

A Cross-Cultural Study about Positive and Negative Emotions and Well-being in Infertile Women

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Abstract

Recently Diener et al. used a new measurement to distinguish between cognitive/global and emotional components of well-being. Kormi-Nouri et al. examined this distinction among Swedish and Iranian university students and found no cultural differences in cognitive component but cultural differences in emotional component. The present study examined the distinction between global/cognitive and emotional components of well-being where the two groups of Swedish and Iranian participants were in an unpleasant situation and experience a significant amount of stress and negative emotions, namely infertility. The results showed no difference between infertile Swedish and Iranian women in flourishing. However, infertile Swedish women reported higher levels of positive and negative emotions than infertile Iranian women. In both infertile populations, the most predictive affect with regard to flourishing was the balance affect. It was concluded that, under a stressful and unpleasant situation like infertility compared to a normal situation, the same pattern of distinction between global/cognitive and emotional components of well-being can be still observable. However, negative emotions can act differently at cultural level: they become more noticeable in the Swedish population than in the Iranian population. The results are discussed with respect to individualistic-collectivistic dimension.

Keywords: Positive emotion; Negative emotion; Well-being; Infertile women; Individualistic culture; Collectivistic culture

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Introduction

Well-being, global/cognitive component, positive emotion, negative emotion, infertility Cross-cultural studies have shown that different patterns of positive and negative emotional responses exist across different cultures. For instance, there is evidence to suggest that, in pleasant situations, Easterners have a dialectical emotionality and report more mixed emotions than Westerners, whereas there are no cultural differences in unpleasant and mixed situations [1]. There are also studies that indicate that the large emotional differences observed between Western and Asian cultures concern positive affect rather than negative affect [1,2]. Thus, Asian and Western cultures have more similarities in negative emotions than in positive emotions. In some previous research, it has been assumed that people in an individualistic-based Western culture adapt a contradictory unidirectionality perspective of happiness in which positive and negative emotions

are regarded as opposite ends of a bipolar continuum. It is therefore assumed that people in Western cultures cannot feel both positive and negative emotions simultaneously and that you cannot be happy if you are experiencing unhappiness [3,4]. Such a view emphasizes the maximization of happiness and the minimization of unhappiness. In contrast, in Eastern cultures, the emphasis is on a dialectically experienced emotion, where there is a co-existence of positive and negative emotions [5]. In their research, Williams and Aaker [5] illustrate this notion by showing that collectivist-based Asian Americans prefer advertisements that evoke mixed emotions (e.g., happy and sad) more than individualistic-based European Americans.

In a recent study of well-being and positive and negative emotions Kormi-Nouri, Farahani, and Trost [6] compared Swedish

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university students, who were representative of an individualistic Western culture [7], and Iranian university students, who were representative of a collectivistic Asian culture [8,9]. These authors used a new well-being measurement that was designed by Diener et al. [10] to distinguish between cognitive/global well-being (flourishing) and emotional well-being (positive versus negative), but they found no difference between Swedish and Iranian participants in their flourishing scores. However, they found different emotional patterns in these two cultures. Whereas Swedish students showed more positive emotions, Iranian participants showed more negative emotions. Further, whereas positive affect and flourishing were positively correlated in the Swedish sample, they were negatively correlated in the Iranian sample. It was also found that, in the Swedish sample, the factor most predictive of flourishing was positive affect. However, in the Iranian sample, the most predictive factor was the balance affect (a combination of both positive and negative affects together). In line with previous research [11-13], it was concluded that there is a need to distinguish between the cognitive and emotional components of well-being, especially at the cultural level. Whereas culture has no impact on the cognitive component of subjective well-being, it can selectively influence different emotional components of subjective well-being. The present research was designed to follow up the study by Kormi-Nouri et al. [6] in the same two cultures (Sweden and Iran), but in a different population, namely infertile women, who are in an unpleasant situation and might experience a significant amount of stress and negative emotions.

