

PSYCHOLOGICAL CONSEQUENCES OF INFERTILITY

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Abstract: The present study aimed at investigating the differences of infertile and fertile couples in the levels of depression, anxiety, aggression, self-esteem, marital satisfaction and sexual satisfaction. The sample comprised 200 infertile couples (females' mean age = 32.51, $SD = 7.52$; males' mean age = 37.55, $SD = 7.95$) and 200 fertile couples (females' mean age = 30.33, $SD = 10.18$; males' mean age = 35.3, $SD = 11.26$) from different cities of Pakistan. The Beck Depression Inventory, the Beck Anxiety Inventory, the Aggression Questionnaire, and the Indexes of Self-Esteem, Marital Satisfaction and Sexual Satisfaction were used. The results indicated that infertile couples tend to demonstrate higher levels of depression, anxiety, and aggression, and lower levels of self-esteem, marital satisfaction and sexual satisfaction as compared to fertile couples. Furthermore, the results suggested that the age of infertile women and men had significant effects on their levels of sexual satisfaction, and infertile men of different ages also differed in their anxiety and self-esteem. Aggression and anxiety in infertile couples differed with gender and were influenced by educational level. Income level did not play any role in the psychological distress of infertile couples.

Key words: Distress, Emotional challenges, Inability to conceive, Wellbeing.

INTRODUCTION

The psychological aspects of infertility refer to the study of psychological changes that may occur in a couple after being diagnosed with infertility. Infertility is generally defined as the inability to conceive a pregnancy after a year or more of regular intercourse without contraceptives, or the inability to carry a pregnancy to live birth (Burns, 1999; Jones & Hunter, 1996). It is a very serious problem that a person or

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couple can experience and it poses physical, emotional, and financial challenges (Guerra, Llobera, Veiga, & Barri, 1998). This study is focused on the psychological consequences of infertility, and is not concerned with psychological ailments leading to infertility.

Being a parent is a normative assumption of adult life in any society. Most couples who experience infertility consider it a major crisis (Burns, 1999). From the beginning of time, the command "Be fruitful and multiply" remains a permanent truth for most societies (Lee & Kuo, 2000). In every society a woman's childbearing ability is often closely linked to her status as a woman, so that when a woman is infertile she may feel unfeminine. Due to the inability of childbearing, many women fear separation from their partners. Fear of losing attraction and self-worth make them even depressed (Greil, 1997).

Most of the couples when faced with the crisis of infertility go through a chain of emotional changes that can be harmful to the couple (Crick, Casas, & Mosher, 1997). Depression is a common reaction to this problem. It is the response to the excessive losses and prolonged stress created by the infertility process. Infertile couples may have feelings of failure, loss, disappointment, and betrayal. Infertile couples' sadness can transform into sorrow or grief especially for the loss of the child of their dreams or the imagined experiences one could share with a child (Ardenti, Campari, Agazzi, & La Sala, 1999).

Anxiety is another common response associated with infertility (Crick et al., 1997). Women especially feel anxiety and stress each month when trying to conceive. Every month upon the beginning of a new menstrual cycle, a woman is reminded of yet another failure (Haynes & Miller, 2003). Moreover, when the couple remains infertile for a long time and goes through infertility treatments, this may evoke anxiety about the outcome of the treatment. The couple may also become socially isolated (Unisa, 1999).

As the diagnosis of infertility has a tremendous negative impact on the well being of a couple, feelings of anger, frustration, and aggression often accompany it (Crick et al., 1997). Hormonal changes during treatment may also affect the emotions of infertile men and women. Aggression increases when the success is not there at the end of every month starting the menstrual period (Boivin, 2003). Rohrlick (1998) pointed out gender differences in aggression level in infertility. When males feel powerless and experience low self-esteem they try to reclaim it through aggressive behavior. On the other hand, for females, aggression is a transitory loss of self-control arising out of high stress, social pressure and extreme sense of guilt (Greil, 1997).

Besides intense emotional reactions, infertile couples may also experience

decreases in their self-image with a diminished sense of femininity and masculinity (Abbey, Andrews, & Halman, 1992). These feelings can disturb the self-esteem and self-image of the partners. Furthermore, couples may find it difficult to share their feelings with relatives and between them. This may lead to loneliness and distress (Shaprio, Palmer, & Capute, 2003). Childless couples also face the critique of others, and this further decreases self-esteem and self-image. As a consequence having the sense of being valued and feeling competent and joyful in a life without a child is a hard task (Eugster & Vingerhoets, 1999).

Interpersonal relationship in marriage may also get impaired because of infertility (Verhaak, & Vaillant, 2001). Feeling a psychological distance or withdrawal from one's partner is often observed in infertile couples (Sillars, Leonard, Roberts, & Dun, 2002). More than that, infertile couples may also experience a lack of sexual satisfaction such as arousal and orgasm. This could result in avoidance of sex altogether or having sex for the sole purpose of reproduction (Boivin, 2003). Sex may become mechanical and unemotional as the couple tries to conceive (Donnelly, 1993).

