model 3: ß=0.50, $p<0.05$, Model 4: ß=0.47, $p<0.05$). In this domain, concerns were increased by social child wish motives (LKM3) (Model 3: ß=0.37, $p<0.05$, Model 4: ß=0.36, $p<0.05$) and depression (BDI) (Model 3: ß=0.47, $p<0.05$, Model 4: ß=0.39, $p<0.05$). Good marital adjustment (DAS) entered in Model 4 had a negative effect on relational concerns (ß=-0.40, $p<0.01$). The overall model fit was R^2=32.4% for this subscale.

Emotional child wish motives (LKM1) proved to be the only positive predictor for need for parenthood (FPI5) (Model 2: ß=0.42, $p<0.01$, Model 3: ß=0.37, $p<0.05$, Model 4: ß=0.36, $p<0.05$). The overall model fit for this domain was R^2=26.7% in Model 4.

STUDY II: DEPRESSION AND PSYCHOSOCIAL CONSEQUENCES OF INFERTILITY ON THE LEVEL OF HUNGARIAN COUPLES

Rates of depression categories in our sample and in the general population

After participants were divided into one of the four depression categories, we measured whether the prevalence of each category in our sample differs from the prevalence of the catogories in the general Hungarian population. Mild depressive symptoms were more frequent in the infertile sample compared to general population (24.2% vs 12.8%, OR=0.43, 95% CI: 0.20-0.92, $p<0.05$). 2 women (0.02%) reported about diagnosed depression.
Moderately severe and severe depression categories contained only 10 and 32 individuals, respectively, so we united them in one category ("moderately severe/severe category") in order to have more confident results.

Correlations of severity of depression and sociodemographic characteristics

Demographic data of participants were compared in the three depression categories. More women than men had mild (OR: 1.97, 95% CI 1.07-3.60, $p<0.05$) and severe depressive symptoms (OR: 2.46, 95% CI 1.21-5.00, $p<0.05$), so depression was more likely in woman than in men. Mild depression symptoms were common in the earlier period of unfulfilled child wish: individuals wishing a child less than 2,5 years were more likely to have mild depression than to belong to the normal group (OR: 2.01, 95% CI 1.06-3.80). When their partner did not report any depressive symptoms, participants were at lower risk to be mildly depressed (OR=0.27, 95% CI 0.15-0.51, $p<0.001$), or moderately severe/severe depressed (OR=0.24, 95% CI 0.12-0.50, $p<0.001$). The likelihood to have mild depression was higher when partner was mild depressed, as well (OR: 2.86, 95% CI 1.47-5.59, $p<0.01$). When their partner showed moderately severe/severe depression, individuals had twice the risk to have mild depression (OR: 2.25, 95% CI 1.01-5.02, $p<0.05$), and four times the risk to be moderately severe/severe depressed (OR: 4.18, 95% CI 1.82-9.48, $p<0.01$); so any kind of depression of the partner could be a risk factor for occurrence of personal depression.

Relations between depression and infertility-related concerns on levels of the person and the couple

Women in different depression categories reported significantly different scores in sexual concerns ($F(2)=8.17$, $p<0.001$) and in relational concerns ($F(2)=12.60$, $p<0.001$): more concerns were recorded in women with moderately severe depression than in women with mild depression or without depression. Females` relational concerns correlated with their partner`s depression ($F(2)=12.25$, $p<0.001$): women scored a significantly higher level on relational concerns scale, if the partner had mild or moderately severe/severe depression.

For men, absence of depression made a significant effect, because men with mild or moderately severe/severe depression had more sexual ($F(2)=11.19$, $p<0.001$) and relational concerns ($F(2)=12.05$, $p<0.001$), than men without depression. Occurrence of the partner's depression also made a difference for men in relational concerns ($F(2)=6.50$, $p<0.01$): if the female partner did not show any depressive symptoms, men reported fewer relational concerns. If the female partner showed mild depression, men scored higher on sexual concerns scale ($F(2)=3.29$, $p<0.05$), compared to the case when women belonged to the no depression category.