Infertility is the inability of a sexually active, non-contraceptive couple to achieve pregnancy in at least one year [14]. In primary infertility, pregnancy has never occurred. In secondary infertility, one or both members of the couple have previously conceived but are unable to conceive again after a full year of trying. The term infertility may be perceived clinically as a medical condition with no inclusion of psychological and social aspects [15]. However, there are studies indicating that infertility is experienced as a social and psychological phenomenon as well [16,17] and affects both social functioning [18,19] and psychological well-being [20]. Parenthood is a major transition in adult life for both men and women. Today, children are valued as a source of fulfillments and happiness [21]. The stress of the non-fulfilment of a wish for a child has been associated with emotional problems such as depression, anger, guilt, anxiety and feeling of worthlessness [20,22,23]. There are indeed findings to reflect a much higher prevalence and levels of psychological distress in the sample of infertility patients compared to a normative sample [24,25]. Distress has been seen both as a cause of infertility [26,27] and as a consequence of infertility [21,28]. In a review of research about consequences of infertility, Griel [29] reported that the majority of studies have demonstrated that infertile couples are moderately different from fertile norms on some indices such as depression and interpersonal sensitivity.

Infertile women, compared to infertile men, experience more depression and distress, feel less satisfied with life and happiness, pin the blame for this problem often on themselves, and seek more treatment for their infertility. Leiblum, Kemman and Lane [30] reported that infertile women, compared to infertile men,

had more depression before and after infertility treatment and rated IVF as being very stressful. Infertile women become the focus of infertility treatment regardless of what is causing the infertility [31]. For infertile women, pregnancy and motherhood are highly emphasized, and a traditional gender role is strongly identified [32]. Infertile women reported more psychological distress when they were under strong social pressure towards motherhood [32]. Childless women perceive their condition negatively depending to a negative attribute of the public to their involuntary childlessness [33]. For infertile women, social sanctions and social control are shown to be relevant to an understanding of the experience of involuntary childlessness [34].

Social and cultural factors such as norms, values and role expectations are considered as important factors affecting the meaning of infertility among infertile individuals [15,20]. However, norms and standards can be valued differently in collectivistic and individualistic cultures [35,36]. In a collectivistic culture, social organizations such as family and community and importance of the group are highly emphasized [37]. Family formation can increase social and economic status of people in collectivistic cultures [38]. Voluntary childlessness is not socially acceptable in such a culture [19]. On the other hand, in an individual culture, there is a high value on the freedom and happiness of an individual, self and autonomous individual are highly emphasized [39]. In individualistic cultures, family formation may be less valued, and choosing voluntary childlessness is more respected, as family formation is not as equally strong norms as it is in collectivistic cultures [40].

Thus, stigma or being marginalized may have more negative social and psychological consequences especially for infertile women in collectivistic cultures in which social life and family formation is the center of most human interactions [32,41]. Especially in collectivistic cultures, this may be partly due to still prevailing ideas that infertility is a woman's fault or the denial of the existence of male infertility [42]. This stigmatization can result in negative community effects (e.g., isolation and exclusion) and marriage effects for childless women in collectivistic cultures, whereas positive marriage effects have been reported in studies of infertile women in western or individualistic cultures [43].

The aim of the present study was to examine Iranian and Swedish women's cognitive and emotional well-being while they underwent fertility treatment. The level of psychological distress caused by infertility may be affected by culturally shaped norms about family formation, leading to cultural differences in stigmatization. This may produce a cultural difference in well-being and its components, with infertile Iranian women being more stigmatized than Swedish women and displaying different emotional patterns of well-being.

The current study intended to investigate if there were any differences in the degree of positive and negative emotions in Iranian and Swedish women who were undergoing fertility treatment and how these emotions may have affected well-being differently based on culture. Based on previous research on cultural differences in the strive for emotional moderation or emotional maximization [44,6], a cultural difference would be expected to be found in the present study, with the well-being of

infertile Iranian women not being affected by negative emotions as in infertile Swedish women. On the contrary, research indicates that these cultural differences are often observed in “pleasant” situations and may not be present in “unpleasant” situations [1,2], which may result in small or no differences in emotions between Iranian and Swedish women who are undergoing fertility treatment.