Men and women face a terrible shock when the cause of male- or female-factor infertility is identified. Especially women may develop feelings of hopelessness, anger, shame, and guilt in facing their partners as well as their parents and relatives (Guerra et al., 1998). But in case of unknown cause of infertility frustration in both partners may occur, and this may increase if the two partners have a different attitude towards treatment; the latter may damage the relationship (Daniluk, 1996). To sum up, infertility has many implications for the psychological state of both partners of infertile couples.

The present study

Studying infertility and its impact on couples in Pakistan is important for a number of reasons. First, in Pakistan, for most people, conception is as natural as breathing. As in other countries, infertility may have implications for the person's psychological state such as depression, stress, and anxiety. These emotional effects can damage the couple's interpersonal relations and especially their marital and sexual satisfaction. Second, there is a dire need to study the psychological problems faced by infertile couples in Pakistan, because although approximately 46,000 physicians are providing treatment for infertility in Pakistan, no research has been conducted up to now in Pakistan about the psychological consequences of infertility to infertile couples.

Specifically, the present study focused on the assessment of the levels of depression, anxiety, aggression, self-esteem, marital and sexual satisfaction, and to compare infertile with fertile couples. It was hypothesized that infertile couples will be

more depressed, anxious, and aggressive as compared to fertile couples, and will likely have lower self-esteem and less marital and sexual satisfaction than fertile couples (Hypothesis 1). To investigate the effects of gender, age, education, and level of income on the emotional health of infertile couples was another aim of the present study. No hypotheses were stated on the effects of demographic factors on emotions and interpersonal relations in infertile couples because of the lack of prior research on infertility in Pakistan. However, in order to investigate whether demographic factors have a differential effect on the psychological state of partners of infertile couples comparison with fertile couples was made.

METHOD

Participants

The sample consisted of 400 married couples (200 fertile couples and 200 infertile couples). In the infertile couples, mean age for females was 32.51 ($SD = 7.52$) and for males was 37.55 years ($SD = 7.95$); for 200 fertile couples, mean age for females was 30.33 years ($SD = 10.18$) and for males was 35.3 ($SD = 11.26$).

The participants had different education levels ranging from illiterate ($n = 19$), below matriculation (10 years; $n = 35$), matriculation (10 years; $n = 87$), intermediate (12 years; $n = 63$), higher education (14 years; $n = 92$), to postgraduate and above ($n = 104$). The education levels of fertile couples ranged from illiterate ($n = 15$), below matriculation (10 years; $n = 19$), matriculation (10 years; $n = 77$), intermediate (12 years; $n = 67$), higher education (14 years; $n = 101$), to postgraduate and above ($n = 121$).

The income level ranged from below 5,000 rupees (Group 1; $n = 18$ infertile couples; $n = 26$ fertile couples), 5,001-15,000 (Group 2; $n = 85$ infertile couples; $n = 95$ fertile couples), 15,001-50,000 (Group 3; $n = 77$ infertile couples; $n = 71$ fertile couples), 50,001-200,000 (Group 4; $n = 18$ infertile couples; $n = 6$ fertile couples), to over 200,001 (Group 5; $n = 2$ infertile couples; $n = 2$ fertile couples).

To select the participating couples, purposive convenient sampling techniques were used. The infertile and fertile couples were contacted at their homes, infertility hospitals, and clinics after taking their consent to participate in the research. All the participating couples were approached at different cities of Pakistan including Multan, Sahiwal, Khanewal, Bahawalpur, Vehari, Faisalabad, Lahore, Sialkot, and Rawalpindi-Islamabad.

Instruments

To measure the psychological consequences of infertility, the following six instruments were used. Translation of the instruments from English to Urdu was made by using the back translation method. The relevance of all the instruments was checked by a sample of 20 educationists. They were asked to examine carefully all the items of each instrument and rate which of them were relevant to the Pakistani culture. Analysis of the responses revealed that all the items were judged fairly relevant to the Pakistani culture. All the instruments were, then, administered to a sample of 50 married couples (25 fertile couples and 25 infertile couples) so that their reliability and validity was determined.

For all instruments the mean score of the two partners was used as the couple's score when needed.

Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI). Both the BDI (Beck, Ward, Mendelson, Mock & Erbaugh, 1961) and the BAI (Beck, Epstein, Brown, & Steer, 1988) are 21-item self-report scales, which measure the presence and manifestations of depression and anxiety respectively. Each item was rated on a 4-point rating scale from 0 (not at all) to 3 (very much). Each questionnaire's scoring was the sum of the ratings of the 21 items; thus, the highest possible total for each questionnaire was 63 and the lowest zero. The reliability (Cronbach's alpha) in the validation sample for BDI was $\alpha = .70$, and for BAI $\alpha = .77$.

Aggression Questionnaire (AQ). The Aggression Questionnaire (Buss & Perry, 1992) consists of 29 items. Items were rated on a 5-point rating scale ranging from 1 (no or low intensity) to 5 (high intensity). This scoring was used to all items except for items 15 and 21 for which reverse scoring was applied. The sum score (max = 145, min. = 29) of all items was used for the measurement of aggression. The reliability (Cronbach's alpha) in the validation sample for AQ was $\alpha = .66$.