Relations between depression and fertility specific quality of life on levels of the person and the couple

Domains of infertility specific quality of life and depression had negative correlations for both women and men. Higher depression in men had a strong correlation with own lower quality of life (FertiQoL emotional: $r=-0.44$, $p<0.001$; mind/body: $r=-0.41$, $p<0.001$; relational: $r=-0.53$, $p<0.001$; social: $r=-0.40$, $p<0.001$), and a weak correlation with lower female emotional quality of life ($r=-0.18$; $p<0.05$). Women's higher depression correlated with their own lower levels of quality of life (FertiQoL emotional: $r=-0.45$, $p<0.001$; mind/body: $r=-0.53$, $p<0.001$; relational: $r=-0.25$, $p<0.01$; social: $r=-0.38$, $p<0.001$), and lower levels of emotional, mind/body and social quality of life in men (FertiQoL emotional: $r=-0.21$, $p<0.05$; mind/body: $r=-0.19$, $p<0.05$; social: $r=-0.21$, $p<0.05$). Among demographic variables, only duration of child wish showed a negative correlation with male quality of life: being infertile for longer correlated with lower emotional ($r=-0.22$, $p<0.05$), mind/body ($r=-0.20$, $p<0.05$) and relation ($r=-0.21$, $p<0.05$) QoL in men.

STUDY III: FERTILITY SPECIFIC QUALITY OF LIFE IN INTERNATIONAL SETTING

Study population

288 participants (response rate 81%) in Germany and 252 participants (response rate 43%) in Hungary completed the questionnaire set, thus the initial database was composed of data of 540 participants (270 couples). Some German members who agreed to participate in our study did not fill out either FertiQoL or PAQ, therefore 498 participants (249 couples) were left for final analysis.

Comparing the two study populations regarding age, education level, type of relationship, type of diagnosis, duration of partnership, and duration of child wish, we found that German couples were older (women: $t(247)=3.52$, $p<0.01$; men: $t(246)=4.73$, $p<0.001$) and lived for longer in a partnership ($t(496)=2.76$, $p<0.01$). More Hungarian participants had a higher secondary education (women: OR=2.71, CI 95%=1.45-5.07, $p<0.001$; men: OR=2.45, CI 95%=1.32-4.55, $p<0.01$) and less primary or lower secondary education (women: OR=0.22, CI 95%=0.12-0.40, $p<0.001$; men: OR=0.53, CI 95%=0.32-0.88, $p<0.05$). Hungarian women also had a significant higher education than German women (women: OR=1.79, CI 95%=1.08-2.97, $p<0.05$).

Differences between countries and genders

Hungarian women and men scored higher on QoL-scales than German women and men (women: FertiQoL emotional: $t(244)=-3.94$, $p<0.001$; mind/body: $t(247)=-2.05$, $p<0.05$; relational: $t(244)=-1.99$, $p<0.05$; social: $t(247)=-3.69$, $p<0.001$; men: FertiQoL emotional: $t(247)=-3.89$, $p<0.001$; mind/body: $t(247)=-5.26$, $p<0.001$; relational: $t(246)=-4.58$, $p<0.001$; social: $t(247)=-8.47$, $p<0.001$). Therefore Hungarians seem to feel less burdens of infertility on their emotional, mind/body status and their partnership and other social relations. Hungarian women reported about more “expressive” attitudes than German women ($t(247)=-5.12$, $p<0.001$). Gender differences in the German group were detected only on Emotional ($t(242)=-6.45$, $p<0.001$) and Mind/Body scales ($t(238)=-4.82$, $p<0.001$). Hungarian women scored lower than men on all FertiQoL subscales except Relational scale (FertiQoL emotional: $t(250)=-6.71$, $p<0.001$; mind/body: $t(250)=-7.48$, $p<0.001$; social: $t(250)=-4.46$, $p<0.001$). Gender differences were detected on PAQ-scales as expected: women showed more „expressive” attitudes (Hungarians: $t(249)=5.42$, $p<0.001$; Germans: $t(242)=2.84$, $p<0.01$),

and men showed more „instrumental" attitudes (Hungarians: $t(250)=-3.96$, $p<0.001$; Germans: $t(239)=-3.72$, $p<0.001$).