Methods

Participants

Participants who were included in the study were women who had received some kind of infertility-related help at fertility clinics in Iran and Sweden. The study only involved women, as women are the main focus of fertility treatment. Because the Iranian culture is regarded as a collectivistic Asian culture, and Sweden is regarded as a highly individualistic Western culture, the use of an Iranian and a Swedish sample for comparisons on cultural dimensions such as collectivism and individualism was appropriate [6,7,45].

Sample characteristics: Demographic information for the two samples is presented in **Table 1**. It should be noted that seven participants from the Swedish sample were excluded, due to not having a diagnosis of primary infertility or having a previous history of hospitalization for psychiatric treatment. One case was excluded from the Iranian sample, due to not having a diagnosis of primary infertility.

The emotional distress of the subjects in the two samples was tested with the Hospital Anxiety and Depression Scale (HADS) [46]. The participants in both samples reported low sub-clinical levels of emotional distress (less than 11 in each subscale of depression and anxiety), but they scored higher than normative subjects in a non-clinical sample (mean (M)=9.82, standard deviation (SD)=5.98) [46]. The Iranian women exhibited distress scores that were 1.29 SD higher than the results from a non-clinical female sample, and the Swedish women exhibited scores that were 0.33 SD higher compared to normative data. As was

expected, the Iranian participants reported higher levels than the Swedish participants of both depression (10.12 vs. 6.84) and anxiety (6.28 vs. 5.59).

Criteria for inclusion and exclusion: Inclusion criteria were a confirmed diagnosis of primary infertility (i.e., active attempts to achieve pregnancy without success, and no previous biological children) and the participation in fertility treatment at a fertility clinic. Because the study focused on the investigation of infertility-related emotional symptoms in childless women who wanted to have children, these inclusion criteria were established. There is research showing that this group experiences significant psychological distress compared to normative data [25].

Exclusion criteria for participation in the study were a level of education lower than high school and a previous history of hospitalization for psychiatric treatment. Because the study was based on data obtained from questionnaires, it was crucial that the participants fully understood all of the written instructions to correctly fill in the questionnaires. Subjects with a severe psychological disorder were excluded on the basis of risks of disruptive third variables regarding the relationship between infertility and emotional patterns.

Procedures

Recruitment

In all, 212 participants were recruited from fertility clinics in Sweden and Iran. Staff at the clinics asked patients about their interest in participating in the study, and patients who were interested in participating received an information sheet with easily comprehensible information about the study. The information also stated that the patients’ care at the clinic would not be affected by their choice to participate. Participation was anonymous and voluntarily. The participants received one movie ticket for responding to the survey.

Ethical considerations

The study was approved by ethical review boards both in Sweden and in Iran.

Table 1 Demographic information for Swedish and Iranian subjects.

	Sweden	Iran
N	94	118
Age-range (years)	19-41 (M=31.33)	18-45 (M=29.13)
Native born	90%	100%
Occupation	69% employed	25% employed
Income	Low (5%) Average (20%) High (71%)	Low (19%) Average (80%) High (0%)
Education	Secondary school (2%) High school degree (42%) University degree (54%)	Secondary school (31%) High school degree (50%) University degree (18%)
Main cause of infertility	Female (29%), Male (21%), Both (25%), Unknown (25%)	Female (34%), Male (23%), Both (22%), Unknown (21%)
Duration of treatment (years)	1-6 (M=1.23)	1-15 (M=3.62)
Duration of diagnosis (years)	1-15 (M=2.19)	1-20 (M=5.46)
Satisfaction with partner relationship	78%	83%
Duration of relationship (years)	2-18 (M=6.88)	1-20 (M=6.87)

Data analysis

The homogeneity of variance between the Swedish and the Iranian data was analyzed by performing Levene's test. The assumption of homogeneity was supported on well-being, positive emotions, negative emotions and anxiety scales at a 0.05 significance level. The assumption of homogeneity was not supported on distress or depression at a 0.05 significance level.