Index of Self-Esteem (ISE), Index of Marital Satisfaction (IMS), and Index of Sexual Satisfaction (ISS). The Indexes of Self-Esteem, Marital Satisfaction, and Sexual Satisfaction came from the respective scales of the Clinical Measurement Package (CMP) developed by Hudson (1981). The ISE index was designed to measure the degree (severity or magnitude) of a problem a person has with self-esteem; the IMS index to measure the degree of a problem a spouse or a partner has in the marital relationship, and the ISS index to measure the degree of a problem in the sexual component of a dyadic relationship. Each index was measured with a 25-item scale in which the items were scored with a 5-point rating scale ranging from 1 (rarely or never), 2 (few times), 3 (some times), 4 (often), to 5 (most or all of the time). Higher scores (max. = 125) represent more severe problems and lower scores

(min. = 25) indicate the relative absence of such problems. The ISE, IMS, and ISS indexes have a clinical cutting score of 30, that is, persons who obtain a score above 30 have a clinically significant problem in the area being measured and those with a score below 30 are considered free of such problems. For the ISE, IMS, and ISS indexes the reliability (Cronbach's alpha) in the validation sample was $\alpha = .63, .72,$ and $.68,$ respectively.

Procedure

The participants were informed on the objectives of the study and then given the instructions. A demographic information sheet was also given to each participant. The partners of the couples responded to the instruments separately. The information from the illiterate sample was collected by the researcher who asked the questions orally. They were assured that all the information would be kept strictly confidential and would be used for research purposes only. The instruments were presented to the couple one after another in the form of a booklet.

RESULTS

Infertility effects

To compare the psychological state of infertile and fertile couples, a MANOVA was conducted with the mean score of the two partners on BDI, BAI, AQ, ISE index, IMS index, and ISS index as dependent variables. Fertility (infertile vs. fertile couples) was the independent variable. The main effect of fertility was significant, Wilks's lambda = .871, $F(6, 393) = 9.714, p < .001,$ partial $\eta^2 = .067.$

Table 1. Means, standard deviations and t-values for the scores of infertile and fertile couples on BDI, BAI, AQ, ISE, IMS, and ISS

Instruments	Infertile couples (<i>n</i> = 200)		Fertile couples (<i>n</i> = 200)		<i>t</i> (398)	<i>p</i> <
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
BDI	17.14	10.92	11.02	8.61	6.23	.001
BAI	18.67	9.66	12.67	7.77	6.85	.001
AQ	69.37	14.42	62.23	13.08	5.18	.001
ISE	38.18	14.52	31.13	13.60	5.02	.001
IMS	30.52	17.81	22.01	14.85	5.19	.001
ISS	29.15	15.47	24.51	12.78	3.26	.001

To find the differences between the two groups (infertile vs. fertile couples) post hoc *t*-tests on each dependent variable were computed. The *t*-tests are given in Table 1. As shown in Table 1, the infertile couples reported significantly higher levels of depression, anxiety, and aggression and had significantly lower levels of self-esteem, marital, and sexual satisfaction as compared to fertile couples (higher scores denote more problems). Thus, Hypothesis 1 was supported.

Individual differences effects

The MANOVA conducted established the difference between fertile and infertile couples regarding their psychological state. However, since the variables entered in the analysis were the mean scores of the two partners, it is not clear in the analysis whether the individual partners differ in their psychological state and whether gender, age, educational level, and income level have an effect. For this reason a series of analyses were performed.

Gender effects. To identify gender effects a MANOVA was conducted with the score of the each partner on BDI, BAI, AQ, ISE index, IMS index, and ISS index as dependent variables, separately for the infertile and fertile couples' responses. Gender was the independent variable.

In the case of infertile couples, the main effect of gender was marginally significant, Wilks's lambda = .969, $F(6, 393) = 2.129$, $p = .049$, partial $\eta^2 = .040$.

In the case of fertile couples, the main effect of gender was non significant, Wilks's lambda = .981, $F(1, 273)$, $p = .269$, partial $\eta^2 = .002$.

To decipher the effect of gender on the psychological state of partners in infertile couples, paired sample *t*-test was applied on the scores of each instrument for the two partners. Table 2 shows that females tended to demonstrate significantly higher levels of depression, anxiety and lower levels of self-esteem as compared to males. The results further showed that there were no differences in the levels of

Table 2. Means, standard deviations and t-values for the individual scores of males and females of infertile couples on BDI, BAI, AQ, ISE, IMS, and ISS

Instruments	Males (<i>n</i> = 200)		Females (<i>n</i> = 200)		<i>t</i> (398)	<i>p</i> <
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
BDI	16.46	12.17	17.82	11.24	2.25	.05
BAI	17.24	11.07	20.10	10.49	4.21	.001
AQ	69.71	16.79	69.03	16.32	-0.58	<i>ns</i>
ISE	37.18	16.97	39.19	16.12	1.79	.05
IMS	30.09	19.81	30.95	19.17	0.76	<i>ns</i>
ISS	28.80	16.81	29.49	17.37	0.67	<i>ns</i>

aggression, marital satisfaction and sexual satisfaction between the partners of infertile couples.

