

# Role of Marital Relationship Quality in Emotional Disturbance and Personal Growth of Women with Infertility: A Cross-Sectional Study

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## Abstract

**Background:** Infertility is a stressful condition that can lead to either emotional disturbance or personal growth. Marital relationship is one of the factors affecting the consequences of infertility. This study aimed to explore the role of marital relationship quality in development of women's personal growth after experiencing infertility.

**Materials and Methods:** In the cross-sectional study, 122 infertile women (mean age  $28.79 \pm 6.3$ ) were invited to complete the survey, including ENRICH Marital Satisfaction Scale, Posttraumatic Growth, Fertility problem inventory, State-Trait Anxiety Inventory, and Beck Inventory Depression.

**Results:** Higher scores of quality of marital relationships were a protective factor against infertility stress and state/trait anxiety. Additionally, infertility stress was a strong negative predictor of personal growth. Furthermore, infertile women with a high level of marital relationships may have more chances to experience personal growth rather than stress in infertility treatments.

**Conclusion:** The study suggests that high quality of marital relationships may provide positive opportunities for women's personal growth after experiencing infertility.

**Keywords:** Infertility, Marital Relationships, Posttraumatic Growth, Stress, Women

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## Introduction

Diagnosis of infertility is one of the greatest stressors for couples that not only causes psychological stress in infertile individuals but also leads them to achieve personal growth that is considered posttraumatic growth (PTG) (1). PTG is the positive legacy of experiencing a traumatic event (2). Considerable evidence confirms that the struggle with infertility may offer an opportunity for positive changes (3). Various factors are attributed to the development of PTG. Some studies have found the negative impact of anxiety and depression on PTG (4). However, a meta-analysis of PTG in cancer survivors found no significant association between PTG and anxiety/depression (5).

Marital relationships is one of the important factors influencing the mental health of couples dealing with

infertility (6). It is estimated that 1 out of 8 couples lives with infertility worldwide (7). The evidence indicates that infertile couples having poor relationships are at higher risk of experiencing mental illness, such as depression and anxiety (8). The quality of marital relationships in infertile couples is controversial (1, 9). It appears that the relationship between infertility and marital relationships is reciprocal. Some research reported poor marital relationships in infertile couples due to the negative effects of infertility (1). However, positive effects of infertility on marital relationships have also been reported (10).

The quality of marital relationships is an important factor that may influence infertility growth and stress in people struggling to conceive (11). The quality of marital relationships is positively associated with psychological well-being and success in life. In addition, it is negatively



related to mental illnesses like depression (12). Some evidence demonstrates that poor quality of marital relationships enhances infertility stress in infertile women (13). Furthermore, studies have documented that the high quality of marital relationships positively impacts PTG (14).

Although the role of marital relationships has been investigated in numerous studies, limited information has been published regarding the relations between the quality of marital relationships and PTG (14). Moreover, there is no evidence of an association between the quality of marital relationships and personal growth in infertility. To the best of our knowledge, this is the first study investigating the association of infertility stress with personal growth and marital relationships in women struggling with infertility. Considering the importance of PTG in contributing to individual progress and achieving positive new changes after facing stressful events, it is necessary to identify the factors related to this growth. Since PTG can result in positive changes, facilitating psychological growth and better adaptation to challenging conditions, this could benefit infertile women. Infertile women may experience emotional disturbances including anxiety, depression, and infertility stress. Therefore, identifying the factors contributing to PTG and emotional disturbance can guide health care practitioners in providing the appropriate conditions for promoting positive features. In the present study, we consider the quality of marital relationships as a factor and examine its impact on PTG and emotional disturbance.

## Materials and Methods

### Participants and study design

We conducted a cross-sectional study at the Fatemeh Azahra Infertility and Reproductive Health Research Center (Babol, Iran) from September 2018 to January 2020.

Convenience sampling was used to recruit infertile women. Women interested in participating were assessed for eligibility according to the inclusion and exclusion criteria in a clinic.

**Inclusion criteria:** Women who were at least 18 years old, had at least primary school educational, were not currently pregnant, and had no history of childbirth and adoption. However, in case of low literacy, the questionnaire questions were read by the questioners.

