



The Relationship Between Infertility, Stress, and Quality of Life with Posttraumatic Stress Disorder in Infertile Women

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Abstract

Background: The infertility experience and its treatment are accompanied by the symptoms of posttraumatic stress disorder (PTSD). The aim of this study was determining the relationship between posttraumatic stress disorder and quality of life and the infertile women's stress.

Methods: In this descriptive-analytic study, 172 infertile women were divided in four groups. Convenience sampling was done and eligible infertile women referred to Qafqaz Infertility Center in Iran were included in the study. The data was collected between January and March 2019 through posttraumatic stress disorder checklist, The Fertility Quality of Life (FertiQoL) questionnaire, and Newton's infertility stress questionnaire. Pearson correlation, linear regression analysis, and two-way analysis of variance (ANOVA) were applied for data analysis with a significance level of 0.05.

Results: The results of two-way analysis of variance (ANOVA) revealed that there was no significant relationship between the type of treatment ($p=0.548$) and the reception of psychological intervention ($p=0.450$). In addition, the results of Pearson correlation showed that there was an inverse significant relationship between the total score of posttraumatic stress disorder and quality of life ($r=-0.91$, $p<0.001$) and a direct relationship between the total score of posttraumatic stress disorder and level of stress ($r=0.56$, $p<0.001$).

Conclusion: The results of this study showed that 41.3% of the infertile women had the symptoms of posttraumatic stress disorder. Due to the relationships of posttraumatic stress disorder with the quality of life and infertility stress, providing regular designed psychological interventions is recommended for infertile individuals.

Keywords: Female, Infertility, Posttraumatic stress disorders, Psychology, Quality of life.

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Introduction

About 60-80 million couples are affected by infertility problems worldwide. In fact, one fifth of European couples suffer from infertility (1). The prevalence of the disorder in Iran is reported to be 20.2% (2). All over the world and in all cultures, infertility is considered as a stress-

ful critical experience which threatens personal, family, and social stability (3). In Iranian context, a special cultural and religious significance is given to childbearing insomuch that it is considered a cause of divorce (4). Most infertile women suffer increasing stress, because of lack of social and

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economic support and low chance of remarriage. Also, women who have not achieved pregnancy and who have not developed an ability to adapt to their infertility, continue to show signs of post-traumatic stress disorder (5). Although both the number of medically diagnosed infertile women and the number of assisted reproductive technologies in Iran have significantly increased, the emotional effects induced by diagnosis and treatment are not well understood. Psychological intervention would not only promote the mental health of infertile patients, but also increase the chance of a successful treatment. The number of infertility treatment techniques is constantly growing. In spite of being helpful, some of these treatments are stressful for infertile women (6).

The high costs of infertility treatment, concerns about the effectiveness of treatments, and threads about family breakups lead to the reduction of quality of life, emotional, and social problems (7). As childbearing is a strong motivation to continue marital life, infertility and its related stigma are the psychological trauma (8) and the beginning of infertility treatment will be a source of psychological problems for the couples (9, 10). Huang has mentioned infertility as a significant trauma (11). After the acceptance of their infertility, women think of themselves as vulnerable individuals and, therefore, experience the symptoms of posttraumatic stress disorder (PTSD) (12).

In spite of the fact that both men and women may experience infertility, the social biases explain infertility as a problem related to women. For this reason, even in infertilities with a male factor, women face further family and social challenges and bear the stigma and guilt associated with infertility and its related treatments (13). Following the diagnosis of infertility, a traumatic event triggers as soon as the individual is informed of her new condition. The existence of trauma, the duration of chronic stress, and the constant fear are all the symptoms for PTSD (14).

In spite of the importance and high prevalence of the anxiety symptoms related to PTSD in infertile women, these patients are less likely to be treated psychologically. Due to scarcity of studies evaluating the impact of infertility and its treatment, research addressing the psychological consequences of infertility as well as the long-term effects of treatments on infertility is needed to estimate the required time for infertility treatment (15). Moreover, the effects of medical and psychological treatments in these individuals have

been neglected. Therefore, this study was performed in order to determine the relation of PTSD to quality of life and infertile women's stress, considering the type of treatment and reception of psychological interventions.