We found differences in quality of life in connection with education level only for women (FertiQoL emotional: $F(1)=8.08$, $p<0.001$; mind/body: $F(1)=3.18$, $p<0.05$; relational: $F(1)=5.21$, $p<0.00$; social: $F(1)=4.51$, $p<0.01$). Post hoc tests showed that women in the higher secondary education group reported better QoL-scores in each domain than did women with primary or lower secondary education (all $ps<0.05$). Regarding emotional and social domains, female participants with university degree also scored higher than female members of the primary or lower secondary education group (all $ps<0.05$).

Differences in gender role attitudes

Participants in the "neutral" and "expressive" group tended to show poorer quality of life than subjects with "combined" attitudes in the German group. These differences were especially accentuated on the FertiQoL Emotional ($F(3)=3.80$, $p<0.05$, post hoc: neutral<combined, $p<0.05$, expressive<combined, $p<0.05$), Mind/Body ($F(3)=5.52$, $p<0.01$, post hoc: neutral<combined, $p<0.01$, expressive<combined, $p<0.05$) and Social scales ($F(3)=4.37$, $p<0.01$, post hoc: neutral<combined, $p<0.01$, expressive<combined, $p<0.05$). Individuals with neutral attitudes reported additionally a lower level of mind/body quality of life than members of the instrumental group ($F(3)=5.52$, $p<0.01$, post hoc: neutral<instrumental, $p<0.05$). In the relational domain, participants with neutral scored lower than individuals in all three other groups ($F(3)=8.20$, $p<0.001$, post hoc: neutral<combined, $p<0.01$, neutral<expressive, $p<0.01$, neutral<instrumental, $p<0.001$).

It was remarkable that Hungarian individuals in the expressive category seemed to be on the lowest level of quality of life compared with the combined group (Figure 6). On all four QoL-scales, belonging to the combined group was associated with the highest scores concerning the Hungarian sample (FertiQoL emotional: $F(3)=2.35$, $p<0.05$, post hoc: expressive<combined, $p<0.05$; FertiQoL mind/body: $F(3)=2.27$, $p<0.05$, post hoc: expressive<combined, $p<0.05$; FertiQoL relational: $F(3)=3.98$, $p<0.01$, post hoc: expressive<combined, instrumental<combined, $p<0.05$; FertiQoL social: $F(3)=3.57$, $p<0.05$, post hoc: neutral<combined, expressive<combined, instrumental<combined, $p<0.05$). Even participants with instrumental and neutral attitudes reported about lower relational and social quality of life than members of the combined cluster.

DISCUSSION

STUDY I: EXPLORATORY ANALYSIS WITH PSYCHOSOCIAL ASPECTS IN HUNGARIAN INFERTILE MEN AND WOMEN

In line with our expectation, women are affected by infertility-related strain in a more explicit way than men because unmet fertility desires create a greater frustration in women than in men. Social concerns, as being frustrated when hearing about other people's children are more typical among women.

General good quality of life and a long and deep relationship can protect the couples against the burdens of infertility, particularly against the burdens of relationship concerns as our results showed.