**Exclusion criteria:** In the study sample, infertility patients with a history of mental illness such as severe depression, psychotic disorders or any addiction, taking medications for psychiatric disorders and patients with a history of incurable disease, as well as women who underwent new stress for less than 6 months were excluded.

### Procedure

A study research member performed an interview to obtain their infertility history and to evaluate the eligibility criteria. Furthermore, brief information about the aims of

the study was explained to the participants. All of 122 eligible women, who provided written informed consent for study participation, entered the study.

The tools used in this study included the ENRICH marital satisfaction scale (EMSS), PTG, Anxiety Trait Inventory (STAI), Fertility Problems Inventory (FPI), and Beck Depression Inventory (BDI-II).

## Instruments

### ENRICH marital satisfaction scale

This is a 47-item scale consisting of 11 subscales. Topics that fall under the sub-category are ideal distortions, marital satisfaction, personality issues, marital communication, conflict resolution, financial management, leisure activities, sexual activities, children and parenting, family and friends and religious orientation. Items are scored on a 5-point scale, from 1 (strongly disagree) to 5 (strongly agree). The total possible score between 47 and 235 is calculated by adding up the score for each item. Higher scores reflect higher levels of marital satisfaction. Cronbach's alpha was 0.74 for the Persian version of the Scale (15).

### Posttraumatic growth

This scale was created by Tedeschi and Calhoun (1996). The scale includes 21 items to assess positive psychological outcomes for people with a history of trauma (16). It contains 5 sub-fields including new abilities, relationships with others, personal strength, spiritual change, and life appreciation. The total score can be from 0 to 105. Higher scores indicate more positive psychological improvements. We use a PTG score  $\geq 63$  for personal growth. The computed Cronbach's alpha for the Persian version of PTG was 0.87 (17).

### State-trait anxiety inventory

This scale is one of the self-report tools used in research to assess anxiety levels. It contains 20 items for anxiety characteristics and 20 items for anxiety status. Each item is rated on a four-point scale, from 1 (not at all) to 4 (almost always). The total score for each subscale ranged from 20 to 80. We identified anxiety symptoms with an anxiety threshold state  $\geq 41$  (18). Cronbach's alpha coefficients for the state anxiety and trait anxiety were 0.91 and 0.92, respectively (19).

### Fertility problem inventory

This instrument was developed by Newton et al. (20) in 1999 to measure stress and problems related to infertility. This scale includes 5 child scales, including social concerns, sexual concerns, relationship concerns, parental rejection, and parenting needs. The total score is 46 to 276, as each of the 46 items can be scored on a six-point scale, from 1 (strongly disagree) to 6 (strongly agree). Higher scores indicate higher stress levels. The validity and reliability of the Persian version has been studied

(21). Cronbach's alpha for all sub-components was more than 0.70 and the overall integrity was found to be 87%.

### Beck inventory depression

It is a self-assessment scale consisting of 21 questions which assesses the presence and severity of depressive symptoms. Items are scored on a 4-point scale from 0 to 3 and total score from 0 to 63. Higher scores indicate more severe depressive symptoms. In this study, depressive symptoms were defined as BDI-II threshold  $\geq 14$ . The Cronbach's alpha value for the BDI-II-Persian was high (0.87) and the test-retest reliability was satisfactory ( $r=0.74$ ) (22).

The study was approved by Babol University of Medical Sciences's Ethics Committee (IR.MUBABOL.HRI.REC.1398.077).

### Statistical analysis

Data analysis was performed using SPSS 22.0 software (IBM, The United States). Descriptive statistics were conducted to describe the socio-demographic of the study sample. The mean comparison of psychological profiles was performed in infertile women using t tests. The associations between psychological factors were evaluated using Pearson correlation analysis.