Normality was assessed using Kolmogorov-Smirnov's test of normality and by the visual inspection of normal q-q-plots and histograms, which showed a mostly negatively skewed distribution of data for both the Swedish and the Iranian samples. Normality transformations were performed using reversed score transformations on Log transformations as well as Square root transformations [47]. Normality analyses were performed on both transformed and non-transformed data, in addition to Levene's test of homogeneity of variance regarding the Swedish and the Iranian data. Because the transformed and the non-transformed data did not noticeably differ, the results presented in this study are from the non-transformed data.

Materials

Demographic questionnaire

The questionnaire provided information on background variables and included questions regarding ethnicity, relationship status, education, occupation, income, social support, infertility diagnosis, medical treatment and medical history.

Flourishing scale (FS)

The term flourishing refers to a subjective experience of life going well, with an emphasis on effective functioning in combination with feeling good. By adding the construct of flourishing to the measurement of well-being, Diener has enriched the concept of well-being to comprise more than mere emotions [48]. The FS [10] includes eight items that were designed to measure subjective well-being on the basis of different important areas of human life, such as relationships, engagement, competence, optimism, self-esteem, purpose and contribution to the well-being of others. The participants responded to eight different positively phrased statements on a 7-point Likert scale ("strongly disagree"; "disagree"; "slightly agree"; "neither agree nor disagree"; "slightly agree"; "agree"; "strongly agree").

The FS strongly correlates with other scales on well-being and shows good psychometric characteristics. Cronbach's alpha of the scale is good at 0.87, and the temporal reliabilities are moderately good. A principal axis factor analysis showed that the scale is characterized by one single strong factor [10]. Swedish and Persian versions of the FS showed good reliability (α for the Swedish version: 0.87; α for the Persian version: 0.85) [6].

Scale of positive and negative experience (SPANE)

The SPANE [10] measures subjective emotions and consists of 12 items that are divided into scores for positive (six items) and negative (six items) emotions. Both the negative and the positive items are divided into three general items (e.g., negative, positive)

and three specific items (e.g., sad, joyful). The inclusion of general items in the SPANE undermines the possibility of cultural biases due to cultural differences in specific expressions of emotions, which enables a better cultural comparison. The SPANE assesses a wide range of negative and positive experiences and emotions, the results converge well with other measures of emotions and well-being and are consistent in different cultures [10].

The 12 items are rated on a 5-point Likert scale, ranging from one ("very rarely or never") to five ("very often or always"), and the respondents are asked to base their answer on the amount of emotions experienced in the last month.

In the present study, the Cronbach's alpha of the scale was 0.87 (positive feelings) and 0.81 (negative feelings). Previous research also showed good reliability for the Swedish and Iranian versions of this scale, for both positive feeling (0.86 for the Iranian version and 0.82 for the Swedish version) and negative feeling (0.85 for the Iranian version and 0.84 for the Swedish version) [6].

Results

The descriptive findings are shown in **Table 2**.

A multivariate analysis for national effect was conducted, and the results are shown in **Table 3**.

As shown in **Table 3**, there were significant differences between dependent variables (positive, negative and balance affects and also flourishing) when the data were combined with respect to the two cultures. A univariate analysis of variance test was also conducted, and nationality was considered as an independent variable of interest. The results are shown in **Table 4**.

The results in **Table 4** show that there was no significant difference between Iranian and Swedish participants in terms of flourishing and balance affect (the difference between positive and negative emotion), but there were significant differences in both positive and negative affects separately.

It should be mentioned that the invariance hypothesis was examined by Levene's test for the equality of variances rather than Box's M test on the flourishing scale and the SPANE scale because some cells showed fewer than two nonsingular cell covariance matrices. The homogeneity of covariance across the two groups is shown in **Table 5**.

The two groups of Iranian and Swedish samples did not show a significant difference ($F=0.005, p=0.94$) in variance on the flourishing scale and also did not show significant differences for positive affect ($F=1.54, p=0.22$), negative affect ($F=0.223, p=0.64$) and balance affect ($F=1.67, p=0.20$). Thus, the results were generalizable to the normal population for all scales

In the case of flourishing, the zero order correlations of positive, negative and balance affects for Iranian and Swedish samples are shown in **Table 6**.