Femininity is strongly connected with fewer aspects of infertility-related stress. In case of women, a previous study reported that they felt themselves less feminine as a consequence of infertility, so in reverse if they show several feminine attitudes or feel themselves frustrated in their gender roles, it can cause an increased stress-level in their psychological status. In our study, women with unwanted childlessness showed more femininity than the reference population which could be a compensatory action to prove being a real woman although they have not been to be able to get pregnant. Traditional gender role attitudes lead to a lower possibility to experience infertility-related stress. Indeed, these results are paradoxical at the first sight. We measured traditional gender roles not only in child rearing, but also in couple relationship. In this sense, following some rules in sharing domestic roles could gives a frame to couple's lives and gives a source for facing the crisis of infertility.

Social and emotional child wish motives could be the predictors of infertility-caused concerns, but their effects should be interpreted in light of other personal factors, e.g. general health status. As expected, men with involuntary childlessness who reported a great level of emotional engagement for having a child, show a greater level of infertility-caused stress: Hungarian men compared with Canadian reference population experience infertility generally more stressful and have a stronger need for parenthood.

STUDY II: DEPRESSION AND PSYCHOSOCIAL CONSEQUENCES OF INFERTILITY ON THE LEVEL OF COUPLES

Prevalence of severity categories of depression was similar in the infertile study sample as in the general population. Only mild depression seemed to be more prevalent.

Severity of depression made a difference between genders, and if the partner reported depression. Recent studies agreed that severity of depression caused a general increase in all domains of fertility problem concerns. The relations between severity of depression and fertility problem concerns were proven in our study only on two scales, namely sexual and relational concerns. In women, only moderately severe/severe depression correlated with higher level of distress. At the same time, only the occurrence of male depression – regardless of the severity of depression – was related with more fertility concerns.

There was a relationship between the partners' depression: so if the man or woman had depression, the partner was likely also depressed in the same extent. We found an unambiguous correlation in relational concerns: both female and male depression increases partner's infertility-related distress in the relational field. Male sexual concerns were affected by the partner's depression, in contrast, female sexual concerns were not influenced by the partner's depression. Anxiety has a stronger correlation with infertility-related sexual concerns in men than in women. For men, anxiety is directly connected with sexual performance; a female partner with depressive symptoms might strengthen this connection, so men tend to feel negative effects of infertility on their sexual life. Relational dimension of FertiQoL seemed to be a unique domain of quality of life. Firstly, we did not find any gender differences in this field. Secondly, female depression had a weak correlation with personal relational quality of life, and did not have any relation to the partner's relational QoL.

One of our most important results is that female depression correlated with lower levels of the men's emotional, mind/body and social quality of life. Our results, considering conclusions of recent studies, tend to show that severe depression of woman decreases the level of quality of life in men. We can assume that female depression decreases the quality of life of the couple (so the QoL of the man), while male depression in a certain way does not have any effect on couple's quality of life. Other studies summarize if women don't use positive coping strategies (e. g. seeking social support, positive reframing), it increases both personal and partners` infertility specific concerns. At the same time, if men show optimistic expressions or reframe positively a problem, it rather increases depression and stress in women. We can consider additionally another background factor behind the correlation of female depression and male lower qol, namely the cognitive misconception of men in way they tend to see their wife more depressed than they feel themselves in fact.

STUDY III: FERTILITY SPECIFIC QUALITY OF LIFE IN INTERNATIONAL SETTING

Regarding gender role attitudes, we find some interesting connections to infertility specific quality of life. "Combined" attitudes (that means having incorporated both "expressive"/"feminine" and "instrumental"/"masculine" attitudes) tend to have a strong correlation with good quality of life in all areas affected by infertility in both Germany and Hungary. The central finding of our study is that flexibility in the gender role attitudes ("combined" attitudes) might act as a buffer against infertility-related stress for both members of the couple. Similar results have not been found yet in infertile subjects.

German couples were older aged and had their relationship for a longer time than their Hungarian counterparts, while the length of child wish did not show any cross-country difference. There has been a difference in the age at first childbirth between Hungarian and German women for decades, although postponement of parenthood is present in both countries.

