Psychological Disorders among Iranian Infertile Couples Undergoing Assisted Reproductive Technology (ART)

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Abstract
Background: Worldwide, infertility affects 10%-15% of couples and most of them seek medical help including Assisted Reproductive Technology (ART) treatments. Undergoing ART treatments create many physical and emotional burdens. This study examined the psychological consequences of infertility in Iranian infertile males and females as well as their spouses, unlike previous studies that examined mainly females with infertility.

Methods: Subjects in this descriptive analytical design were recruited from the IVF Department of Mirza Koochak Khan Hospital and the Rouyesh Infertility Treatment Center of Tehran, Iran between Aug 2014 and Sep 2015. Overall, 256 couples (64% response rate), consisting of 78 infertile male and their spouses and 50 infertile female and their spouses, were included in this research. The psychological disorders were measured by the Persian version of Symptoms Checklist-90-Revised and Cattle Inventory.

Results: Psychological disorders of infertile couples are significantly associated with increasing age, higher education, longer duration of infertility and unemployment (P<0.05). Prevalence of anxiety, depression, hypochondriasis and paranoia in infertile females and spouses of infertile males were significantly higher than husbands of infertile females (P<0.05). Obsession was more severe in infertile females was significantly greater than infertile males (P=0.01). Depression was significantly lower in infertile males than their spouses (P=0.016).

Conclusion: Iranian infertile females and spouses of infertile males experienced more psychological disorders than infertile males and spouses of infertile females. These results may be due to the impact of cultural beliefs and gender roles in Iranian society. Anxiety, depression, obsession, paranoia and hypochondriasis should be addressed before any ART treatments.

Keywords: Infertility, Psychological disorders, Assisted reproductive technology (ART)

Introduction

Infertility is a serious and prevalent health problem in developing countries (1). It inflicts 10%-15% of couples trying for a child (2, 3) and the trend is increasing in many societies and industrialized countries (4). It is defined as the unsuccessful attempts to attain a pregnancy after one year or more of unprotected intercourse (5). The causes of infertility may be categorized into three main groups: 1) the male factors, 2) the female factors and 3) both female and male factors or unknown causes (6). About 30%-40% of factors were related to males. The possible risk factors in females included tubal and peritoneal pathology (30%-40%), ovulatory dysfunctions (15%). The remaining 5% was attributed to uterine pathology and other unknown causes (6). Several factors
affecting fertility rates involve the enhanced presence of females in employment and higher education, partnership’s inconsistency, delayed childbearing, values’ change and increasing economic difficulties (7). In Iran, 78.4% of the couples suffer from primary infertility and 21.6% suffer from secondary infertility. Percentage distribution of gender infertility contribution was 34.0% in male factor, 43.5% in female factor, 17.1% in both male and female factors and the remaining 8.1% was related to unknown causes (8).

Couples suffering fertility problem often seek medical help including assisted reproductive technology (ART) treatments (9). During the past 10 years, the number of females treated with ART had raised (10). An estimated 5 million babies and more had been born throughout the world ever since the first successful IVF baby was delivered (11). Thus, many infertile couples have been found treatment with ART helpful (12). However, undergoing ART treatments do create many physical, economic and emotional burdens (13-15). Several studies have examined the psychological consequences associated with infertility treatments (15-37). Some of them have found correlations between distress, mostly anxiety, and depression, and low ART treatment outcomes (32-38). However, a handful of studies had not reported such correlations (39-42).

In addition, psychological problems of infertile couples are correlated with age, employment, education, duration of infertility and gender. For example, depression among infertile females was directly related to age and longer duration of infertility (19, 22, 24, 43). Infertile housewives were exposed to a higher risk of developing psychiatric disorders than working infertile females (15). Infertility could be a very stressful and distressing experience, particularly in females (38, 44-49). Females will be more affected by the social burden of the treatment and less affected by any changes in the interpersonal functioning of the couples; while husbands were more concerned about the couples’ relationship and interpersonal strategies rather than the cost of the treatment (50).