Methods

The data for this descriptive-analytic study was collected between January and March 2019. The samples of study included the infertile women referred to Qafqaz Infertility Center in Ardabil Province. The inclusion criteria of the study were being married, infertility with female factor, primary infertility, age between 24 and 44, ability to write and read in Persian, time interval more than 12 months and less than 36 months from infertility diagnosis and starting treatment, and participation in more than 6 sessions of using psychological intervention. The exclusion criteria included stressful experience such as the death of an acquaintance within the past 6 months, consumption of psychiatric drugs, and having physical or mental problems (Based on the individual's own claim). Samples were selected with the cooperation of the psychologist and the personnel of the infertility center from the profile of the infertile women referred to Qafqaz Infertility Center.

To determine the size of the sample, Corley-Newman's study (16) with a 2×2 factorial ANOVA and GPower software with 95% confidence and 90% power were used. The sample size was determined to be 172 subjects divided into 4 groups. The first group included subjects who received both surgery treatment and psychological interventions. The second group included those who received surgery but not psychological interventions and the third group included subjects who received non-surgical treatment (Drug and IUI) and psychological interventions. The fourth group received non-surgical treatment (Drug and IUI) but not psychological interventions.

After identifying the eligible subjects for the study, the goals of the study besides the possible benefits and risks were explained and written consent was obtained from participants for protecting autonomy and ensuring confidentiality. Next, women completed The Fertility Quality of Life (FertiQoL) questionnaire, Newton's infertility stress questionnaire, and posttraumatic stress disorder (PCL5) checklist. The present study was approved by the Ethics Committee of Alborz University of Medical Sciences (Ethics code: IR.ABZUMS.REC.1397.201).

Data collection

Posttraumatic stress disorder (PTSD) checklist: This questionnaire (PCL5) which has been designed by American Psychiatric Association is a self-reporting scale. It includes 17 questions. This checklist is based on the total scores in a range of 17-85, and the cutoff score to diagnose posttraumatic stress disorder is 50 in relevant validated samples. For each symptom, there is a 5-point (1-5) score. The validity and reliability of the questionnaire have been confirmed by Weathers et al. (17). The validity and reliability of this questionnaire were confirmed at Shiraz University in Iran in 2001 (18).

The Fertility Quality of Life (FertiQoL) questionnaire: This questionnaire was designed to assess infertile women's quality of life. It contains 36 questions which assess two general domains of infertile women's quality of life. The first domain, including fertility quality of life, contains 4 subclasses, each including 6 questions. The second domain is related to quality of life and infertility treatment which includes 10 questions. The FertiQoL items use a 5-point Likert-type scale (0-4). The higher scores show higher quality of life (19). In Iran, Keramat et al. completed the psychometrics of the questionnaire in Fatemieh Hospital in Hamedan (20).

Newton's infertility stress questionnaire: This is a multi-dimensional instrument designed by Newton et al. in 1999 in London Health Sciences Center. This is a 46-item questionnaire which assesses the concerns of infertile individuals through 5 subscales including social (10 questions), sexual (8 questions), communication (10 questions), not accepting a life without children (8 questions), needing parents (10 questions), and the answers are scored using Likert scale ranging from 1 (Completely disagree) to 6 (Completely agree) (21). This questionnaire was conducted among 30 infertile individuals in Isfahan city and its psychometrics were measured by Alizadeh in Iran in 2005 (22).

Data analysis: In this study, descriptive tests, Pearson correlation, one-way and two-way ANOVA, and linear regression were applied to analyze the data and SPSS software V16 (IBM, USA) was used for calculations.

Results

The results of ANOVA showed that there was not any significant difference between the wom-

en's age ($p=0.12$), husbands age ($p=0.16$), and duration of marriage ($p=0.06$) in 4 study groups, but Tukey post-hoc tests revealed that the duration of infertility treatment in surgery group was significantly longer than the non-surgical group ($p=0.011$); the significant difference can be attributed to the fact that surgery group received drug treatment first, which was then followed by surgery. In addition, the results of chi-square revealed that there was not any significant difference between education level ($p=0.07$), occupation ($p=0.23$), and failures in previous treatment ($p=0.92$) in women who participated in four study groups (Table 1).

The results of two-way analysis of variance showed that there was no significant difference between the type of treatment ($p=0.548$) and the psychological intervention received ($p=0.450$), and the posttraumatic stress disorder in four study groups (Table 2).