Four stepwise multivariable logistic regression models were run to evaluate the relationship between variables. Model 1 is applied to investigate the role of six independent variables, namely quality of marital relationships, infertility stress, depression, anxiety, age, and duration of infertility as predictors of PTG (as dependent variables). In model 2, presence of depression symptoms was the dependent variable, and the total score quality of marital relationships, total score of infertility stress, anxiety score, age, and duration of infertility were independent variables. In Model 3, trait anxiety was the dependent variable, and the total score of quality of marital relationships, total score of infertility stress, age, and duration of infertility were independent variables. In Model 4, state anxiety was the dependent variable, and quality of marital relationships, total score of infertility stress, age, and duration of infertility were independent variables. The significance level was also set at  $P<0.05$ .

### Results

Table 1 describes the demographic characteristics of the study population. The participants' mean age was  $28.79 \pm 6.3$  years (range: 18-44 years), and the mean infertility duration was  $3.9 \pm 3.4$  years.

According to the results, the total score of quality of marital relationships in infertile women was at a moderate level ( $M=180.14 \pm 13.5$ ) of the possible range of 47-235. In addition, the mean scores of all of nine subscales indicated that the quality of marital relationships was higher than the median of each subscale. Furthermore, the mean score of the PTG of infertile women was slightly higher than the median total score ( $M=63.1 \pm 14.6$  of the

possible range of 0-105). Moreover, the total score of infertility stress was  $M=144.2 \pm 27.5$  (the possible range: 46-276), demonstrating that most infertile women had moderate infertility stress. The participants' mean scores in trait anxiety ( $M=41.5 \pm 9.3$ ,  $M=42.7 \pm 7.8$  of 0-80 range, respectively) and depression symptoms ( $M=14.58 \pm 9.0$  of 0-63 range) were higher than normal range.

**Table 1:** Characteristics of the study population

Variables	n (%) or Mean $\pm$ SD
Age (Y)	
18-30	72 (60.5)
$\geq 31$	47 (39.5)
Education	
Diploma/Under diploma	71 (59.7)
University	48 (40.3)
Job	
Employed	92 (77.3)
Unemployed	27 (22.7)
History of illness	
Yes	23 (19.2)
No	97 (80.8)
History of psychotic disorder	
Yes	7 (5.8)
No	113 (94.2)
Smoking	
Yes	3 (2.5)
No	117 (97.5)
Duration of infertility	
$\leq 4$	78 (67.2)
$\geq 5$	38 (32.8)
Marital satisfaction	
Idealistic distortion	12.8 $\pm$ 1.6
Marital satisfaction	32.8 $\pm$ 3.2
Personality issues	14.6 $\pm$ 2.0
Marital communication	14.6 $\pm$ 1.9
Conflict resolution	17.9 $\pm$ 1.9
Financial management	11.8 $\pm$ 1.5
Leisure activities	14.8 $\pm$ 1.4
Sexual relationship	13.3 $\pm$ 1.2
Children and parenting	16.2 $\pm$ 1.6
Family and friends	15.9 $\pm$ 1.7
Religious orientation	14.9 $\pm$ 1.6
Total marital satisfaction	180.14 $\pm$ 13.5
PTG	
Relating to others	21.1 $\pm$ 5.6
New possibilities	14.7 $\pm$ 4.2
Personal strength	11.8 $\pm$ 3.7
Spiritual change	6.0 $\pm$ 2.0
Appreciation of life	9.3 $\pm$ 2.6
Total PTG	63.1 $\pm$ 14.6
FPI	
Social concern	25.7 $\pm$ 7.5
Sexual concern	20.8 $\pm$ 6.6
Relationship concern	24.4 $\pm$ 7.0
Rejection of childfree lifestyle	32.2 $\pm$ 6.9
Need for parenthood	40.9 $\pm$ 8.3
Total FPI	144.2 $\pm$ 27.5
Anxiety	
State anxiety	41.5 $\pm$ 9.3
Trait anxiety	42.7 $\pm$ 7.8
BDI	14.58 $\pm$ 9.0

Range of scores: Idealistic distortion (3-15), Marital satisfaction (8-40), Personality issues(4-20), Marital communication (4-20), Conflict resolution (5-25), Financial management (3-15), Leisure activities (4-20), Sexual relationship (4-20), Children and parenting (4-20), Family and friends (4-20), Religious orientation (4-20), Total Enrich marital satisfaction (47-235), PTG; Posttraumatic Growth (0-105), BDI; Beck depression inventory (0-63), State anxiety (0-80), Trait anxiety (0-80), and FPI; Fertility problem inventory (46-276).