Although there are many studies on psychological distress among females with infertility (10, 13, 15, 16, 19, 21, 29, 31-33, 37, 51, 52), studies examining both partners’ psychological distress status in infertile couples have not been reported. This study examined the psychological impact of infertility in both Iranian infertile males and females as well as in their spouses.

Materials and Methods

Participants
A total of 256 couples, consisting of 78 infertile male (IM) and their spouses and 50 infertile female (IF) and their spouses, were included in this analytical and descriptive study from 400 couples undergoing ART treatment at the IVF department of Mirza Koochak Khan Hospital and the Rouyesh Infertility Treatment Center, Tehran, Iran. Couples referred to two centers between Aug 2014 and Sep 2015 got both verbal and written detailed information about the study. The couples were recruited by convenience sampling during the study period. The inclusion criteria were: 1) willingness to participate in the study and 2) ability to complete independently the study questionnaires. Patients were excluded if they used treatment other than IVF and ICSI such as IUI and had not completed the questionnaire.

Procedure
The questionnaires package was given to the couples who agreed to participate in the study. Informed written consents were obtained from all couples. Demographic information like age, gender, education and duration of infertility were included.

The study was approved by the Research Ethics Committee of the University of Social Welfare and Rehabilitation sciences (via approval No. USWR.REC.239 Dated July 2014), Tehran, Iran.

Measurements
The Symptom Checklist-90-Revised (SCL-90-R)
Leonard R. Derogatis (1970s) developed the SCL-90-R. It is a self-report symptom inventory to measure psychological symptoms and distress
(53). It contains 90 items using a five-point scale, with responses ranging from zero (not at all) to four (extremely). The SCL-90-R assesses psychological distress in terms of nine primary symptom dimensions. Somatization, Interpersonal Sensitivity, Obsessive-Compulsive, Depression, Anxiety, Hostility, Paranoid Ideation, Phobic Anxiety, and Psychoticism are the nine dimensions. The internal consistency reliability for the 9 subscales was 0.36-0.73 in SCL-90-R (53).

In this study, the Persian translated version of Symptoms Checklist-90-Revised (SCL-90-R) was used. The Cronbach's Alpha coefficient for the Persian version was 0.72 and its' inter-rater reliability was 0.80. The participants are to answer the questions. Then total scores derived from the Persian version of SCL-90-R. An average of ≥1 and ≥3 represent psychological disorder, and psychotic and depression, respectively.

The Cattle Inventory (CI)
The CI is a self-report measure of anxiety. It contains 40 items using a three-point scale, with responses ranging from zero to two. Scores were ranged from zero to 80, with scores of 28 or more indicating anxiety. Classification of anxiety scores involves 0-27 (without anxiety), 28-40 (moderate anxiety), 41-49 (neurotic anxiety) and 50-80 (severe anxiety). The CI utilized in this study is Iranian validated version (54).