The results of Pearson correlation showed that there was an inverse significant relationship between the total score of posttraumatic stress disorder and all aspects of quality of life, except for the domain of interpersonal relationship (Table 3).

The results of Pearson correlation revealed that there was a direct significant relationship between posttraumatic stress disorder and all aspects of Newton's infertility stress questionnaire (Table 4).

In order to determine the strongest variables to predict posttraumatic stress disorder based on quality of life and infertility stress, the linear regression method was used and the results demonstrated that with an increase of one unit in infertility stress, the level of PTSD will increase up to 0.61 and with an increase of one unit in quality of life, the level of PTSD will be reduced to 0.22; moreover, the results of linear regression showed that the quality of life and infertility stress predict 37.3 % of the changes in posttraumatic stress disorder (Table 5).

Discussion

The results of the present study showed that 41.3% of the infertile women participating in the study showed PTSD. Van der Kolk et al. reported the worldwide prevalence of PTSD to be between 10.4 and 48.4% based on different populations experienced different traumas in their lives (23). The incidence rate of PTSD is very high among infertile women as a life threatening trauma.

The results of the present study showed no relationship between PTSD and the type of infertility treatment. A study consider infertility treatment as

Table 1. Demographic characteristics of infertile women participated in 4 study groups

	Surgery + counselling N (%) or (Mean±SD) n=43	Surgery N (%) or (Mean±SD) n=43	Non-surgical (drug and IUI) + counselling N (%) or (Mean±SD) n=43	Non-surgical (drug and IUI) N (%) or (Mean±SD) n=43	p-value
Age of the women (years)	32.6 (5.9)	31.5 (4.4)	32.1 (5.3)	30 (5.5)	0.122 *
Age of the husband (years)	36.9 (5.8)	36.7 (4.6)	36.6 (6.3)	34.5 (6)	0.165 *
Duration of marriage (months)	7.4 (3.5)	6.6 (2.7)	6.8 (3.2)	5.5 (2.2)	0.06 *
Duration of infertility treatment (months)	28.4 (7.8)	26.4 (8.6)	23.8 (8.7)	23 (7.7)	0.011 *
Woman's education					
Elementary	16 (37.2)	8 (18.6)	18 (41.9)	7 (16.3)	0.079 **
Below diploma	14 (32.6)	39.5 (17)	23.2 (10)	18 (41.9)	
University	13 (30.2)	18(41.9)	15(34.9)	18 (41.9)	
Woman's occupation					
Housewife	36 (83.7)	34 (79.1)	35 (81.4)	35 (81.4)	0.234 **
Employee	4 (9.3)	9 (20.9)	7 (16.3)	8 (18.6)	
Self-employment	3 (10)	0	1 (2.3)	0	
Type of infertility treatment					
Drugs	0	0	22 (51.2)	19 (44.2)	0.001 **
IUI	0	0	21 (48.8)	24 (55.8)	
IVF	29 (66.9)	33 (76.7)	0	0	
ICSI	13 (30.2)	9 (20.9)	0	0	
GIFT	1 (2.3)	1 (2.3)	0	0	
Failures in previous treatment					
1	6 (14.3)	7 (16.3)	5 (11.6)	11 (25.6)	0.925 *
2	14 (33.3)	13 (30.2)	18 (41.9)	14 (32.6)	
3	9 (20.9)	9 (20.9)	11 (25.6)	8 (18.6)	
4	10 (23.2)	9 (20.9)	6 (14)	6 (14)	
5	3 (7)	4 (9.3)	3 (7)	4 (9.3)	
6	1 (2.3)	1 (2.3)	0	0	

* ANOVA, ** Fisher exact test

Table 2. Comparison of PTSD based on the type of treatment and reception of psychological interventions

Groups	Mean±SD	F	p-value
Type of treatment + psychological interventions			
Surgical	52.1±22.5	0.08	0.971
Medical	51.9±19.5		
Surgical + psychological interventions	51.3±22.1		
Medical + psychological interventions	50.7±18.2		

Two-way ANOVA

Table 3. The correlation of quality of life with the symptoms of posttraumatic stress disorder