## Marital Relationship and Personal Growth in Infertility

Table 2 compares the mean scores of psychological variables regarding the participants' demographics. The results of the t test revealed no significant relationship between categories of age, education, and duration of infertility and the total score of PTG. However, some subscales of PTG, including new possibilities ( $P=0.004$ ), personal strength ( $P=0.002$ ), and spiritual change ( $P=0.02$ ), were significantly higher in 31 years and older participants than in participants under the age of 30.

There were no significant relationships between psychological variables and duration of infertility. The total score of quality of marital relationship and all nine subscales were not significantly associated with age, education, and duration of infertility of women.

Additionally, the anxiety score was significantly higher in participants under the age of 30 than in the other age group ( $P=0.018$ ). Women with primary/high school education had significantly higher scores

of depression than the ones with university education ( $P=0.006$ ).

Table 3 lists the correlation matrix of psychosocial variables. The total score of the quality of marital relationships was positively associated with the total score of PTG. Furthermore, infertility stress was negatively correlated with the total score of quality of marital relationships ( $r=-0.454$ ). Also, it has low to moderate negative correlation with most subscales.

Depression had a significant negative correlation with the total score of quality of marital relationships ( $r=-0.399$ ). Depression has low to moderate negative correlation with subscales except leisure activities, sexual relationship, children and parenting.

State anxiety and trait anxiety had a significant negative correlation with all of the marital satisfaction subscales. However, both of them were not associated with sexual relationship.

**Table 2:** Comparison of mean  $\pm$  SD scores of the psychological profile regarding demographic characteristic of infertile women