Age effects. To find out whether there were age effects in the responses of males and females in infertile and fertile couples, the two samples were divided into three age groups: (a) a 20-40 years group (Group 1: with high probability for therapy and high expectations for the infertile couples); (b) a 40-55 years group (Group 2: with lower probability and more frustration due to chronic unsuccessful efforts but still possible to have a pregnancy for the infertile couples); and (c) an over 55 years group (Group 3: with no hope for pregnancy any more for the infertile couples). Table 3 shows the number of participants in each age group of the two samples as a function of gender. A 3(age) x 2(gender) MANOVA with the score of the each partner on BDI, BAI, AQ, ISE index, IMS index, and ISS index as dependent variables was performed, separately on the infertile and fertile couples' responses. The three age groups and gender were the independent variables.

Table 3. Number of participants in each age group of infertile and fertile samples as a function of gender

Age groups	Infertile sample ($n = 400$)		Fertile couples ($n = 400$)	
	Males	Females	Males	Females
20-40 years (Group 1)	152	174	145	164
40-55 years (Group 2)	40	22	46	28
Over 55 years (Group 3)	8	4	9	8

For the infertile couples the main effect of age was significant, Wilks's lambda = .920, $F(12, 774) = 2.760$, $p = .001$, partial $\eta^2 = .024$. The interaction effect of gender and age on the six psychological state variables was non-significant, Wilks's lambda = .972, $F(12, 776) = .937$, $p = .509$. The univariate F -tests showed that age influenced women's responses only on the ISS index, $F(2, 197) = 4.589$, $p = .011$, partial $\eta^2 = .045$. On the contrary, males' responses did differ in the three age groups on the BAI, $F(2, 197) = 3.055$, $p = .049$, partial $\eta^2 = .030$; on the ISE index, $F(2, 197) = 3.319$, $p = .038$, partial $\eta^2 = .032$; and on the ISS index, $F(2, 197) = 3.227$, $p = .042$, partial $\eta^2 = .031$. Table 4 shows the means and standard deviations of the responses on the six psychological state variables for the three age groups as a function of gender.

To investigate which age groups in the infertile sample differed in their responses post hoc Tukey-test was performed. The results pertaining to females' responses showed significant differences in the mean scores on ISS of Group 1 ($p = .001$) and Group 2 ($p = .006$) from Group 3. Specifically, women aged 20-40 years and 40-55

Table 4. Means (and SD) for the individual scores of males and females of the three age groups of the infertile sample ($n = 400$) on BDI, BAI, AQ, ISE, IMS, and ISS

Males			Females		
Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
BDI					
16.30 (12.20)	17.09 (12.69)	11.55 (9.25)	18.12 (11.14)	18.44 (12.54)	13.50 (7.05)
BAI					
16.21 (10.83)	20.74 (11.63)	14.88 (8.76)	20.20 (10.46)	21.78 (11.60)	16.00 (7.53)
AQ					
68.01 (15.62)	73.77 (19.45)	76.00 (19.70)	69.17 (15.50)	67.78 (15.96)	74.25 (14.57)
ISE					
36.41 (17.17)	40.77 (16.35)	34.63 (12.16)	40.41 (15.91)	32.39 (16.47)	34.50 (12.48)
IMS					
29.45 (20.07)	32.84 (18.72)	22.13 (18.47)	31.69 (19.46)	28.28 (18.83)	25.50 (10.34)
ISS					
29.49 (16.77)	31.16 (19.62)	14.50 (8.09)	30.17 (16.70)	23.50 (15.80)	8.25 (6.70)

Note: Group 1: 20-40 years; Group 2: 40-55 years; Group 3: 55-up years.

years were significantly less sexually satisfied as compared to those aged over 55 years. Post hoc Tukey-test performed for males' responses showed significant differences between Group 2 and Group 1 ($p = .043$) in the mean scores on BAI, between Group 2 and Group 3 ($p = .034$) on ISE, and between Group 2 and Group 3 ($p = .032$) on ISS.

For the fertile couples the main effect of age was also significant, Wilks's lambda = .904, $F(12, 730) = 3.158$, $p < .001$, partial $\eta^2 = .031$. The interaction effect of gender and age on the six psychological state variables was marginally significant, Wilks's lambda = .943, $F(12, 730) = 1.808$, $p = .043$, partial $\eta^2 = .035$. The univariate F -tests showed that age influenced females' responses on BAI, $F(2, 397) = 8.547$, $p < .001$, partial $\eta^2 = .085$; and on ISE, $F(2, 197) = 3.140$, $p = .046$, partial $\eta^2 = .033$. Males' responses did not differ in the three age groups except for responses on BDI, $F(2, 197) = 5.054$, $p = .007$, partial $\eta^2 = .051$; on BAI, $F(2, 197) = 3.527$, $p = .031$, partial $\eta^2 = .036$; and on AQ, $F(2, 197) = 2.969$, $p = .051$, partial $\eta^2 = .031$. Table 5 shows the means and standard deviations of the responses on the six psychological state variables in the fertile sample for the three age groups as a function of gender.