As shown in **Table 6**, the directions of the relationships between positive, negative, and balance affect with flourishing did not differ between the two groups, although the relationship was stronger for the Swedish sample.

In order to test whether culture was influenced by positive

Table 2 Means (M), standard deviations (SD) and alpha values for positive affect, negative affect and balance affect and well-being in relation to the nationality of participants.

	Nationality	N	M	SD	α
Balance affect	Iranian	118	2.77	4.66	0.87
	Swedish	94	3.85	5.26	0.86
Positive affect	Iranian	118	11.70	3.68	0.90
	Swedish	94	15.56	2.89	0.82
Negative affect	Iranian	118	8.93	3.24	0.79
	Swedish	94	11.71	3.10	0.85
Flourishing	Iranian	118	45.61	6.83	0.82
	Swedish	94	47.16	6.50	0.88

Table 3 A multivariate analysis of variance of dependent and independent variables.

Test	Value	F	Hypothesis df	Error df	Sig.	Partial eta squared (η^2)
Pillai's Trace	0.38	32.10	4.00	207	0.00	0.38
Wilks' Lambda	0.61	32.10	4.00	207	0.00	0.38
Hotelling's Trace	0.62	32.10	4.00	207	0.00	0.38
Roy's Largest Root	0.62	32.10	4.00	207	0.00	0.38

Table 4 A univariate analysis of variance of dependent and independent variables.

Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.	Partial eta squared (η^2)
Nationality	Flourishing	124.56	1	124.56	2.77	0.09	0.01
	Positive affect	779.77	1	779.77	69.22	0.00	0.24
	Negative affect	404.45	1	404.45	39.88	0.00	0.16
	Balance affect	65.41	1	65.41	2.68	0.10	0.01
Error	Flourishing	9412.33	210	4482			
	Positive affect	2365.66	210	11.26			
	Negative affect	2129.66	210	10.14			
	Balance affect	5116.47	210	24.36			
Total	Flourishing	464077.25	212				
	Positive affect	41307.77	212				
	Negative affect	24448.08	212				
	Balance affect	7444.88	212				

Table 5 Levene's test for equality of variance on flourishing and SPANE scales.

Dependent variable	F	df1	df2	Sig.
Flourishing	0.05	1	210	0.94
Positive affect	1.54	1	210	0.22
Negative affect	.22	1	210	0.64
Balance affect	1.67	1	210	0.20

affect, negative affect and balance affect on flourishing, two stepwise regression models were tested. It was found that the most predictive affect with regard to flourishing was the balance affect among Swedish samples ($b=0.69, SE=0.09, p<0.0001$) and Iranian samples ($b=0.31, SE=0.13, p<0.0001$). For the two groups, an increase in balance affect, a decrease in negative affect and an increase in positive affect were associated with greater flourishing. **Tables 7 and 8** show the stepwise regression analyses in Iranian and Swedish samples respectively.

As discussed by Stevens [49], multicollinearity can be a problem for multiple regressions for at least three reasons: a) it reduces the size of the multiple regression, b) it confounds the results because of high intercorrelations between the independent variables, and c) it increases the regression coefficient variance and results in a more unstable regression equation. Hence, the multicollinearity issue was tested. A tolerance level less than 1 was found for both samples, which ruled out the problem of multicollinearity for our results.

Table 6 Correlation matrix for flourishing, positive affect, negative affect and balance affect in Swedish and Iranian participants.

		Flourishing	Positive affect	Negative affect	Balance affect
Flourishing	Pearson Correlation	1	0.18*	-0.24**	0.31**
	Sig. (2-tailed)		0.026	0.004	0.000
	N	94	118	118	118
Positive affect	Pearson Correlation	0.61**	1	0.100	0.72**
	Sig. (2-tailed)	0.000		0.140	0.000
	N	94	118	118	118
Negative affect	Pearson Correlation	-0.59**	-0.55**	1	-0.61**
	Sig. (2-tailed)	0.000	0.000		0.000
	N	94	94	94	118
Balance affect	Pearson Correlation	0.69**	0.87**	-0.88**	1
	Sig. (2-tailed)	0.000	0.000	0.000	
	N	94	94	94	118

Table 7 A stepwise regression analysis for flourishing through positive, negative and balance affects in Iranian subjects.

