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Factors Influencing Anxiety in Infertile Women Undergoing IVF/ICSI Treatment

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ABSTRACT

Background & aim: : Infertility can lead to a diminished sense of well-being and is associated with a high frequency of psychosomatic and somatic disorders. Generally, infertile women are more affected by infertility than men. This study aimed to determine factors influencing anxiety among infertile women undergoing in-vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI).

Methods: This cross-sectional study was conducted on 224 infertile women who were candidate for IVF/ICSI referred to Milad IVF Center, Mashhad, Iran, from September 2015 to July 2016. Prior to the treatment, the participants completed the demographic characteristics questionnaire and Beck Anxiety Inventory (BAI) to assess the level of anxiety. Additionally, a self-structured questionnaire containing the infertility-associated data including the duration and cause of infertility as well as history and the duration of treatment, was completed by the respondents. The subjects were selected through purposive sampling technique. Data analysis was performed using Mann-Whitney U, Kruskal-Wallis, Fisher exact test, regression tests, as well as Spearman's correlation coefficient in SPSS software, version 16.

Results: The results obtained from BAI showed that 38.4% of the subjects had moderate anxiety. There was a significant relationship between the level of anxiety and age (P=0.001), the cause of infertility (P=0.007), and the duration of treatment (P=0.001).

Conclusion: As the level of anxiety was higher in infertile women with younger age, female factor infertility and longer duration of treatment, it is recommended to consider this population more vulnerable and to provide them supportive counseling to be able to overcome their anxiety.

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Introduction

Infertility may decrease the sense of well-being and is associated to a high frequency of psychosomatic and somatic disorders. According to the literature, generally, women are more affected by infertility than men, and they cope with it differently. Furthermore, Khayata et al. showed the importance of childbearing and the stresses exerted on infertile women in Eastern societies (1).

In addition, Cousineau stated that infertility is as stressful as a severe disorder such as cancer (2). The results of a study conducted by Ben-non

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revealed that treatment program and its failure both were associated with increased level of anxiety (3). Nourani et al. demonstrated that infertility was an important problem in the field of reproductive health. Although infertility is not considered as a disease, it can lead to emotional disorders and psychosocial consequences (4).

Chen et al. in 2004 assessed the prevalence of anxiety and depressive disorders in assisted fertility clinic. The results of the mentioned study determined that the prevalence of generalized anxiety disorders was 23.2% (5). Regarding the results of a study carried out by Yasini et al. in 2005, the majority of women had moderate (76%) and severe (12%) anxiety (6). Both treatment process and treatment outcomes are stressful and it is indicated that infertility can lead to psychological disorders (7, 8).

Several studies were performed to assess the relationship between severe anxiety and in-vitro fertilization (IVF) outcome. According to the results of Clerk's study, age, the duration of infertility, and the cause of infertility were independent predictors of live birth (9). Nevertheless, several studies failed to confirm this relationship (10, 11). The results of the study conducted by Ebbsen's et al. showed that some of the most stressful life events were related to disease and treatment modalities including the duration of infertility and its cause.

The negative effects of these factors on the quality of life might cause chronic stress, which could reduce the chances of IVF success (12). The effective factors on anxiety in these patients affect the treatment outcomes. As Beutel et al. in 1999 indicated, there was no significant relationship between anxiety and age, the cause of infertility, and education level (13). Abedinia in 2003 conducted a study and concluded that anxiety had a significant relationship with the duration of infertility and occupation (P=0.048, P=0.047, respectively).

Nonetheless, no significant relationship was found between educational level and the cause of infertility with anxiety (14). However, Domar in 1990 showed that the increased level of anxiety was dependent on the duration of infertility (15). Considering the inconsistency of the results of various studies, the effect of infertile women's anxiety on the treatment outcomes, and the importance of childbearing in Iran, this study sought to investigate the factors affecting anxiety in infertile women referred to Milad Infertility Center, Mashhad, Iran.

Materials and Methods

This cross-sectional study was conducted on the women undergoing intracytoplasmic sperm injection (ICSI) as an additional part of an IVF treatment cycle at Milad Infertility Center affiliated to Mashhad University of Medical Sciences, Mashhad, Iran. After performing the preliminary study, the required sample size was computed using the following formula.

$$n = \frac{pq\left(z1-\frac{\alpha}{2}\right)^2}{d^2}$$

P=0.83
P-1= 0.17
$z1-\frac{\alpha}{2}$=1.96
d=0.05

The sample size was calculated as 217, and considering the 5% sample attrition, the final sample size was estimated to be 227 individuals. Regarding the fact that three samples incompletely filled the Beck Anxiety questionnaire, they excluded from the study. Ultimately, the present study was conducted on 224 women from September 2015 to August 2016. Prior to the treatment, the participants completed the demographic form, Beck Anxiety Inventory, and infertility variables questionnaire (16).