To investigate which age groups in the fertile sample differed in their responses post hoc Tukey-test was performed. The results pertaining to females' responses showed significant differences in the mean scores on BAI between Group 3 and Group 1 ($p = .017$), and on ISE between Group 2 and Group 1 ($p = .034$). Post hoc Tukey-test performed on males' responses showed significant mean difference between Group 2 and Group 1 on BDI ($p = .006$), on BAI ($p = .023$), and on AQ ($p = .040$).

Table 5. Means (and SD) for the individual scores of males and females of three age groups of the fertile sample ($n = 400$) on BDI, BAI, AQ, ISE, IMS, and ISS

Males			Females		
Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
BDI					
9.67(9.18)	14.97 (10.21)	8.00 (7.18)	11.07 (9.88)	13.45 (9.36)	23.00 (29.07)
BA					
11.34 (7.92)	15.78 (12.06)	13.44 (12.43)	12.18 (8.03)	16.90 (9.37)	34.00 (31.11)
AQ					
61.09 (15.38)	68.72 (15.64)	62.00 (13.07)	61.06 (14.14)	67.15 (17.19)	64.50 (31.62)
ISE					
30.92 (16.36)	35.36 (15.27)	29.11 (14.90)	20.81 (14.35)	38.60 (18.39)	28.00 (24.04)
IMS					
22.41 (17.34)	27.58 (19.29)	17.67 (14.37)	20.65 (16.07)	22.90 (15.60)	45.50 (55.86)
ISS					
24.01 (15.90)	27.47 (13.49)	19.67 (7.66)	25.30 (14.48)	23.15 (10.75)	15.50 (12.02)

Note: Group 1: 20-40 years; Group 2: 40-55 years; Group 3: 55-up years.

Effects of educational level. A 6(education level) \times 2(gender) MANOVA with the score of the each partner on BDI, BAI, AQ, ISE index, IMS index, and ISS index as dependent variables was performed in order to find out whether there were education effects in the responses of infertile and fertile couples, separately for the two samples. The six educational levels and gender were the independent variables.

For the infertile sample the main effect of education was significant, Wilks's lambda = .866, $F(30.00, 1534.00) = 1.872$, $p = .003$, partial $\eta^2 = .035$. The main effect of gender was nonsignificant, Wilks's lambda = .992, $F(6.00, 283.00) = .522$, $p = .792$. The interaction effect of gender and education on the six psychological state variables was nonsignificant, Wilks's lambda = .936, $F(30.00, 1534.00) = .856$, $p = .691$. The univariate F -tests showed that educational level influenced females' responses only on BAI, $F(5, 394) = 2.907$, $p = .015$, partial $\eta^2 = .071$. On the contrary, males' responses differed on the AQ, $F(5, 394) = 2.441$, $p = .036$, partial $\eta^2 = .058$. Table 6 shows the means and standard deviations of the responses on the six psychological state variables for the six educational levels as a function of gender.

To investigate which educational level in the infertile sample differed in their responses post hoc Tukey-test was performed within each gender. Results pertaining to females' responses showed significant differences ($p = .048$) between matriculation and intermediate education level in the mean scores on BAI. Results suggested that females of matriculation had higher levels of anxiety as compared to those of intermediate education level. Post hoc Tukey-test performed for males' responses showed significant difference ($p = .028$) between matriculation, and intermediate education level in the mean scores on AQ. Results suggested that

Table 6. Means (and SD) for the individual scores of males and females in the infertile sample ($n = 400$) on BDI, BAI, AQ, ISE, IMS, and ISS as a function of education level

Education level	BDI	BAI	AQ	ISE	IMS	ISS
Males						
Illiterate	13.50 (11.62)	12.75 (11.56)	58.50 (15.11)	38.00 (16.37)	17.00 (22.55)	19.25 (9.91)
Below matriculation	14.60 (14.72)	12.10 (9.97)	65.60 (11.96)	29.80 (15.58)	25.50 (14.52)	19.80 (12.63)
Matriculation	13.27 (11.68)	14.13 (9.57)	65.17 (18.53)	31.17 (16.34)	23.33 (18.58)	23.37 (15.35)
Intermediate	10.96 (8.20)	13.67 (9.31)	59.81 (14.09)	30.81 (15.27)	27.07 (17.84)	24.04 (15.10)
Graduation	11.29 (9.66)	11.96 (9.76)	65.40 (15.62)	33.98 (17.29)	22.56 (17.92)	24.50 (15.70)
Post graduation	8.29 (7.08)	11.29 (7.99)	61.43 (15.15)	30.05 (16.09)	22.05 (17.59)	25.49 (16.30)
Females						
Illiterate	18.82 (15.22)	16.64 (8.85)	71.55 (12.58)	39.27 (11.55)	28.45 (15.96)	28.27 (7.94)
Below matriculation	10.89 (15.42)	12.00 (12.71)	63.00 (15.27)	27.44 (16.79)	16.44 (13.30)	16.44 (7.50)
Matriculation	13.62 (10.73)	15.43 (9.26)	61.40 (13.86)	32.21 (14.80)	18.38 (15.08)	21.60 (12.04)
Intermediate	11.73 (10.16)	14.52 (10.84)	64.35 (16.58)	30.35 (15.68)	22.43 (19.05)	23.20 (12.24)
Graduation	8.96 (6.75)	10.43 (7.25)	60.29 (13.04)	31.43 (14.15)	22.59 (16.52)	26.18 (15.30)
Post graduation	9.93 (7.55)	11.43 (7.34)	57.33 (14.13)	27.26 (15.89)	19.14 (15.12)	28.74 (16.59)

males of matriculation had higher levels of aggression as compared to those with an intermediate education level.