Variables	Age (Y)		P value	Education		P value	Duration of infertility		P value
	18-30	$\geq 31$		Diploma/ under diploma	University		$\leq 4$ years	$\geq 5$ years	
PTG									
Relating to others	20.9 $\pm$ 5.3	21.5 $\pm$ 5.1	0.586	20.8 $\pm$ 4.9	21.6 $\pm$ 5.6	0.398	21.2 $\pm$ 5.2	21.2 $\pm$ 5.4	0.982
New possibilities	13.8 $\pm$ 4.2	16.0 $\pm$ 3.7	0.004	14.5 $\pm$ 4.2	14.9 $\pm$ 4.1	0.592	14.4 $\pm$ 4.2	14.9 $\pm$ 4.1	0.516
Personal strength	11.0 $\pm$ 3.7	13.1 $\pm$ 3.2	0.002	11.9 $\pm$ 4.0	11.8 $\pm$ 3.1	0.930	11.6 $\pm$ 3.5	12.3 $\pm$ 3.9	0.324
Spiritual change	5.6 $\pm$ 2.0	6.5 $\pm$ 1.7	0.02	5.9 $\pm$ 1.8	6.1 $\pm$ 2.1	0.590	6.0 $\pm$ 1.9	5.8 $\pm$ 1.9	0.626
Appreciation of life	9.2 $\pm$ 2.5	9.4 $\pm$ 2.7	0.628	9.2 $\pm$ 2.6	9.3 $\pm$ 2.5	0.902	9.0 $\pm$ 2.7	9.8 $\pm$ 2.0	0.088
Total PTG	60.7 $\pm$ 14.7	66.6 $\pm$ 13.4	0.280	62.4 $\pm$ 14.0	63.9 $\pm$ 15.1	0.592	62.4 $\pm$ 14.8	64.2 $\pm$ 14.3	0.530
BDI	15.4 $\pm$ 9.7	12.6 $\pm$ 7.7	0.108	16.3 $\pm$ 9.3	11.6 $\pm$ 8.0	0.006	14.2 $\pm$ 8.8	14.1 $\pm$ 9.3	0.971
Anxiety									
State anxiety	42.4 $\pm$ 9.6	39.7 $\pm$ 8.9	0.124	42.0 $\pm$ 9.9	40.5 $\pm$ 8.74	0.403	42.0 $\pm$ 9.1	40.4 $\pm$ 9.6	0.404
Trait anxiety	44.1 $\pm$ 7.4	40.6 $\pm$ 8.1	0.018	43.3 $\pm$ 7.7	1.8 $\pm$ 7.9	0.300	42.9 $\pm$ 7.7	42.2 $\pm$ 8.2	0.639
FPI									
Social concern	26.2 $\pm$ 7.4	24.6 $\pm$ 7.5	0.257	26.3 $\pm$ 7.5	24.5 $\pm$ 7.2	0.185	26.0 $\pm$ 7.7	24.8 $\pm$ 6.7	0.418
Sexual concern	20.9 $\pm$ 6.5	20.5 $\pm$ 6.8	0.741	22.2 $\pm$ 6.7	18.7 $\pm$ 6.0	0.005	20.9 $\pm$ 7.0	20.4 $\pm$ 5.7	0.726
Relationship concern	24.7 $\pm$ 6.8	23.7 $\pm$ 7.3	0.474	25.7 $\pm$ 6.93	22.2 $\pm$ 6.7	0.009	24.6 $\pm$ 7.0	23.3 $\pm$ 6.9	0.377
Rejection of childfree	32.9 $\pm$ 6.5	30.9 $\pm$ 7.2	0.136	2.3 $\pm$ 6.2	31.8 $\pm$ 7.7	0.677	31.8 $\pm$ 7.2	33.0 $\pm$ 6.0	0.379
Need for parenthood lifestyle	41.9 $\pm$ 8.4	38.9 $\pm$ 8.0	0.055	41.4 $\pm$ 7.9	39.8 $\pm$ 8.9	0.293	40.7 $\pm$ 8.6	40.3 $\pm$ 8.0	0.824
Total FPI	146.8 $\pm$ 26.6	138.9 $\pm$ 27.8	0.123	148.1 $\pm$ 25.5	137.1 $\pm$ 28.5	0.031	144.2 $\pm$ 29.5	142.1 $\pm$ 22.7	0.679
Marital satisfaction									
Idealistic distortion	9.7 $\pm$ 1.8	10.1 $\pm$ 1.3	0.216	9.6 $\pm$ 1.6	10.14 $\pm$ 1.6	0.133	9.7 $\pm$ 1.5	9.9 $\pm$ 1.8	0.598
Marital satisfaction	24.7 $\pm$ 3.5	25.0 $\pm$ 2.7	0.617	24.3 $\pm$ 3.2	25.5 $\pm$ 3.1	0.056	24.8 $\pm$ 3.3	24.6 $\pm$ 2.9	0.800
Personality issues	10.5 $\pm$ 2.0	10.8 $\pm$ 1.9	0.391	10.4 $\pm$ 2.0	10.9 $\pm$ 1.9	0.192	10.5 $\pm$ 2.1	10.7 $\pm$ 1.9	0.640
Marital communication	10.5 $\pm$ 1.9	10.7 $\pm$ 1.8	0.481	10.4 $\pm$ 1.8	10.8 $\pm$ 1.8	0.246	10.6 $\pm$ 1.9	10.6 $\pm$ 1.6	0.849
Conflict resolution	12.6 $\pm$ 2.0	13.3 $\pm$ 1.8	0.062	12.9 $\pm$ 2.0	13.0 $\pm$ 2.0	0.730	12.7 $\pm$ 1.8	13.2 $\pm$ 2.2	0.256
Financial management	8.8 $\pm$ 1.4	8.8 $\pm$ 1.6	0.835	8.7 $\pm$ 1.41	8.8 $\pm$ 1.6	0.819	8.6 $\pm$ 1.5	9.0 $\pm$ 1.5	0.202
Leisure activities	10.8 $\pm$ 1.4	10.8 $\pm$ 1.4	0.846	0.6 $\pm$ 1.4	11.1 $\pm$ 1.3	0.072	10.8 $\pm$ 1.2	10.8 $\pm$ 1.6	0.992
Sexual relationship	9.2 $\pm$ 1.3	9.3 $\pm$ 1.1	0.649	9.1 $\pm$ 1.1	9.5 $\pm$ 1.3	0.099	9.3 $\pm$ 1.2	9.3 $\pm$ 1.1	0.998
Children and parenting	12.0 $\pm$ 1.51	12.3 $\pm$ 1.71	0.402	11.9 $\pm$ 1.6	12.4 $\pm$ 1.5	0.110	12.0 $\pm$ 1.4	12.3 $\pm$ 1.9	0.526
Family and friends	1.9 $\pm$ 1.9	1.8 $\pm$ 1.5	0.815	11.8 $\pm$ 1.7	12.0 $\pm$ 1.8	0.562	11.8 $\pm$ 1.7	11.8 $\pm$ 1.7	0.939
Religious orientation	11.0 $\pm$ 1.7	10.8 $\pm$ 1.3	0.579	10.8 $\pm$ 1.7	11.1 $\pm$ 1.3	0.384	10.9 $\pm$ 1.6	10.9 $\pm$ 1.5	0.858
Total marital satisfaction	132.1 $\pm$ 13.6	134.3 $\pm$ 13.3	0.388	131.1 $\pm$ 13.1	135.6 $\pm$ 13.6	0.073	132.3 $\pm$ 13.6	133.6 $\pm$ 13.6	0.614