	Re-experience of symptoms from severe traumatic incident r (p)	Emotional numbness r (p)	Intense arousal r (p)	Total score of PTSD r (p)
Emotional	0.11 (0.13)	-0.17 (0.02) *	0.16 (0.03) *	-0.16 (0.001) **
Mental/physical	-0.25 (0.001) **	-0.31 (0.001) **	0.28 (0.001) **	-0.31 (0.001) **
Interpersonal relationship	-0.45 (0.54)	-0.94 (0.006)	-0.13 (0.9)	-0.06 (0.430)
Social relationship	0.28 (0.001) **	-0.39 (0.001) **	0.27 (0.001) **	-0.35 (0.001) **
Total score of life quality related to fertility	0.17 (0.02)	-0.28 (0.001) **	0.22 (0.003) **	-0.25 (0.001) **
Environment	0.40 (0.001) **	-0.53 (0.001) **	-0.38 (0.001) **	-0.48 (0.001) **
Acceptance of treatment	0.41 (0.001) **	-0.49 (0.001) **	-0.40 (0.001) **	-0.48 (0.001) **
Total score of quality of life related to the treatment	0.42 (0.001) **	-0.543 (0.001) **	-0.41 (0.001) **	-0.51 (0.001) **

* p<0.05, ** p<0.001

Table 4. The correlation of Newton’s infertility stress questionnaire with the symptoms of PTSD

	Re-experience of symptoms from severe traumatic incident r (p)	Emotional numbness r (p)	Intense arousal r (p)	Total score of PTSD r (p)
Social	0.53 (0.001) **	0.55 (0.001) **	0.55 (0.001) **	0.59 (0.001) **
Sexual	0.42 (0.001) **	0.49 (0.001) **	0.49 (0.001) **	0.49 (0.001) **
Communication	0.26 (0.001) **	0.32 (0.001) **	0.32 (0.001) **	0.31 (0.001) **
Not accepting a life without children	0.25 (0.001) **	0.28 (0.001) **	0.28 (0.001) **	0.25 (0.001) **
Needing parents	0.36 (0.001) **	0.47 (0.001) **	0.47 (0.001) **	0.46 (0.001) **
Total score of Newton’s questionnaire	0.46 (0.001) **	0.57 (0.001) **	0.57 (0.001) **	0.56 (0.001) **

* p<0.05, ** p<0.001

Table 5. Results of linear regression to predict the variables of PTSD based on quality of life and infertility stress

Predictor variable	B	S.E.	Beta	T	P
Constant value	0.899	5.359		0.168	0.867
Infertility stress	0.617	0.128	0.400	4.812	0.000
Life quality	-0.221	0.068	0.271	3.259	0.001
R ²			0.38		
Adj R ²			0.37		

one of the most complex traumas due to its cyclic nature (24). In another study, it was revealed that the increase in stress levels in women who received infertility treatment can be due to the constant recall of their inability of child bearing and motherhood (25). Results of Corley-New-man’s study showed that there was no significant relationship between the type of treatment and PTSD (16).

In this study, there was not a significant relationship between the reception of psychological interventions and posttraumatic stress disorder. Psychological interventions during infertility treat-

ment not only help the infertile individuals to cope with the mental burden of infertility, but also prevent the risk of anxiety, stress, and the psychological effects of infertility treatment (26). The results of various studies have revealed that the lack of psychological intervention increased the symptoms of PTSD (27, 28). Findings of previous studies are not in line with the current research because psychological interventions and protocols were not the same. In a previous study, the level of PTSD in infertile individuals who had participated in psychological interventions was higher than those who had not participated in those interventions, which can be due to the fact that individuals with higher stress are more interested in receiving psychological interventions (16).

In the current research, there was a direct significant relationship between infertility stress and PTSD. The relationship of the stress and the efforts to receive infertility treatment in individuals with PTSD symptoms was observed in another study (14) and a recently conducted research revealed that the stress level in women receiving

infertility treatment was equal to women with cancer, AIDS, and heart diseases (29).

Moreover, there was an inverse significant relationship between the total score of PTSD and all aspects of quality of life except for the domain of interpersonal communication. Similarly, Huppel-schoten et al. reported that there was an inverse relationship between infertile women's quality of life and posttraumatic stress disorder in conjunction with a direct relationship between the husband's social support and PTSD (30). Infertile women's quality of life is affected by distressing emotions in having children, high costs of infertility treatment, and societal and family pressure. The results of a study showed that the stress resulting from infertility had devastating influences on quality of life and this negative effect in women is higher than in men (31); infertility causes severe reduction of self-confidence, damages body image, and increases the rate of identity disorders in men and women (32). Therefore, infertility is a serious medical problem with consequential negative impacts on quality of life (33).