For the fertile couples the main effect of education was also significant, Wilks's lambda = .901, $F(30.21, 1454.00) = 1.321$, $p = .031$, partial $\eta^2 = .035$. The main effect of gender was nonsignificant, Wilks's lambda = .912, $F(6.00, 283.00) = .461$, $p = .631$, partial $\eta^2 = 0.011$. The interaction effect of gender and education on the six psychological state variables was nonsignificant, Wilks's lambda = .998, $F(30.21, 1454.00) = .853$, $p = .741$. The univariate F -tests showed that educational level influenced females' responses only on BDI, $F(5, 394) = 2.602$, $p = .027$, partial $\eta^2 = .063$. On the contrary, males' responses did not differ in the six education levels. Table 7 shows the means and standard deviations of the responses on the six psychological state variables for the six educational levels as a function of gender.

Table 7. Means (and SD) for the individual scores of males and females in the fertile sample (n = 400) on BDI, BAI, AQ, ISE, IMS, and ISS as a function of education level

Education level	BDI	BAI	AQ	ISE	IMS	ISS
Males						
Illiterate	16.21 (9.12)	14.17 (10.06)	59.73 (13.27)	34.00 (15.77)	28.73 (15.25)	18.15 (10.63)
Below matriculation	12.61 (10.34)	11.11 (10.18)	61.32 (10.16)	27.18 (12.54)	20.42 (12.12)	17.23 (9.83)
Matriculation	10.07 (9.14)	12.10 (10.27)	62.42 (17.63)	28.72 (14.14)	20.30 (13.48)	20.27 (14.66)
Intermediate	11.76 (9.12)	13.17 (9.99)	57.11 (15.13)	28.15 (12.17)	24.77 (12.64)	21.63 (13.11)
Graduation	11.42 (10.66)	10.11 (9.66)	62.51 (16.72)	30.08 (15.79)	21.95 (18.92)	21.87 (15.79)
Post graduation	9.79 (8.18)	11.09 (8.63)	57.23 (14.85)	29.05 (16.29)	21.63 (15.73)	25.32 (17.12)
Females						
Illiterate	17.12 (14.34)	15.54 (9.46)	69.35 (11.87)	33.23 (10.56)	26.33 (14.54)	25.26 (9.83)
Below matriculation	10.34 (13.64)	11.20 (12.54)	60.45 (13.65)	26.34 (14.85)	14.45 (13.23)	16.24 (9.12)
Matriculation	12.36 (9.27)	14.46 (10.84)	60.34 (10.27)	33.23 (13.12)	16.12 (14.23)	20.16 (13.24)
Intermediate	10.28 (9.37)	13.26 (9.82)	60.81 (13.46)	31.34 (15.23)	23.54 (16.36)	20.63 (14.61)
Graduation	9.72 (7.26)	10.71 (9.65)	65.82 (16.17)	33.76 (13.62)	21.87 (15.56)	25.72 (12.81)
Post graduation	10.71 (8.42)	12.82 (8.81)	53.38 (13.52)	24.83 (12.92)	11.45 (10.34)	27.10 (15.14)

To investigate which educational level in the fertile sample differed in their responses post hoc Tukey-test was performed. The results pertaining to females' responses showed significant differences ($p = .028$) in the mean scores on BDI between illiterate and graduation educational level. Results suggested that illiterate females had higher levels of depression as compared to the graduate ones.

Effects of income level. A 5(income level) x 2(fertility: fertile vs. infertile couples) MANOVA with the mean scores of the couple on BDI, BAI, AQ, ISE index, IMS index, and ISS index as dependent variables was performed in order to find out whether there were income effects in the responses of infertile and fertile couples. The five income levels and fertility were the independent variables. For performing this analysis, the income of both partners (if both are earning) was combined to derive the income level of the couple, and an average of the scores of both partners on all measures were also computed to get one unit of analysis for the test scores.

The analysis showed that the main effect of income level was significant, Wilks's

Table 8. Means and standard deviations of the scores for five income levels of fertile and infertile couples on BDI, BAI, AQ, ISE, IMS, and ISS