A high share of participants with higher levels of education were found in the study, especially in woman (50.8% of Hungarian women, 36.6% of German women). However, the increasing number of women and men with non-academic educational level in our study – compared with reports of recent studies in German and Hungarian samples of involuntary childless couples – is indeed impressive because it suggests that information about fertility treatments is more widely available and more individuals with lower education, supposedly with less financial resources, can afford to start an assisted reproduction treatment.

Contrary to our expectations, Hungarian couples rated quality of life regarding infertility-related domains higher than their German counterparts. In interpretation of these results, we consider that factors from other parts of life could enhance the quality of life that was not accurately considered in our study design. In cultures where traditional values have a stronger impact on one's life, extended and strong kinship relations normalize unfulfilled social roles. Perceived social support decreases the infertility-specific stress in personal and relational level. On the other hand, the importance of social expectations may play a role in higher quality of life than expected in the case of Hungarian respondents.

We have to acknowledge as another background factor that health insurance covers assisted reproduction treatments to a different extent in the two countries. Disparities in reproductive health care may have another impact on infertility specific quality of life.

It is also important to mention that gender role expectations may have changed even recently and the high educational status of Hungarian women (compared to German women) could indirectly increase QoL of the couple because a potentially satisfying work situation might offer an alternative life goal if ART should fail.

CONCLUSION

A main strength of the thesis is that it broadens the literature of infertility with psychosocial approach in Central Europe. Only a few recent studies investigated relevant topics in this geographic area, for instance couples' general experiences of infertility in a traditional milieu, infertile women's gender role attitudes, sexual adjustment and feelings of stigmatization in this region. In addition, there is an expressed need in the literature for investigating infertility-specific psychosocial aspects in different sociocultural contexts.

We used disease-specific questionnaires (FPI, FertiQoL) in order to get a picture of the infertile couples' experiences covering all substantive problems. As FertiQoL was developed internationally, it was a proper measurement to detect cross-country differences, too.

Samples sizes of study II and III were sufficiently high and data was collected in five Hungarian fertility centres in order to make the sample quite representative. These studies involved couple-based samples.

Main statements

- Infertility-related stress is principally affected by femininity, traditional gender-role attitudes, quality of life and marital satisfaction.
- Need for parenthood is an important issue for Hungarian women and men. Men's socially determined child wish motives are stronger compared to Canadian and German groups, respectively; and more depressive symptoms tend to be present in Hungarian infertile men with greater need for parenthood.
- Gender differences were detected on many domains of fertility specific quality of life and infertility-related distress.
- For women, only severe depressive symptoms were associated with higher stress regarding infertility, while for men, both mild and severe depression occurred in more infertility-related problems.
- Female depression was stronger of importance in the couple relationship, because it increased men's infertility-related sexual concerns and correlated with men's lower quality of life almost in each fertility specific dimension.
- Hungarian infertile population is younger aged, has better infertility-related quality of life than German infertile population (Further investigations are required.)
- In infertile women, low education is connected with poor quality of life

- In the Hungarian group, “combined” attitudes (use of both “expressive” communicating and “instrumental” acting attitudes) is associated with higher levels of fertility specific quality of life compared with other gender role attitudes.

Implications for the practice

The current international guidelines recommend psychological counselling (psychoeducation, support counselling and therapeutic counselling) before, during and after medical treatment determining special cases when it is urgently needed. Since the Hungarian protocol about infertility care and assisted reproduction does not contain guidelines for psychosocial care of infertile patients and consequently, psychosocial services are not reimbursed by OEP, involuntary childless women and men do not seek psychological support at all, or only in some cases. Our findings regarding cross-country differences give new implications in planning international or national guidelines for psychological counselling with infertile individuals or couples.

Counsellors should accentuate and explore gender differences in reactions to infertility which are also confirmed by our results. Although, men report about better quality of life parameters than women, psychosocial care should be offered for them, as well, because partners’ responses to infertility connect and react to each other.