Data are presented as mean  $\pm$  SD. We used t tests to compare the means of the groups. Range of scores: Idealistic distortion (3-15), Marital satisfaction (8-40), Personality issues (4-20), Marital communication (4-20), Conflict resolution (5-25), Financial management (3-15), Leisure activities (4-20), Sexual relationship (4-20), Children and parenting (4-200), Family and friends (4-20), Religious orientation (4-20), Total enrich marital satisfaction (47-235), PTG; Posttraumatic growth (0-105), BDI; Beck depression inventory (0-63), State anxiety (0-80), Trait anxiety (0-80), and FPI; Fertility problem inventory (46-276).



**Table 3:** Correlation matrix of psychological variables

Variables	PTG	Depression	State anxiety	Trait anxiety	FPI
Idealistic distortion	r=0.144 P=0.115	r=-0.315 P=0.001	r=-0.362 P<0.001	r=-0.276 P=0.002	r=-0.325 P<0.001
Marital satisfaction	r=0.262 P=0.004	r=-0.295 P=0.001	r=-0.390 P<0.001	r=-0.394 P<0.001	r=-0.405 P<0.001
Personality issues	r=0.108 P=0.237	r=-0.281 P=0.002	r=-0.324 P<0.001	r=-0.387 P<0.001	r=-0.337 P<0.001
Marital communication	r=0.099 P=0.279	r=-0.326 P<0.001	r=-0.435 P<0.001	r=-0.402 P<0.001	r=-0.324 P<0.001
Conflict resolution	r=0.111 P=0.223	r=-0.332 P<0.001	r=-0.387 P<0.001	r=-0.435 P<0.001	r=-0.369 P<0.001
Financial management	r=0.120 P=0.188	r=-0.292 P=0.001	r=-0.360 P<0.001	r=-0.282 P=0.002	r=-0.308 P=0.001
Leisure activities	r=0.063 P=0.490	r=-0.210 P=0.24	r=-0.198 P=0.029	r=-0.198 P=0.029	r=-0.171 P=0.059
Sexual relationship	r=-0.087 P=0.339	r=-0.009 P=0.925	r=0.078 P=0.398	r=-0.056 P=0.540	r=-0.135 P=0.139
Children and parenting	r=0.167 P=0.066	r=-0.168 P=0.071	r=-0.250 P=0.006	r=-0.342 P<0.001	r=-0.282 P=0.002
Family and friends	r=0.124 P=0.174	r=-0.336 P<0.001	r=-0.390 P<0.001	r=-0.450 P<0.001	r=-0.335 P<0.001
Religious orientation	r=0.108 P=0.237	r=-0.273 P=0.003	r=-0.300 P=0.001	r=-0.318 P<0.001	r=-0.190 P=0.036
Total marital satisfaction	r=0.188 P=0.038	r=-0.399 P<0.001	r=-0.477 P<0.001	r=-0.503 P<0.001	r=-0.454 P<0.001

PTG; Posttraumatic growth, FPI; Fertility problem inventory, P; P value, and r= Pearson correlation coefficient.