Education level	BDI	BAI	AQ	ISE	IMS	ISS
	Fertile couples					
Group 1	13.96 (11.81)	13.73 (10.07)	70.19 (17.66)	37.46 (13.91)	21.04 (16.91)	19.77 (11.98)
Group 2	12.91 (11.07)	13.62 (9.29)	64.04 (14.85)	32.44 (15.26)	24.65 (18.45)	26.25 (14.90)
Group 3	9.54 (8.29)	11.84 (8.96)	60.36 (14.28)	31.23 (15.71)	21.16 (15.82)	23.98 (14.36)
Group 4	8.24 (5.45)	11.78 (7.85)	58.15 (14.99)	22.87 (15.09)	16.48 (15.69)	22.87 (16.42)
Group 5	16.00 (2.83)	16.00 (4.24)	71.00 (11.31)	27.50 (17.68)	29.00 (9.09)	34.50 (7.78)
	Infertile couples					
Group 1	15.64 (11.89)	18.33 (10.32)	68.14 (13.64)	35.00 (14.21)	29.33 (21.16)	23.92 (16.67)
Group 2	17.35 (12.70)	18.66 (10.98)	70.45 (15.94)	39.94 (17.24)	31.54 (19.69)	29.37 (16.65)
Group 3	16.28 (10.79)	18.27 (10.41)	68.52 (17.49)	37.05 (16.89)	29.60 (19.16)	29.40 (17.77)
Group 4	21.36 (11.56)	19.64 (11.23)	67.14 (17.20)	38.42 (13.65)	29.97 (19.00)	13.17 (16.59)
Group 5	16.75 (21.56)	29.25 (22.75)	87.25 (15.97)	33.75 (16.54)	38.25 (14.84)	39.00 (10.13)

Note: Group 1: Below 5,000 rupees; Group 2: 5,001-15,000 rupees; Group 3: 15,001-50,000 rupees; Group 4: 50,001-200,000 rupees; Group 5: Over 200,000 rupees.

$\lambda = .937$, $F(24, 2739.748) = 2.145$, $p = .001$, partial $\eta^2 = .073$. The main effect of fertility was significant, Wilks's $\lambda = .978$, $F(6, 785) = 2.995$, $p = .007$, partial $\eta^2 = .62$. The interaction effect of income level and fertility on the six psychological state variables was also significant, Wilks's $\lambda = .951$, $F(24, 2793.748) = 1.642$, $p = .025$, partial $\eta^2 = .67$. The univariate F -tests showed that income level did not influence infertile couples' responses on the six psychological state variables. On the contrary for the fertile couples the main effect of income level was significant on BDI, $F(4, 395) = 4.360$, $p = .002$, partial $\eta^2 = .042$; on AQ, $F(4, 395) = 4.183$, $p = .002$, partial $\eta^2 = .041$; and on the ISE index, $F(4, 395) = 4.74$, $p = .001$, partial $\eta^2 = .046$. Table 8 shows the means and standard deviations of the responses on the six psychological state variables for the five income levels as a function of fertility.

To investigate which income level in the fertile sample differed in their responses post hoc Tukey-test was performed. The results showed significant differences in

the mean scores on BDI between Group 2 and Group 3 ($p = .012$), and between Group 2 and Group 4 ($p = .027$), that is, couples earning 5,001-15,000 had higher levels of depression as compared to those earning 15,001-50,000 rupees and 50,001-200,000 rupees. Results further showed significant differences in the mean scores on AQ between Group 1 and Group 2 ($p = .014$), and between Group 1 and Group 3 ($p = .008$), that is, fertile couples earning below 5,000 rupees were more aggressive than couples earning 5,001-15,000 and 15,001-50,000 rupees. Finally, significant differences were found in the mean scores on ISE in the mean scores of Group 1 ($p = .001$), Group 2 ($p = .002$), and Group 3 ($p = .009$) from Group 4, that is, couples earning below 5,000, 5,001-15,000, and 15,001-50,000 had lower self-esteem as compared to those earning 50,001-200,000 rupees.

DISCUSSION

In the context of cultural values and the process of parenthood role socialization, married couples in general, and infertile couples in particular, are under severe social pressures to meet the expectations of performing traditional feminine and masculine roles particularly with reference to their ability to produce children. The first hypothesis of the study was that infertile couples would show higher degree of anxiety, depression, and aggression, and lower levels of self-esteem, marital satisfaction, and sexual satisfaction as compared to fertile couples (Hypothesis 1). The data of the present study supported Hypothesis 1.

Specifically, the prediction that depression, anxiety, and aggression will be more common in infertile couples than in fertile couples was supported. The findings are in line with a previous study conducted by Anate and Akeredolu (1995) who reported that the inability to conceive is correlated with social isolation, severe sense of guilt, anxiety and depression. This finding also corroborates the findings of the work of Argyle and Roth (2002) who reported that infertility and infertility treatment result in anxiety and distress. Finally, this finding is in line with Coryell, Endicott, and Keller (1998) findings. They found that among infertile couples, who never suffered from any psychopathology within a period of four years, 12% of the sample had an onset of major depressive episodes. It is apparent from the study that depression is not necessarily part of the past history of infertile couples but it is the result of infertility; and compared to fertile couples the probability to develop depression is higher for infertile couples.

The findings of the present study regarding aggression are also in line with previous research. Babcock, Waltz, Jacobson, and Gottman (1993) found that infertil-

ity is associated with the risk of subsequent aggressive acts among couples with or without a history of aggressive behavior. Psychosocial explanations tend to stress that aggression and violence are responses to frustration, and infertility may create such frustration and aggression, particularly among males or persons of matriculation level of education.