**Table 1: Demographic characteristics of study participants (n=256)**

| Characteristic                      | Infertile Female (IF) | Spouses of IF | Infertile Male (IM) | Spouses of IM |
|-------------------------------------|-----------------------|---------------|---------------------|--------------|
|                                     | N        | Mean | SD   | n    | Mean | SD   | n    | Mean | SD   |
| **Education**                      |          |      |      |      |      |      |      |      |      |
| Lower Diploma                      | 26 | 82%  | 19   | 36.8% | 22 | 28.2% | 26 | 33.3% |
| Higher Diploma                     | 24 | 48%  | 31   | 63.2% | 56 | 71.8% | 52 | 66.7% |
| Duration of infertility per year (SD) | 5.9 (4.19) | 5.9 (4.19) | 5.5 (2.76) | 5.5 (2.76) |
| **Psychological Variables**        |          |      |      |      |      |      |      |      |
| Anxiety (SCL-90-R)                 | 50 | 1.6  | 1.15 | 50 | 1.17 | 0.68 | 78 | 1.3  | 0.75 | 78 | 1.41 | 0.82 |
| Depression                         | 50 | 1.44 | 0.94 | 50 | 0.95 | 0.71 | 78 | 1.18 | 0.73 | 78 | 1.55 | 0.69 |
| Hypochondriasis                    | 50 | 1.36 | 0.83 | 50 | 1.24 | 0.63 | 78 | 1.33 | 0.73 | 78 | 1.37 | 0.67 |
| Obsession                          | 50 | 1.57 | 0.90 | 50 | 1.03 | 0.69 | 78 | 1.16 | 0.73 | 78 | 1.42 | 0.73 |
| Compulsion                         | 50 | 1.43 | 0.83 | 50 | 0.92 | 0.8  | 78 | 1.26 | 0.78 | 78 | 1.33 | 0.62 |
| Aggression                         | 50 | 1.32 | 0.89 | 50 | 1.01 | 0.85 | 78 | 1.19 | 0.86 | 78 | 1.25 | 0.92 |
| Paranoia                           | 50 | 1.71 | 0.89 | 50 | 1.2  | 0.72 | 78 | 1.57 | 0.77 | 78 | 1.7  | 0.79 |
| Phobia                             | 50 | 1.3  | 1.36 | 50 | 0.84 | 1.1  | 78 | 0.81 | 0.84 | 78 | 0.86 | 0.82 |

**Results**

Of the 400 couples, 144 cases had not completed the questionnaires. Their data were excluded from the final analyses. This led to 256 couples in the final sample. The mean age of IM, IF and spouses of IF in this study were 31.68 yr (±3.43), 28.42 yr (±4.87), 28.3 yr (±5.96) and 33.37 yr (±5.98), respectively. The majority of the participants had high level of university education (63.92%) (Table 1).
The mean score of psychological symptoms (SCL-90-R) among four groups was greater than one except for depression, compulsion, phobia and psychotics in spouses of IF and phobia in IM and their spouses (an average of ≥1 represents psychological disorder). The findings of the Cattle Inventory indicated that anxiety was moderate in all four groups. The psychological disorders were examined in four groups by using MANOVA test (Table 2).

### Table 2: Effects of psychological variables (SCL-90-R) between infertile groups and their spouses

| Variables       | Group1               | Group2               | Mean Difference | SD  | P-value |
|-----------------|----------------------|----------------------|-----------------|-----|---------|
| Anxiety         | Spouses of IF        | IM                   | -3.12           | 1.49| 0.035   |
|                 |                      | Spouses of IM        | -5.21           | 1.149| 0.0001  |
|                 |                      | IF                   | -4.31           | 1.267| 0.004   |
| Depression      | Spouses of IF        | IM                   | -0.59           | 0.139| 0.001   |
|                 |                      | Spouses of IM        | -0.59           | 0.139| 0.001   |
| Obsession       | Spouses of IF        | IM                   | -0.36           | 0.123| 0.016   |
|                 |                      | IF                   | -0.42           | 0.138| 0.01    |
| Hypochondriasis | Spouses of IF        | IM                   | -0.412          | 0.136| 0.014   |
|                 |                      | Spouses of IM        | -0.51           | 0.156| 0.014   |
| Paranoia        | Spouses of IF        | IM                   | -0.458          | 0.144| 0.009   |
|                 |                      | Spouses of IM        | -0.50           | 0.144| 0.003   |
|                 |                      | IF                   | -0.59           | 0.144| 0.001   |

MANOVA test was used for comparison among four groups.

### Table 3: Results of stepwise regression analysis of anxiety by psychological variables (SCL-90-R) among four groups

| Groups            | Criterion Variable | Regression Variables | R (β) | R²     | P-value | F    |
|-------------------|--------------------|----------------------|-------|--------|---------|------|
| Infertile male (IM) | Anxiety           | Depression           | 0.531 | 0.281  | 0.0001  | 29.8 |
| Spouses of IM     | Anxiety           | Paranoia             | 0.36  | 0.13   | 0.0001  | 11.33|
| Infertile female (IF) | Anxiety      | Psychotics           | 0.51  | 0.256  | 0.0001  | 16.5 |
| Spouses of IF     | Anxiety           | Hypochondriasis      | 0.311 | 0.097  | 0.029   | 5.48 |
|                   |                   | Phobia               | 0.501 | 0.251  | 0.0001  | 7.71 |
|                   |                   | Depression           | 0.56  | 0.313  | 0.0001  | 6.83 |