Table 4 lists the results of stepwise multivariate logistic regression models based on four separate groups. Model 1 was applied to investigate the effect of six independent variables, including quality of marital relationships, infertility stress, depression, anxiety, age, and duration of infertility as the predictors of PTG. The results revealed that infertility stress ( $\beta=-0.25 \pm 0.008$ ,  $P=0.002$ ) negatively predicted the PTG. However, individuals over 30 years old reported greater PTG than those under 30 years old ( $\beta=0.913$ ,  $P=0.034$ ).

In Model 2, the total score of the quality of marital relationships, total score of infertility stress, anxiety score, age, and duration of infertility were the predictors (independent variables) of depression symptoms. Depression was significantly predicted by infertility stress ( $\beta=0.038$ ,  $P<0.001$ ).

In Model 3, the total score of the quality of marital relationships, total score of infertility stress, age, and duration of infertility were the predictors (independent variables) of trait anxiety. Findings revealed that the quality of marital relationships was a significant negative predictor ( $\beta=-0.66$ ,  $P=0.001$ ), whereas infertility stress was a significant positive predictor of trait anxiety ( $\beta=0.027$ ,  $P=0.006$ ).

In Model 4, quality of marital relationships, total score of infertility stress, age, and duration of infertility were the predictors of state anxiety. Results showed that the total score of quality of relationships was a negative ( $\beta=-0.078$ ,  $P<0.001$ ), whereas infertility stress was a significant positive predictor of state anxiety ( $\beta=0.023$ ,  $P=0.025$ ).

## Discussion

According to our results, infertile women had a moderate level of quality of marital satisfaction, similar to those in previous studies (11, 23). The mean of personal growth total scores in the present study was moderate and similar to that in the prior study (24). However, compared to our result, Zhang et al. (25) reported a lower mean of PTG among infertile women. This suggests that PTG differs across various social and cultural contexts. Similar to other previous studies, the participants' infertility stress scores were moderate (25, 26).

The results demonstrated that infertile women over the age of 30 experienced greater personal growth than those under the age of 30. On the contrary, another research found that younger individuals exhibited more PTG (27). In their study, it was suggested that younger individuals have a higher PTG due to their greater potential to make changes in their life. Different study populations, higher average age, and larger age range may be the reason for the different results. Suo et al. (28) reported that the participants' general demographic variables were not significantly associated with PTG. The reason may be the homogeneous participant characteristics of their study. Wang et al. (29) revealed that household income and educational level positively influenced PTG.

**Table 4:** Predictor of PTG, anxiety, depression in stepwise logistic regression

Models	Independent variables	Dependent	B (SE)	OR	95% CI	P value
Model 1	FPI	PTG	-0.25 (0.008)	0.975	0.960-0.99	0.002
	Age		0.913 (0.430)	2.492	01.072-5.791	0.034
Model 2	FPI	BDI	0.038 (0.009)	1.039	1.021-1.058	P<0.001
Model 3	Total marital satisfaction	Trait anxiety	-0.66 (0.021)	0.936	0.898-0.975	0.001
	FPI		0.027 (0.010)	1.027	1.008-1.047	0.006
Model 4	Total marital satisfaction	State anxiety	-0.078 (0.022)	0.925	0.886-0.966	P<0.001
	FPI		0.023 (0.010)	1.023	1.003-1.043	0.025

PTG; Posttraumatic growth, FPI; Fertility problem inventory, B; Beta, SE; Standard error, OR; Odds ratio, CI; Confidence interval, PTG scores  $\geq 63$ , Depressive symptoms, BDI-II  $\geq 14$ ; Anxiety symptom, State-anxiety  $\geq 41$ , Trait-anxiety  $\geq 41$ .