Our results add important information for reproductive medical care as they present the depressive symptomatology in patients starting their infertility treatment, and depression’s impact on personal and partner’s distress. Depression is a most common symptom experienced by infertile individuals. In the study II, a proportion of the sample (17%) reported moderately severe or severe depression. In these cases, more severe depression should be screened at first medical consultation yet, because depression at the beginning of fertility treatment is a strong predictor for depression after treatment and could raise depression in the partner, as well.

Medical staff should give patients more information about other psychosocial consequences of infertility, e.g. the links between gender role attitudes and experiencing difficulties of becoming a parent. The strategy of combined “expressive” and “instrumental” attitudes proven to act as a buffer against infertility-related stress for both members of the couple in two European countries and therefore it can be recommended to infertile couples in infertility counselling.

SUMMARY

Infertility is a worldwide public health problem affecting the 10% of the population of reproductive age in developed countries including Hungary. A couple is defined as infertile if they can archive pregnancy after at least a one-year period of regular, unprotected sexual intercourses. To better understand and provide a good professional service to patients with infertility, it is recommended to have proper knowledge about how couples adjust psychologically to infertility.

In our research work, we investigated infertility-related stress and fertility specific quality of life by measuring gender differences, possible characteristics in the Hungarian sample. We analyzed effects of severity of depression on infertility specific aspects on the level of the person and the couple. Relations between gender role attitudes and fertility specific quality of life were measured in an international setting.

Infertility-related stress is principally connected to femininity, traditional gender-role attitudes, quality of life and marital satisfaction. Need for parenthood is an important issue for Hungarian women and men. Men's socially determined child wish motives are stronger compared to Canadian and German groups, respectively; and more depressive symptoms tend to be present in Hungarian infertile men with greater need for parenthood. Women reported greater burden in many domains of fertility specific quality of life and infertility-related concerns. For women, only severe depressive symptoms were associated with higher stress regarding infertility, while for men, both mild and severe depression lead to more infertility-related problems. Female depression was stronger of importance in the couple relationship, because it increased men`s sexual concerns and correlated with men's lower quality of life almost in each fertility specific dimension. Hungarian infertile population is younger aged, has better infertility-related quality of life than German infertile population. In women, low education is connected with poor quality of life. In the Hungarian group, using of both "expressive" communicating (also known as traditionally feminine) and instrumental acting attitudes (also known as traditionally masculine) is associated with higher levels of quality of life compared with using other gender role attitudes.

Evidence was found in characteristical psychological consequences of infertility. In psychosocial infertility counselling for individuals or for couples, professionals could accent the topics gender differences in experiencing infertility, impact of female's reactions on the level of the relationship, effects of gender role attitudes of adjustment to infertility. Our findings give new implications in planning national guidelines for psychological counselling with infertile individuals or couples in Hungary.

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List of publications related to the dissertation

1. **Cserepes, R.**, Bugán, A., Kőrösi, T., Tóth, B., Rösner, S., Strowitzki, T., Wischmann, T.: Infertility specific quality of life and gender role attitudes in German and Hungarian involuntary childless couples =Infertilitätsbezogene Lebensqualität und persönliche Geschlechtsrollenverhaltens infertiler Paare in Deutschland und in Ungarn.
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3. **Cserepes R.E.**, Bugán A.: A depressziós tünetegyüttes hatásai magyar meddő pároknál =Impacts of depressive symptomatology in Hungarian infertile couples.
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INTERNATIONAL PRESENTATIONS RELATED TO THE DISSERTATION:

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Erdei M., Bugán A., **Cserepes R. E.**: Orvostanhallgatók meddőséggel kapcsolatos vélekedései egészségpszichológiai vonatkozásban. Oral presentation at the XXIII. Annual Meeting of Hungarian Psychological Association, 15-17 May, 2014. Marosvásárhely, Romania

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