The demographic variables included age, education level, occupation, spouse's occupation, and residence status. In addition, the infertility-related variables entailed the duration of infertility, the duration of treatment, the cause of infertility, and the history of applied infertility treatments. There are three types of infertility including male, female, and combined infertility. The Iranian women aged between 20 and 45 years old with female or male and primary infertility undergoing IVF/ICSI treatment were included in this study.

The exclusion criteria included the use of antidepressants and/or anxiolytics and the history of psychological disorders. In the current

study, the Persian version of the Beck Anxiety Inventory was used to determine the level of anxiety in infertile women (17). The content validity of the questionnaire was calculated as 0.98 and Cronbach's alpha was 0.85 that was similar to that of Hashemieh's study (17).

This inventory contained 21 items; each item was scored from 0 (no anxiety) to 3 (severe anxiety). Therefore, the total score was ranged between 0 and 63. The total score of 0-7, 8-15, 16-25, and more than 26 were considered as without anxiety, mild anxiety, moderate anxiety, and severe anxiety, respectively.

Statistical Analysis

Data analysis was performed using descriptive statistics (mean and standard deviation) Spearman's correlation coefficient, Fisher Exact, Mann Whitney U, Kruskal-Wallis, and regression tests in SPSS software, version 16. In all the measurements, P-value less than 0.05 was considered statistically significant.

Ethical Considerations

This study was approved by the Ethics Committee of Mashhad University of Medical Sciences, Mashhad, Iran (No. IR.MUMS.REC. 1394.313).

Results

This study was conducted on 224 infertile women with the mean age of 31.05±5.39 years old. In this study, only 11.2% of the patients had severe anxiety. The mean score of anxiety was 16.21±9.05 ranging from 0 to 45. In the present study, the variables of age, the duration of treatment, and the level of anxiety were not normally distributed. Additionally, it was found that 9.8%, 17%, 4%, 2.2%, 20.1%, 0.9%, 3.1%, 1.8%, and 0.4% of the subjects had the history of ovulation induction, intrauterine insemination (IUI), IVF, ICSI, ovulation induction and IUI, treatment with four methods (ovulation, IUI, IVF, and ICSI), treatment with three methods (induction ovulation, IUI, and IVF), induction ovulation and IVF, and treatment with three methods (ovulation induction, IUI, and ICSI), respectively.

Moreover, 34.8% of the patients had no history of treatment. According to the results obtained by Fisher's exact test, there was no significant relationship between age and anxiety level (Table 1). Kruskal-Wallis test was used to determine the relationship between anxiety and age, spouse's occupation, educational level, residence status, and the type and duration of infertility. Mann-Whitney U test was applied to determine the relationship between anxiety, occupation, and previous treatments.

Regarding the results, there was a significant relationship between age and anxiety levels (P=0.001). However, there was no significant relationship between occupation, spouse's occupation, educational level, and residence status with anxiety (Table 2). There was a significant relationship between the type of infertility and anxiety levels (P=0.007). Furthermore, a significant relationship was observed between no history of treatment and anxiety levels (P=0.005).

Table 1. Relationship between age groups and anxiety levels

Age groups	Anxiety levels			
	Severe anxiety (N) %	Moderate anxiety (N) %	Mild anxiety (N) %	Without anxiety (N) %
20-25	(5) 20%	(13) 15.1%	(9) 13.4%	(3) 6.5%
26-30	(12) 48%	(37) 43%	(16) 23.9%	(13) 28.3%
31-35	(5) 20%	(20) 23.3%	(27) 40.3%	(16) 34.8%
36-40	(12) 3%	(14) 16.3%	(12) 17.9%	(9) 19.6%
41-45	(0) 0%	(2) 2.3%	(3) 4.5%	(5) 10.9%
Total	(25) 100%	(86) 100%	(67) 100%	(46) 100%
Fisher's exact test	11.90=f P=0.001			

Table 2. Relationship between demographic variables and anxiety

Variables	Median (Interquartile range)	Test results
Age groups		
20-25	22 (3.25)	P=0.001*

26-30	28 (2)	χ^2=18.28
31-35	32 (3)	
36-40	38 (2)	
41-45	42 (3)	
Occupation		
Housewife	3 (1)	P=0.97**
Employee	2 (1)	z=-0.37
Spouse's occupation		
Employee	3 (1)	P= 0.53*
Unemployed	3 (1)	χ^2=1.25
Other	2 (1)	
Educational level		
Elementary	2 (2)	
Guidance school	2.5 (1.75)	P= 0.18*
High school	3 (1)	χ^2= 4.87
Academic	2 (1)	
Residence status		
Householder	2 (1)	P=0.052
Tenant	2 (1)	χ^2=5.91*
With parents	3 (0.00)	

* Kruskal-Wallis test
** Mann-Whitney U test

Table 3. Relationship between infertility-related variables and anxiety

Infertility-related variables	Median (interquartile range)	Test results
Etiology of infertility		
Female	3 (1)	P=0.007*
Male	2 (2)	χ^2=9.83
Combined	2 (1)	
History of treatment		
No	3 (1)	P=0.005**
Yes	2 (2)	z=-2.82

* Kruskal-Wallis test
** Mann-Whitney U test

The Spearman's correlation coefficient was used to determine the correlation between the duration of treatment and anxiety levels, which revealed a significant correlation (P=0.001, r=0.22). Therefore, in infertile women, the level of anxiety increased along with the duration of treatment. The Kruskal-Wallis test demonstrated no significant relationship between the duration of infertility and anxiety levels (P=0.64, χ^2=1.68; Table 3).