Addressing and satisfying the psychological needs is one of requirements in order to be successful in infertility treatment as they affect the couples' relationships during treatment; stress, despair, and embarrassment about fertility issues can be destructive elements for the couples' mental health and their relationship (34).

One of the limitations of this study was that all infertile individuals in the study started either non-surgical (IUI-Drug) or surgical treatments. It is suggested to conduct several studies to compare PTSD in those infertile individuals who received infertility treatment with those who did not start this treatment. Another limitation was that the type of psychological intervention for all participants was not the same and the protocols were not clear; therefore, further studies with clear protocols are recommended.

Conclusion

The results of this study showed that 41.3% of infertile women had the symptoms of posttraumatic stress disorder. Although the type of treatment and psychological interventions had no relationship with the symptoms of PTSD, providing regular and designed psychological interventions for infertile individuals is recommended due to significant relationship between PTSD and the quality of life and infertility stress.

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Conflict of Interest

The authors of this study declared no conflict of interest.

References

1. Wdowiak A, Wdowiak A, Moroz E, Bojar I. Comparison of selected sperm parameters between 6,278 males in Poland and Ukraine. *Ann Agric Environ Med.* 2016;23(1):174-81.
2. Akhondi MM, Ranjbar F, Shirzad M, Ardakani ZB, Kamali K, Mohammad K. Practical difficulties in estimating the prevalence of primary infertility in Iran. *Int J Fertil Steril.* 2019;13(2):113-7.
3. Ghasemi Gojani M, Kordi M, Asgharipur N, Amirian M, Esmaeli H, Eskandarnia E. Comparing the effect of positive reappraisal coping intervention on anxiety of waiting period in IUI treatment using problem-solving skills training. *J Mazandaran Univ Med Sci.* 2017;27(149):111-23.
4. Hasanpoor-Azghady SB, Simbar M, Vedadhir AA, Azin SA, Amiri-Farahani L. The social construction of infertility among Iranian infertile women: a qualitative study. *J Reprod Infertil.* 2019;20(3):178-90.
5. Fahami F, Hoseini Quchani S, Ehsanpour S, Zargham A. Women's lived experiences of female infertility. *Iran J Obstet Gynecol Infertil.* 2010;13(4):45-53.
6. Haelyon H. The psychological needs of women undergoing IVF treatment. *J Reprod Stem Cell Biotechnol.* 2010;1(2):212-8.
7. Hesam AA, Taghipour L, Rasekhi S, Fallahi S, Hesam Z. Investigating the multiple aspects of mental health in infertile women. *Int J Mental Health Addict.* 2017;15(4):928-32.
8. Morshed-Behbahani B, Mossalanejad L, Shahsavari S, Dastpak M. The experiences of infertile women on assistant reproductive treatments: a phenomenological study. *Iran Red Crescent Med J.* 2012;14(6):382-3.
9. Luk BH, Loke AY. A review of supportive interventions targeting individuals or couples undergoing infertility treatment: directions for the development of interventions. *J Sex Marital Ther.* 2016;42(6):515-33.
10. Mains L, Zimmerman M, Blaine J, Stegmann B, Sparks A, Ansley T, et al. Achievement test performance in children conceived by IVF. *Hum Reprod.* 2010;25(10):2605-11.