Furthermore, infertility stress and depression were higher in women with a lower education level than in those with a university level education, being consistent with previous studies conducted on infertile couples (26). Compared to individuals with a higher education level, those with an education level lower than high school graduation had a higher risk of depression (30). Higher education may lead infertile women to gain more knowledge about their infertility problems and have better ways to receive professional help. In terms of resilience and feeling of control, they have fewer psychological tools to cope with adversity. It is hypothesized that more educated infertile women have more social resources to cope with infertility stress and may be able to protect themselves against mental illnesses such as depression (31). Therefore, infertile women with lower levels of education should thus receive greater attention from health care providers.

The study revealed that the quality of marital relationships was positively correlated with personal growth while negatively correlated with infertility stress, anxiety, and depression. Previous studies supported the positive correlation between marital satisfaction personal growth (32, 33). Therefore, infertile couples with strong marital relationships use strategies that ultimately lead to personal growth. Maroufizadeh et al. (34) concluded that marital satisfaction in infertile patients was influenced by both their own anxiety and their spouses' anxiety. Another study found that total infertility stress scores and specific sub-rates of relationship concerns, social concerns, and rejection of a childless lifestyle, in particular, were significantly associated negatively with the marital satisfaction of infertile women (12). Moreover, longitudinal studies demonstrated that marital dissatisfaction was associated with subsequent depressive disorder (35, 36). High quality of marital relationships leads couples to spend time understanding their life conditions, such as infertility. Therefore, a satisfying marital relationship may improve an infertile woman's mental health by increasing positive emotions.

Our findings confirmed that a higher score of quality marital relationships was a protective factor against infertility stress, as well as state/trait anxiety. These findings were in agreement with the results obtained in previous studies (14, 32). Lee et al. (37) suggested that marital satisfaction positively influenced positive psychological adaptation to breast cancer among patients and their spouses. However, Dehle et al. (38) found that women's anxiety symptoms were not a significant predictor of changes in their or their partners' reports of marital satisfaction. A study implied that the trait anxiety strongly predicted marital satisfaction, but the role of state anxiety in predicting marital satisfaction was insignificant (39).

In our study, infertility stress was a negative predictor of personal growth. There is evidence supporting the effect of infertility stress on PTG (3). The results reported by Paul et al. (40) demonstrated that appreciation of the life

factor was positively associated with infertility stress. Zhang et al. (25) stated that the husbands' infertility stress affected only their PTG, while the wives' infertility stress did not influence their own or their spouses' PTG.

It should be mentioned that this study has several limitations. The use of a convenience sample of infertile women limits the generalizability of the findings to all infertile patients. Therefore, in future studies, researchers should endeavor to recruit a larger sample size. The participants of our work included only women; therefore, it is recommended that future studies replicate the same study with the participation of men. Finally, this was a cross-sectional study; causal inferences are impossible with this kind of study.

Our results can have important clinical implications for clinicians working with infertile couples. The study proposed that clinicians working in infertility settings should pay further attention to the role of quality of marital relationships in reducing infertility stress. Clinicians should encourage infertile couples to enrich their marital relationships to better cope with stress. The study recommended that educating infertile couples and healthcare providers about the benefits of enhancing quality of couples' relationships might facilitate the ways of achieving personal growth rather than infertility stress or mental illness.

## Conclusion

Our findings emphasized that higher scores of quality marital relationships were a protective factor against infertility stress and state/trait anxiety in infertile women. Additionally, higher infertility stress reduced personal growth. According to the results, infertile women with a high level of marital satisfaction may have more tendencies for personal growth than to stress.

The study suggests that all physicians of infertility centers, particularly gynecologists, should pay more attention to reduction of infertility stress in infertile couples, help them to improve marital satisfaction, and support them to have more positive opportunities for personal growth instead of negative consequences of infertility like mental illness.

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## Authors' Contributions

M.F., Sh.Sh.; Conceptualization, Methodology and Conducted the project. H.Gh.; Data curation and Analyzed the data. M.F.; Wrote the primary draft of the paper

and Project administration. S.E.; Supervised the study, Resources and Project administration. F.Gh., Sh.Sh.; Collected the data and Investigation. All authors read and approved the final manuscript.

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