**Infertile Male (IM)**

There was significant correlation between depression and anxiety in infertile males (P=0.0001, R=0.531) (Table 3). Stepwise regression analysis indicated that higher education significantly predicted 18% of anxiety (P=0.0001), 8% of depression (P=0.034) and 22% of paranoia (P=0.0001) (Table 4). In addition, increasing age significantly
identify 8.2% of obsession ($P=0.032$) and 12% of paranoia ($P=0.00007$) (Table 4).

**Table 4:** Results of stepwise regression analysis of psychological variables (SCL-90-R) in infertile groups and their spouses

| Groups               | Criterion Variable | Regression Variables | $R$ ($\beta$) | $R^2$ | $P$-value | $F$  |
|----------------------|--------------------|----------------------|---------------|-------|-----------|------|
| Infertile male (IM)  | Anxiety            | Education            | 0.433         | 0.187 | 0.0001    | 12.44|
|                      | Depression         | Education            | 0.284         | 0.08  | 0.034     | 4.75 |
|                      | Paranoia           | Education            | 0.469         | 0.22  | 0.0001    | 7.5  |
|                      | Obsession          | Age                  | 0.286         | 0.082 | 0.032     | 4.8  |
|                      | Paranoia           | Age                  | 0.357         | 0.127 | 0.00007   | 7.88 |
| Spouses of IM        | Obsession          | Age                  | 0.301         | 0.091 | 0.032     | 4.88 |
|                      | Hypochondriasis    | Age                  | 0.28          | 0.079 | 0.046     | 4.18 |
|                      | Psychotics         | Age                  | 0.297         | 0.088 | 0.034     | 4.75 |
| Infertile female (IF)| Anxiety            | Duration of Infertility | 0.432      | 0.187 | 0.022     | 5.97 |
|                      | Depression         | Duration of Infertility | 0.506      | 0.256 | 0.0006    | 8.96 |
|                      | Psychotics         | Age                  | 0.576         | 0.332 | 0.00006   | 6.22 |
|                      | Anxiety            | Age                  | 0.607         | 0.37  | 0.00003   | 7.31 |
|                      | Aggression         | Age                  | 0.451         | 0.204 | 0.00006   | 6.64 |
|                      | Psychotics         | Employment           | 0.389         | 0.151 | 0.04      | 4.63 |
|                      | Anxiety            | Employment           | 0.539         | 0.291 | 0.014     | 5.13 |
|                      | Paranoia           | Employment           | 0.523         | 0.273 | 0.0004    | 9.78 |
|                      | Hypochondriasis    | Employment           | 0.512         | 0.262 | 0.0005    | 9.24 |

**Spouses of IM**

There was significant correlation between paranoia and anxiety in spouses of IM ($P=0.0001$, $R=0.36$) (Table 3). Stepwise regression analysis showed that increasing age significantly predicted 9% of obsession ($P=0.032$), 7.9% of hypochondriasis ($P=0.046$) and 8.8% of psychotics ($P=0.034$) (Table 4).

**Infertile Female (IF)**

There was significant correlation between psychotics and anxiety in IF ($P=0.0001$, $R=0.51$) (Table 3). Stepwise regression analysis indicated that 18% of anxiety ($P=0.022$) and 25% of depression ($P=0.0006$) have been predicted by duration of infertility. Increasing age significantly identify 33% of psychotics ($P=0.00006$), 37% of anxiety ($P=0.00003$) and 20% of aggression ($P=0.00006$). In addition, employment significantly predicted 15.1% of psychotics ($P=0.04$), 29.1% of anxiety ($P=0.014$), 27.3% of paranoia ($P=0.0004$) and 26.2% of hypochondriasis ($P=0.0005$) (Table 4).