Predictor (s)	Standardized coefficients			Unstandardized coefficients	
	Beta	t	Sig.	B	Std. error
Constant		63.35	0	44.36	0.7
Balance affect	0.31	3.5	0.001	0.45	0.13

Table 8 A stepwise regression analysis for flourishing through positive, negative and balance affects in Swedish subjects.

Predictor (s)	Standardized coefficients			Unstandardized coefficients	
	Beta	t	Sig.	B	Std. error
Constant		71.99	0	43.84	0.6
Balance affect	0.69	9.13	0	0.85	0.09

Discussion

In line with the findings of Diener et al. [10], Kormi-Nouri et al. [6] found different patterns of cognitive and emotional well-being at the cultural level. Whereas there was no difference between Swedish university students (as members of an individualistic culture) and Iranian university students (as members of a collectivistic culture) concerning the cognitive component of well-being (flourishing), the subjects differed concerning the emotional components of well-being (i.e., positive and negative affect). Swedish students reported higher levels of positive emotions, and positive emotions predicted their flourishing to a larger extent. However, in Iranian students, there were more negative emotions, and the negative emotions more strongly predicted their flourishing. The main aim of this study was to investigate whether similar cultural patterns could also be observed in infertile women, thus extending earlier findings to subjects in more unpleasant and stressful situations.

The main important finding of the present study, in line with

the findings of the Kormi-Nouri et al. [6] study, was that there was no difference between the two cultures concerning the cognitive components of well-being. That is, once again, Swedish and Iranian participants, who belong to individualistic and collectivistic cultures, respectively, were similar with respect to the general evaluation of their life satisfaction. This similarity was therefore not affected by being in an unpleasant and stressful situation. Infertility has usually been considered a powerful stressor that involves emotional changes [50], and infertile women experience strong psychological distress and negative feelings related to infertility [32]. There is also research showing that social pressure towards family formation and having a child [35,38] and stigmatization in infertility [32,41] are observed to a greater extent in collectivistic cultures than in individualistic cultures. However, the results of the present study showed that this unpleasant and stressful situation had no effect on flourishing at a cultural level. Interestingly, the scores of flourishing for the infertile women in the present study and for university students in the Kormi-Nouri et al. [6] study were comparable, and both studies showed high general life satisfaction in these two cultures.

However, like the Kormi-Nouri et al. [6] study, cultural differences were observable in the emotional components of well-being, namely positive and negative emotions. Infertile Swedish women reported higher levels of positive affect than infertile Iranian women. However, unlike the university student population in the Kormi-Nouri et al. [6] study, infertile Swedish women in this sample also reported higher levels of negative emotions than infertile Iranian women. Moreover, in both infertile groups, the same pattern of prediction was observed: the most predictive affect with regard to flourishing was the balance affect, and negative and positive effects were in the second and third places, respectively. Thus, it appears that, under a stressful and unpleasant situation like infertility, negative emotions act differently in these two cultures: they become more noticeable in the Swedish population than in the Iranian population.

A comparison between the two studies showed that while the balance affect was the most predictive variable for flourishing in the Iranian group in the Kormi-Nouri et al. [6] study, this was the case for both cultural groups in the present study. Additionally, whereas the results of the Swedish groups in terms of positive and negative emotions were comparable in these two studies,