11. Huang JP. The unique challenges in counseling infertile individuals and couples [dissertation]. [US]: University of Minnesota; 2013. 174 p.
12. Edmondson D, Chaudoir SR, Mills MA, Park CL, Holub J, Bartkowiak JM. From shattered assumptions to weakened worldviews: trauma symptoms signal anxiety buffer disruption. *J Loss Trauma*. 2011;16(4):358-85.
13. Karimi FZ, Taghipour A, Latifnejad Roudsari R, Kimiaee SA, Mazloun SR, Amirian M. Psychosocial effects of male infertility in Iranian women: a qualitative study. *Iran J Obstet Gynecol Infertil*. 2016;19(10):20-32.
14. Jaffe J. Reproductive trauma: psychotherapy for pregnancy loss and infertility clients from a reproductive story perspective. *Psychotherapy (Chic)*. 2017;54(4):380-5.
15. Öztürk R, Herbell K, Morton J, Bloom T. "The worst time of my life": treatment-related stress and unmet needs of women living with infertility. *J Community Psychol*. 2021;49(5):1121-33.
16. Corley-Newman A. The relationship between infertility, infertility treatment, therapeutic interventions, and posttraumatic stress disorder [dissertation]: [US]: Walden University; 2017. 149 p.
17. Weathers FW, Litz BT, Herman DS, Huska JA, Keane TM, editors. *The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility*. annual convention of the international society for traumatic stress studies, San Antonio, TX; 1993: San Antonio, TX.
18. Mirzamani MS, Mahmoudi-Gharaei J, Mohammadi MR, Mirzamani SM. Validity of the PTSD symptoms scale self report (PSS-SR) in Iran. *Iran J Psychiatry*. 2007;2(3):120-3.
19. Boivin J, Takefman J, Braverman A. The fertility quality of life (FertiQoL) tool: development and general psychometric properties. *Hum Reprod*. 2011;26(8):2084-91.
20. Keramat A, Masoomi SZ, Mousavi SA, Poorolajal J, Shobeiri F, Hazavhei SMM. Quality of life and its related factors in infertile couples. *J Res Health Sci*. 2014;14(1):57-64.
21. Newton CR, Sherrard W, Glavac I. The fertility problem inventory: measuring perceived infertility-related stress. *Fertil Steril*. 1999;72(1):54-62.
22. Alizadeh T, Farahani MN, Shahraray M, Alizadehan S. The relationship between self esteem and locus of control with infertility related stress of no related infertile men and women. *J Reprod Infertil*. 2005;6(2):194-204.
23. Van der Kolk BA, McFarlane AC, Weisaeth L. Traumatic stress: The effects of overwhelming experience on mind, body, and society. 1st ed. New York: Guilford. 1996. 559 p.
24. Bradow A. Primary and secondary infertility and post traumatic stress disorder: experiential differences between type of infertility and symptom characteristics [dissertation]. [Louisville]: Spalding University; 2011. 405 p.
25. Ranjbar F, Warmelink JC, Gharacheh M. Prenatal attachment in pregnancy following assisted reproductive technology: a literature review. *J Reprod Infant Psychol*. 2020;38(1):86-108.
26. Huppelschoten AG, van Duijnhoven NT, Hermens RP, Verhaak C, Kremer JA, Nelen WL. Improving patient-centeredness of fertility care using a multifaceted approach: study protocol for a randomized controlled trial. *Trials*. 2012;13:175.
27. Frederiksen Y, Farver-Vestergaard I, Skovgård NG, Ingerslev HJ, Zachariae R. Efficacy of psychosocial interventions for psychological and pregnancy outcomes in infertile women and men: a systematic review and meta-analysis. *BMJ Open*. 2015;5(1):e006592.
28. Zaig I, Azem F, Schreiber S, Gottlieb-Litvin Y, Meiboom H, Bloch M. Women's psychological profile and psychiatric diagnoses and the outcome of in vitro fertilization: is there an association? *Arch Women's Mental Health*. 2012;15(5):353-9.
29. Rooney KL, Domar AD. The relationship between stress and infertility. *Dialogues Clin Neurosci*. 2018;20(1):41-7.
30. Huppelschoten AG, Van Dongen A, Verhaak C, Smeenk J, Kremer J, Nelen W. Differences in quality of life and emotional status between infertile women and their partners. *Hum Reprod*. 2013;28(8):2168-76.
31. Péloquin K, Brassard A, Arpin V, Sabourin S, Wright J. Whose fault is it? blame predicting psychological adjustment and couple satisfaction in couples seeking fertility treatment. *J Psychosomatic Obstet Gynecol*. 2018;39(1):64-72.
32. Farzadi L, Ghasemzadeh A, Bahrami Asl Z, Mahinib M, Shirdel H. Intimate partner violence against infertile women. *J Clin Res Gov*. 2014;3(2):147-51.
33. Luk BHK, Loke AY. The impact of infertility on the psychological well-being, marital relationships, sexual relationships, and quality of life of couples: a systematic review. *J Sex Marital Ther*. 2015;41(6):610-25.
34. Ying L, Wu LH, Loke AY. The effects of psychosocial interventions on the mental health, pregnancy rates, and marital function of infertile couples undergoing in vitro fertilization: a systematic review. *J Assist Reprod Genet*. 2016;33(6):689-701.