**Spouses of IF**

There was significant correlation between anxiety and hypochondriasis in spouses of IF ($P=0.029$, $R=0.31$), phobia ($P=0.0001$, $R=0.501$) and depression ($P=0.0001$, $R=0.56$) (Table 3).

**Discussion**

Reproduction is one of the vital and natural human goals for survival of every society and when childbearing seems impossible, probable psychological crisis begins (55). This study showed that Iranian infertile females and spouses of infertile males experienced more psychological disorders than infertile males and spouses of infertile females. Anxiety, depression, hypochondriasis and paranoia in infertile females and spouses of infertile males were significantly higher than husbands of infertile females. Obsession in infertile females was higher than infertile males. Depression was...
significantly lower in infertile males than their spouses were. Thus, in Iranian society, husbands of infertile females may have extended coping abilities to better control the concerns of their situation. While females cope with infertility less well, even if they were not the source and cause of infertility. Cultural beliefs, gender roles, and traditional society may be important risk factors for infertile couples psychologically. Our results concurred with previous studies examining females bearing the major burden of infertility psychologically, even when they know there is a male cause (56-58). These results thus expand previous findings pertaining to infertility and psychological consequences of infertility (44-49).

In addition, higher education was associated with increased anxiety and depression in infertile males. Anxiety and depression in infertile females were worsened by increasing age and longer duration of infertility. Our study results are in accordance with previous studies (19, 22, 24, 43, 59, 60). Increasing age resulted in increased obsession and hypochondriasis in infertile males and increased psychotics and aggression in infertile females. Increased anxiety and psychotics are associated with unemployment in infertile females. Our result is consistent with other study in Iran (15).

Previous studies have examined enhanced risk of depression, anxiety, mood disorders and psychiatric disorders mainly in females with infertility (10, 15, 20, 21, 35-37). Until recently, most studies are limited to clinic samples seeking and receiving treatment. The enhanced risk indicated major diversity probably because of considerable differences in methodology and study design. Our study design varies from previous studies since most studies have not compared infertility problems of Iranian infertile females and males according to their spouses’ status.

This study had some limitations. First, since the researchers had relied on convenience samples drawn from only two clinic samples and not a multi-central trial, generalizing to entire Tehran city may be limited. Second, because it is drawn from only Iranian couples, generalizing to other ethnic minority and even non-city dwellers may be limited.

Conclusion

Regardless of infertility factors, females were more vulnerable to psychological disorders. Childbearing inability was always attributed to women. They were blamed and held responsible for infertility even if they are not the cause. These results may be due to differences in cultural beliefs in Iranian society, as well as the gender roles of Iranian females compared to males. It had been suggested that psychological counseling and cognitive behavioral therapy (CBT) prior to ART treatment might help to reduce psychological distress in couples undergoing infertility treatment and increase the possibility of pregnancy. Future studies should investigate how the recommended psychological therapies are effective in reducing psychological distress in couples undergoing ART treatment as well as how these interventions affect pregnancy rate. The other area that needs further research is the psychological profile of non-treatment seekers and non-clinic samples in bigger scale.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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References

Available at:  http://ijph.tums.ac.ir
1. World Health Organization (2002). Current practices and controversies in assisted reproduction. Report of meeting on “Medical, Ethical and Social Aspects of Assisted Reproduction. WHO Headquarters Geneva, Switzerland.

2. Evers JL (2002). Female subfertility. *Lancet*, 360 (9327): 151-9.

3. Bonde JPE, Olsen J (2008). Interpreting trends in fecundity over time. *BMJ*, 336 (7640): 339-40.

4. Skakkebaek NE, Jørgensen N, Main KM, Rajpert-De Meyts E, Jeppesen E, Andersen AM, Juul A, Carlsen E, Mortensen GK, Jensen TK, Tønnesen J (2006). Is human fecundity declining? *Int J Androl*, 29 (1): 2-11.