the results were different for Iranian groups: infertile Iranian women, compared to Iranian university students, scored higher in positive emotions but scored lower in negative emotions. That is, infertility as a stressful and negative situation can change the emotional pattern at a cultural level. First, in a stressful and unpleasant situation such as infertility, the balance affect (where both positive and negative emotions are taken into account) becomes an important factor even for individuals in an individualistic culture like Sweden, although this factor was still important for individuals in a collectivistic culture like Iran. Thus, it is important to take into consideration the combination of these two types of emotions especially under stressful and negative situations. Second, in contrast with our expectation, infertility was not associated with a more negative outcome in Iran than in Sweden. There are studies that show that infertility (especially for women) is more stressful and is more negatively experienced in a collectivistic culture than in an individualistic culture [38,41]. Thus, the expectation was to see more negative emotions and/or fewer positive emotions in infertile Iranian women than in infertile Swedish women. However, the between-studies comparison showed the opposite results. Compared to Iranian university students, infertile Iranian women experienced more positive emotions and, even more notably, less negative emotions. In addition, the within-study comparison that is presented in the present study showed that infertile Swedish women experienced more emotions (both positive and negative) compared to their counterparts in the Iranian group. This result can be explained by findings showing that social support (especially from family and friends) is more observable in a collectivistic culture than in an individualistic culture, and social support is a stronger predictor of well-being in collectivistic cultures than in individualistic cultures [51,52,2]. In an infertility situation, women might be in need of more emotional support, which can be provided more by family and friends and not by medical care services alone. Such women may express more negative feelings with significant others and receive more attention from close family members and friends, which may influence their well-being. More specifically, when infertile women are undergoing *in vitro* fertilization (IVF) treatment, they may experience additional stress and emotional disappointments because IVF treatments are highly technological and can be difficult both physically and emotionally [53,54]. To examine the differential effects of social support in the two cultures, we analyzed data related to social support that had been collected in the demographic information for the present study. Although the results demonstrated no significant differences between Iranian and Swedish participants with respect to social support received from their family, friends and significant others, social support had different meanings for the Iranian and Swedish women. Social support (in general) significantly predicted distress (i.e., more social support was associated with less distress) in the Iranian subjects and explained a significant proportion of the variance in their well-being. However, in the Swedish subjects, social support did not significantly predict well-being or distress. The finding that social support is a buffer against distress and a mechanism that influences well-being in a collectivistic context indicates that social support can have a beneficial effect on a stressful condition such as infertility, and it therefore should be included in the treatment of infertility in

such contexts. Further research is needed on how to implement such elements in psychological treatment; there are examples in the literature of psychological interventions that include training in validation for partners [55,56]. Similar interventions have been implemented in medical contexts, in which people who were suffering from medical conditions such as long-term pain showed more favorable emotional outcomes when their partners received training in validation [57]. Hence, training partners in emotional communication and possibly implementing communication training to an extended social network and even medical professionals might be helpful for infertile women and might influence their sense of social support.

Regardless of culture, the present study indicates that infertility is a stressor that results in psychological suffering. This finding emphasizes the importance of psychological interventions as complements to the conventional medical treatment of infertility in order to minimize infertility-related distress and prevent the discontinuation of treatment due to treatment-induced strain.

There were some limitations in the present study. First, the measurement of *subjective well-being* is linked to several difficulties. For example, the level of satisfaction with one's life in individualistic cultures is, to a greater extent, determined by the individual's emotions and moods, while in collectivistic cultures, the level of satisfaction with one's life is determined by the individual's social life [58,59]. Since most well-being measures are designed in individualistic Western societies, the meaning of well-being in other cultures may not be properly captured [60]. Additionally, there may be technical biases due to culture-specific social norms about a condition or circumstance, such as infertility, that may affect the individual's responses on questions regarding this condition and the individual's well-being [7,14]. These issues were considered in the process of choosing instruments to measure well-being and emotions in the present study.

Second, there is a need for a better control group for infertile participants other than the university participants included in the Kormi-Nouri et al. [6] study. Although in the aforementioned study, the majority of students were females, and no significant gender differences were found, there were still age differences between these two studies, and the subjects in the student population were not asked about their fertility status. Thus, the comparison of these two studies should be considered with caution. In spite of these limitations, this work provides an important message that is worth developing further: infertility is indeed related to psychological distress, and the findings help to identify approaches that we can and should take in terms of supporting women who are suffering from the negative emotionality related to infertility.

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