Linear regression test was used to determine the relationship between independent variables and anxiety level, as a dependent variable, for each subject. The independent variables consisted of residence status, age, the duration of treatment, the type of infertility, no history of treatment, and educational level. Then, the patients without any history of treatment and those who had low educational level were excluded by backward method (P=0.15 and P=0.58, respectively). Thereafter, final model was used to determine the relationship between the variables. Independent variables such as residence status, age, the duration of treatment, and the type of infertility were effective on the anxiety levels of the participants (Table 4).

Table 4. Effect of residence status, age groups, type of infertility, and duration of treatment on anxiety

Independent variables	Not standardized correlation coefficient	standardized coefficient	T	P-value

	B	Standard deviation	B		
Residence status	1.89	0.87	0.13	2.16	0.03
Age groups	-2.95	0.55	-0.34	-5.37	<0.001
Etiology of infertility	-2.95	0.9	-0.2	-3.27	0.001
Duration of treatment	0.51	0.16	0.2	3.24	0.001

Discussion

According to the results of the present study, there was a significant relationship between age and anxiety level among infertile women undergoing IVF/ICSI (P=0.001). However, no significant relationship was found between age and anxiety levels. In this study, the majority of the participants aged between 26 and 30 years old (38.4%) had moderate anxiety. Our findings were inconsistent with the results obtained by Simbar et al. in 2010, Beutel et al. in 1999, and Hashemieh et al. in 2013 (13, 17, 18). Regarding the results of Simbar's study, the mean levels of apparent and hidden anxiety in infertile women were 47.33 and 43.89, respectively, and there was no significant difference between the subjects in terms of age. Simbar et al. in their study used the State-Trait Anxiety Inventory to measure anxiety levels that might affect the results (18). The results of Hashemieh's study revealed that most of the subjects had mild anxiety (34%) (17).

In our study, there was no significant relationship between the duration of infertility and anxiety level (P=0.64). This result was contrary to those of the studies conducted by Domar and Abedinia in 2003 and Hashemieh and Ramezanzadeh in 2004, which indicated a significant relationship between the duration of infertility and anxiety level (14, 15, 17, 19).

In our study, there was a significant relationship between the type of infertility and anxiety level (P=0.007), while Ramezanzadeh et al., Beutel, Abedinia et al., and Simbar et al. found no significant relationship between these variables (13, 14, 18, 19).

In our study, there was a significant relationship between no history of treatment and anxiety level (P=0.005). Nevertheless, there was no significant relationship between the history of using treatment methods and anxiety levels, which was contrary to the results of Hashemieh and Maroufizadeh in 2015 (17, 20). This inconsistency might be due to different instruments. Maroufizadeh et al. used Hospital Anxiety and Depression Scale (20).

In the present study, there was no significant relationship between women's and their spouses' occupation with anxiety levels, which was in agreement with the results of Ramazanzadeh's study and contrary to the results of Abedinia et al. (14, 19). Considering the results of Abedinia's study, housewives were more anxious than employed ones; nonetheless, a significant relationship was observed by Ramezanzadeh. Abedienia et al. used 16-items Personality Factors Questionnaire to determine the level of anxiety, which can cause the inconsistency between their results with the results of the current study.

In this study, there was no significant relationship between educational level and anxiety levels, which was in line with the results of the study conducted by Abedinia and Beutel (13, 14). Furthermore, there was no significant relationship between the residence status and anxiety levels (P=0.052). To the best of our knowledge, there was no study carried out into these variables to compare the results.

Transferability was one of the strengths of this study, which was due to the fact that all the participants were from east and northeast of Iran and Milad IVF Center is the only academic center in this region. Therefore, this Center covers a wide range of infertile people.

Conclusion

According to the results of this study, anxiety among infertile women was more affected by age, the type of infertility, and the duration of treatment. The level of anxiety decreases with age advancing. In addition, female infertility causes higher levels of anxiety in women in comparison to male factor. Additionally, the level of anxiety increases along with the duration of treatment. It is recommended to evaluate the level of anxiety using reliable screening tools such as Beck Anxiety Inventory in infertile women to prevent its complications by

identifying the etiology and eliminating it. There were various factors affecting the level of anxiety in infertile women including family support, family income, and cultural beliefs on childbearing. Accordingly, providing appropriate psychological and medical counseling and necessary information about reproductive system physiology, the causes of infertility, treatment process, and its adverse effects could greatly diminish anxiety in these patients.

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Conflicts of interest

The authors declare no conflicts of interest.

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