5. Zegers-Hochschild F, Adamson GD, de Mouzon J, Ishihara O, Mansour R, Nygren K, Sullivan E, VanderPoel S (2009). International committee for monitoring assisted reproductive technology (ICMART) and the world health organization (WHO) revised glossary on ART terminology, 2009. *Fertil Steril*, 92 (5): 1520-4.

6. Speroff L, Fritz MA (2005). *Clinical gynecologic endocrinology and infertility*. 7th ed. Lippincott Williams & Wilkins, USA, pp.: 1027-8.

7. ESHRE Capri Workshop Group (2010). Europe the continent with the lowest fertility. *Hum Reprod Update*, 16 (6): 590-602.

8. Parsanezhad ME, Jahromi BN, Zare N, Keramati P, Khalili A, Parsa-Nezhad M (2013). Epidemiology and etiology of infertility in Iran, systematic review and meta-analysis. *J Womens' Health, Issues Care*, 2 (6): 1-6.

9. Schmidt L, Münster K, Helm P (1995). Infertility and the seeking of infertility treatment in a representative population. *Br J Obstet Gynaecol*, 102 (12): 978-84.

10. Baklund-Felskov B, Kjær SK, Albieri V, Steding-Jessen M, Kjær T, Johansen C, Dalton SO, Jensen A (2013). Psychiatric disorders in women with fertility problems: results from a large Danish register-based cohort study. *Hum Reprod*, 28 (3): 683-90.

11. Anonymous (2012). European Society of Human Reproduction and Embryology. The world's number of IVF and ICSI babies has now reached a calculated total of 5 million. Press release. http://www.meditex-software.com/index.php/en/news/74-the-worlds-number-of-ivf-and-icsi-babies-has-now-reached-a-calculated-total-of-5-million

12. Inhorn MC (2009). Right to Assisted Reproductive technology: overcoming infertility in low-resource countries. *Int J Gynaecol Obstet*, 106 (2): 172-4.

13. Klonoff-Cohen H, Chu E, Natarajan L, Sieber W (2001). A prospective study of stress among women undergoing in vitro fertilization or gamete intrafallopian transfer. *Fertil Steril*, 76 (4): 675-87.

14. Cwikel J, Gidron Y, Sheiner E (2004). Psychological interactions with infertility among women. *Eur J Obstet Gynecol Reprod Biol*, 117 (2): 126-31.

15. Noorbala AA, Ramezanadeh F, Abedinia N, Naghizadeh MM (2009). Psychiatric disorders among infertile and fertile women. *Southeast Asian J Trop Med Public Health*, 44 (7): 587-91.

16. Eusinger A, Vingerhoets A (1999). Psychological aspects of in vitro fertilization: a review. *Southeast Asian J Trop Med Public Health*, 48 (5): 575-89.

17. Kee BS, Jung BJ, Lee SH (2000). A study on psychological strain in IVF patients. *J Assist Reprod Genet*, 17 (8): 445-8.

18. Hammarberg K, Astbury J, Baker H (2001). Women's experience of IVF: a follow-up study. *Hum Reprod*, 16 (2): 374-83.

19. Lok IH, Lee DT, Cheung LP, Chung WS, Lo WK, Haines CJ (2002). Psychiatric morbidity amongst infertile Chinese women undergoing treatment with assisted reproductive technology and the impact of treatment failure. *Gynecol Obstet Invest*, 53 (4): 195-9.

20. Chen TH, Chang SP, Tsai CF, Juang KD (2004). Prevalence of depressive and anxiety disorders in an assisted reproductive technique clinic. *Hum Reprod*, 19 (10): 2313-8.

21. Ramezanadeh F, Aghasii MM, Abedinia N, Zayeri F, Kheafashar N, Shariat M, Jafari M (2004). A survey of relationship between anxiety, depression and duration of infertility. *BMC Womens Health*, 4 (1): 9.

22. Khademi A, Alleyassin A, Aghahosseini M, Ramezanadeh F, Abhari AA (2005). Pretreatment Beck Depression Inventory score is an important predictor for post-treatment score in infertile patients: a before-after study. *BMC Psychiatry*, 5: 25.
23. Verhaak CM, Smeenk JM, van Minnen A, Kremer JA, Kraaimaat FW (2005). A longitudinal, prospective study on emotional adjustment before, during and after consecutive fertility treatment cycles. *Hum Reprod*, 20 (8): 2253-60.