The prediction that infertile couples will be more likely to report lower level of self-esteem, marital satisfaction, and sexual satisfaction than fertile couples has also been supported by the findings of this study. Infertile couples may have a poor self-image, including concerns for one's physical health or sexual ability as compared to fertile couples. Such concerns may interfere with the couple's marital and sexual lives. The findings again provide empirical support for the study conducted by Anate and Akeredolu (1995) who reported lower self-esteem as emotional response towards the experience of infertility. As regards the finding that infertile couples express lower marital and sexual satisfaction than fertile couples, this finding is consistent with the findings of a study conducted by Sillars et al. (2002) who found that infertile persons reported less contentment, lower levels of marital and sexual satisfaction, and lower self-esteem over time. The majority of infertile couples reported conflict, low sexual satisfaction, communication problems, and disagreements over medical treatment, as well as lack of empathy. Distress caused by infertility may further impair fertility, because low marital and sexual satisfaction may lead to decreased frequency of intercourse and, possibly, to impair sperm quality (Moret, Glaser, Page, & Barger, 1998).

Interesting gender differences were also found in the present study in relation to consequences of infertility. In the case of fertile couples, the main effect of gender was not significant. However, infertile women were found to be more likely to demonstrate more depression and anxiety as compared to men when they remain childless. This finding is in line with the findings of the study by Stewart-Smythe and Van Iddekinge (2003) who reported that women, who continually face the disappointment of not conceiving month after month, show more frequent signs of grief, depression and anxiety. Webb and Daniluk (1999) also concluded that women and men responded to the stress of infertility quite differently. Women reported more intense feelings of anxiety and depression compared to men.

No detectable gender differences were found in the case of aggression, marital, and sexual satisfaction. The results pertaining to gender differences in marital and sexual satisfaction are in contrast with the findings of Affect and Disord (2003) who reported that husbands revealed more distress in marital and sexual satisfaction as compared to wives. The rejection of this hypothesis might be attributed to the fact that several couples reported that the crisis of infertility enhanced intimacy and

improved couple communication that may lead to sexual satisfaction (Hurlbert, Carol, & Rabehl, 1993).

With respect to age effects it was assumed that infertile and fertile couples of different age groups will differ in the six psychological states reported. For the infertile couples the main effect of age was significant, but not for the fertile couples. Moreover, age affected only some psychological states of the infertile couples and these effects differed between males and females. Specifically, age affected women's responses on the ISS index, and infertile men's responses on BAI, the ISE index, and the ISS index. Women's age of infertile couples was not associated with varying degrees of depression, anxiety, aggression self-esteem, and marital satisfaction as a function of age; only for sexual satisfaction, age was found to be a significant factor. The men of infertile couples also reported a decline in sexual satisfaction. The findings of the present study suggest that men aged 40-55 years reported more anxiety, and lower levels of self-esteem and sexual satisfaction as compared to men aged over 55 years.

The data of the present study were further analyzed to see whether the men and women of infertile and fertile couples having different educational levels differed in their psychological states. It was assumed that different educational levels would differentially contribute to the psychological concomitants of infertility. For the infertile couples the main effect of education was significant. However, this effect was limited to women's responses on BAI, and men's responses on the AQ. The findings of the post hoc test showed that women with matriculation had higher levels of anxiety as compared to those having an intermediate education level. Results further showed significant differences in the mean scores of men with matriculation as compared to those with an intermediate education level. Men with matriculation had higher levels of aggression as compared to those with an intermediate education level.

For the fertile couples the main effect of educational was also weak and regarded mainly women's depression. Illiterate women had higher levels of depression as compared to graduate ones. These findings could be justified considering the difference in the level of education. Illiterate women may find themselves more depressed in situations of failures and disappointments compared to educated women.

To explore the role of income level on infertile and fertile couples' psychological states variables was another aim of the present study. The analysis showed a significant interaction effect of income level and fertility on the six psychological state variables. Depression, anxiety, self-esteem, aggression, marital and sexual satisfaction in infertile couples of different income level did not differ. Since infertility has consequences to the social, emotional, physical, and economic well-being for many

couples, income does not seem to be able to counteract the effects of infertility. The consequences of infertility are present in all income groups. On the contrary, the income level had effects on fertile couples' psychological states. This implies that infertility played a significant role in the lives of infertile couples and likely masked effects that could be caused by the income level, as shown in the fertile couples' responses.

Limitations and implications

While the overall findings of the present study help our understanding of the psychological effects of infertility, it is important to acknowledge some limitations of the study. The sample of the present study is not large enough to represent the whole population of infertile couples in Pakistan. Moreover, this sample is non-representative of the levels of income in Pakistan. The group earning 0-5000 comprised only the 9% of the whole sample in the present study, whereas in Pakistan the group with this income level makes up the 40% of the whole population. There was also unwillingness to participate in the present study because of the sensitivity of the issue of infertility, which is another constraint to the representativeness of the sample. The study relied on a convenience sample and, therefore, the findings cannot be generalized to the whole Pakistani population, especially to the other cities of Pakistan that can have totally different social background.

In the light of limitations and across the wide implications of the present study, it is suggested that more research should be carried out with a larger sample from different provinces of Pakistan with respect to infertility and its psychological consequences.

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