24. Sbaragli C, Morgante G, Goracci A, Hofkens T, De Leo V, Castrogiovanni P (2008). Infertility and psychiatric morbidity. *Fertil Steril*, 90 (6): 2107-11.

25. Volgsten H, Skoog Svanberg A, Ekselius L, Lundkvist O, Sundström Poromaa I (2008). Prevalence of psychiatric disorders in infertile women and men undergoing in vitro fertilization treatment. *Hum Reprod*, 23 (9): 2056-63.

26. Volgsten H, Skoog Svanberg A, Ekselius L, Lundkvist O, Sundström Poromaa I (2010). Risk factors for psychiatric disorders in infertile women and men undergoing in vitro fertilization treatment. *Fertil Steril*, 93 (4): 1088-96.

27. Drosdzio A, Skrzypulec V (2009). Depression and anxiety among Polish infertile couples—an evaluative prevalence study. *J Psychosom Obstet Gynaecol*, 30 (1): 11-20.

28. Johansson M, Adolfsson A, Berg M, Francis J, Hogström L, Janson PO, Sogn J, Hellström AL (2010). Gender perspective on quality of life, comparisons between groups 4–5.5 years after unsuccessful or successful IVF treatment. *Acta Obstet Gynecol Scand*, 89 (5): 683-91.

29. Gelbaya TA (2010). Short and long-term risks to women who conceive through in vitro fertilization. *Hum Fertil (Camb)*, 13 (1): 19-27.

30. Klemetti R, Raitanen J, Silvo S, Saarni S, Koponen P (2010). Infertility, mental disorders and well-being—a nationwide survey. *Acta Obstet Gynecol Scand*, 89 (5): 677-82.

31. Greil AL, Shreffler KM, Schmidt L, McQuillan J (2011). Variation in distress among women with infertility: evidence from a population-based sample. *Hum Reprod*, 26 (8): 2101-12.

32. Pasch LA, Gregorich SE, Katz PK, Millstein SG, Nachtigall RD, Blei ME, Adler NE (2012). Psychological distress and in vitro fertilization outcome. *Fertil Steril*, 98 (2): 459-64.

33. Verhaak CM, Snoek JM, Nahuis MJ, Kremer JA, Braat DD (2007). Long-term psychological adjustment to IVF/ICSI treatment in women. *Hum Reprod*, 22 (1): 305-8.

34. Klonoff-Cohen H (2005). Female and male lifestyle habits and IVF: what is known and unknown. *Hum Reprod Update*, 11 (2): 179-203.

35. Ebbesen SM, Zachariae R, Mehlisen MY, Thomsen D, Hoijgaard A, Ottosen I, Petersen T, Ingerslev HJ (2009). Stressful life events are associated with a poor in vitro fertilization (IVF) outcome: a prospective study. *Hum Reprod*, 24 (9): 2173-82.

36. Matthiesen SM, Frederiksen Y, Ingerslev HJ, Zachariae R (2011). Stress, distress and outcome of assisted reproductive technology (ART): a meta-analysis. *Hum Reprod*, 26 (10): 2763-76.

37. Takaki J, Hibino Y (2014). Family-related opinions and stressful situations associated with psychological distress in women undergoing infertility treatment. *Int J Environ Res Public Health*, 11 (9): 9068-81.

38. Greil AL (1997). Infertility and psychological distress: a critical review of the literature. *Soc Sci Med*, 45 (11): 1679-704.

39. Milad MP, Klock SC, Moses S, Chatterton R (1998). Stress and anxiety do not result in pregnancy wastage. *Hum Reprod*, 13 (8): 2296-300.

40. Lovely LP, Meyer WR, Ekstrom RD, Golden RN (2003). Effect of stress on pregnancy outcome among women undergoing assisted reproduction procedures. *South Med J*, 96 (6): 548-51.

41. Anderheim L, Holter H, Bergh C, Möller A (2005). Does psychological stress affect the outcome of in vitro fertilization? *Hum Reprod*, 20 (10): 2969-75.

42. de Klerk C, Hunfeld JA, Heijnen EM, Eijkemans MJ, Fauser BC, Pauschier J, Macklon NS (2008). Low negative affect prior to treatment is associated with a decreased chance of live birth from a first IVF cycle. *Hum Reprod*, 23 (1): 112-6.

43. Gourounti K, Anagnostopoulos F, Potamianos G, Lykeridou K, Schmidt I, Vaslamatzis G (2012). Perception of control, coping and psychological stress of infertile women undergoing IVF. *Reprod Biomed Online*, 24 (6): 670-9.
44. Anderson KM, Sharpe M, Rattray A, Irvine DS (2003). Distress and concerns in couples referred to a specialist infertility clinic. J Psychosom Res, 54 (4): 353-5.
45. Holter H, Anderheim L, Bergh C, Möller A (2006). First IVF treatment—short-term impact on psychological well-being and the marital relationship. Hum Reprod, 21 (12): 3295-302.
46. Lee TY, Sun GH (2000). Psychosocial response of Chinese infertile husbands and wives. Arch Androl, 45 (3): 143-8.
47. Monga M, Alexandrescu B, Katz SE, Stein M, Ganiats T (2004). Impact of infertility on quality of life, marital adjustment, and sexual function. Urology, 63 (1): 126-30.
48. Schneider MG, Forthofer MS (2005). Associations of psychosocial factors with the stress of infertility treatment. Health Soc Work, 30 (3): 183-91.
49. Slade P, O’Neill C, Simpson AJ, Lashen H (2007). The relationship between perceived stigma, disclosure patterns, support and distress in new attendees at an infertility clinic. Hum Reprod, 22 (8): 2309-17.
50. Donarelli Z, Kivlighan D, Allegra A, Lo Coco G (2016). How do individual attachment patterns of both members of couples affect their perceived infertility stress? An actor–partner interdependence analysis. Pers Individ Dif, 92: 63-8.
51. Dembińska AA (2016). Psychological determinants of life satisfaction in women undergoing infertility treatment. Health Psychology Report, 4 (2): 146-58
52. Hasanpoor-Azighdy SB, Simbar M, Vedadhir A (2014). The emotional-psychological consequences of infertility among infertile women seeking treatment: Results of a qualitative study. Iran J Reprod Med, 12 (2): 131-8.
53. Derogatis LR, Unger R (2010). Symptom checklist-90-revised. Corsini encyclopedia of psychology. John Wiley & Sons Inc, New York.
54. Alvand A (1988). Validity and reliability of Cattle inventory for Iranians. Tehran University, Iran.
55. Wiersema NJ, Drukker AJ, Mai BT, Giang HN, Nguyen TN, Lambalk CB (2006). Consequences of infertility in developing countries: results of a questionnaire and interview survey in the South of Vietnam. J Transl Med, 4: 54.
56. Inhorn MC (2003). “The worms are weak”: male infertility and patriarchal paradoxes in Egypt. Men Mov, 5 (3): 238-58.
57. Inhorn MC, Patrizio P (2015). Infertility around the globe: new thinking on gender, reproductive technologies and global movements in the 21st century. Hum Reprod Update, 21 (4): 411-26
58. Inhorn MC (1994). Interpreting infertility: Medical anthropological perspectives: Introduction. Soc Sci Med, 39 (4): 459-61.
59. Salsabili N, Karimzadeh M, Ahmadvand MA, Asadi MH, Brati F (2000). A comparative study of Psychological Problem and anxiety levels in between spinal cord injured infertile couples with normal infertile couples. Iran. Med J Hakim, 3 (3): 207-14.
60. Karimzadeh M, Salsabili N, Akbariasbagh F, Mehrsai A (2006). The psychological impact of infertility in the male able bodied and spinal cord injured population. Sex Disabil, 24 (4): 185-93.