# *Original Articles*

# Anxiety and depression among couples undergoing treatment for infertility with assisted reproductive techniques at an Indian centre

RAVISH KUMAR, HARPREET SINGH DHILLON, UZMA HASHIM, GURPREET KAUR DHILLON, SHIBU SASIDHARAN

## ABSTRACT

***Background.*** Infertility and its treatment are frequently associated with psychological distress. We assessed the prevalence of anxiety and depression in couples undergoing treatment for infertility with assisted reproductive techniques (ARTs).

***Methods.*** We included 160 married couples undergoing treatment for infertility at an ART centre. The prevalence of anxiety and depression was assessed using the hospital anxiety and depression scale.

***Results.*** The prevalence of anxiety and depression was 46.2% and 40.9%, respectively. Women had higher mean (SD) anxiety (10.76 [2.69]) and depression (9.86 [2.06]) scores; however, this gender difference was statistically significant only with respect to anxiety (p=0.02). The mean anxiety scores were highest among both genders when the cause of infertility was attributed to both partners and during the first year and 10 years after treatment. Men in the age groups of 20–24 years and 40–44 years and those with no prior treatment had a statistically significant association with the highest anxiety scores. The mean depression scores showed a statistically significant decline in both genders with increasing age. Among men, the mean depression scores were significantly higher in those with no prior treatment, male cause of infertility and during the first year and after 10 years of treatment.

***Conclusion.*** The prevalence of anxiety and depression among infertile couples undergoing treatment with ART was almost twice as high as that in the general population. The mean anxiety scores were significantly associated with duration of treatment and gender-based attribution in both genders; however, age and prior treatment were associated with only men. The mean scores of depression were significantly associated with age in both genders, while duration of treatment, gender-based attribution and prior treatment were significantly associated only with men.

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Sukh Hospital, Sri Muktsar Sahib, Punjab 152026, India
RAVISH KUMAR

INHS Asvini, Mumbai, Maharashtra, India
UZMA HASHIM    Department of Psychiatry

Command Hospotal, Chandimandir, India
HARPREET SINGH DHILLON Department of Psychiatry
GURPREET KAUR DHILLON Department of Paediatrics
Level III Hospital, Goma, DRC, India
SHIBU SASIDHARAN Department of Anaesthesiology and
    Critical Care

Correspondence to HARPREET SINGH DHILLON;
*harpreet5467@yahoo.com*

## INTRODUCTION

Infertility is a major healthcare problem affecting 15% of couples of reproductive age worldwide with an overall prevalence between 3.9% and 16.8% in India.[1–3] It is frequently associated with a myriad of cognitive and emotional symptoms, viz. psychological turmoil, reduced self-esteem, fear, anxiety, loneliness and guilt, depression, regret and feelings of failure.[4,5] The prevalence of psychiatric morbidity in infertile couples is in the range of 26.8% for mood disorders and 28.6% for anxiety disorders, which is significantly higher than in fertile controls.[6] The interaction between infertility treatment using assisted reproductive techniques (ARTs) and psychiatric morbidity is complicated. Some studies report that psychological distress is negatively related to treatment outcomes in ART.[7,8] However, another study has incriminated ART as a perpetuating factor for increased level of psychological distress, especially in couples with treatment failure and longer duration of treatment.[9]

We aimed to study the prevalence of anxiety and depression in couples undergoing infertility treatment with ART. The gender-wise difference in anxiety and depression and their association with different variables were also examined.

## METHODS

We did this observational, cross-sectional, single-centre study in a state-funded tertiary care hospital catering to government

employees. Hospital ethics committee approval was taken. Sampling was convenience-based. Couples already registered and undergoing treatment by ART as well as the new registrations occurring during the study period were recruited in the study. Married infertile and consenting couples between 18 and 49 years of age undergoing treatment at the ART centre were included, while those with any other chronic physical or psychiatric comorbid condition were excluded. A total of 192 couples were recruited, of which 32 couples were excluded due to incomplete questionnaires. The study was done over 18 months from February 2016 to July 2018. A semi-structured questionnaire was used to collect sociodemographic and treatment-related information.

The prevalence of anxiety and depression was assessed by the hospital anxiety and depression scale (HADS). The HADS was developed as a screening tool to identify cases of anxiety and depression disorders among patients in non-psychiatric hospital clinics.[10] The self-administered HADS test consists of 14 survey questions, seven each pertaining to anxiety and depression. Each question is rated on a four-point scale ranging from 0 to 3, and scores are obtained by summing up the scores of the seven items, yielding values between 0 and 21 for anxiety and depression each. The scores obtained were classified into three categories, wherein scores of 0–7 indicated non-cases, 8–10 indicated doubtful cases and 11–21 indicated actual cases. Cronbach alpha for HADS-A varied from 0.68 to 0.93 (mean 0.83) and for HADS-D from 0.67 to 0.90 (mean 0.82).[11] Patients who scored above the cut-off of 7 for anxiety and/or depression were then assessed by a psychiatrist for confirming the diagnosis as per the ICD-10 diagnostic criteria for research.

The data were analysed using Statistical Package for the Social Sciences (SPSS) version 16 (SPSS for Windows, Version 16.0. SPSS Inc., Chicago, USA) for descriptive measures, such as means, frequencies and percentages for the different variables. Any p value ≤0.05 was considered to be statistically significant. Chi-square analysis was used to find the significance of study parameters on categorical scale. Analysis of variance (ANOVA) was used to find the significance of study parameters between the groups (inter-group analysis). Further, Tukey *post hoc* analysis was done if the values of ANOVA test were significant.

## RESULTS

### Sociodemographic characteristics

The majority of patients were in their 3rd or 4th decades of life. All men were central government employees with free access to tertiary care ART services (Table I).

### Marital and infertility-related information

The majority of couples were married for 5–9 years with a duration of treatment between 1 and 4 years and most of them had not conceived in the past (Table II).

### Gender-wise comparison of severity of anxiety and depression

Women had higher mean (SD) anxiety (10.76 [2.686]) and depression (9.86 [2.06]) scores; however, this gender difference was statistically significant only with respect to anxiety (p=0.022). Depression scores in groups of men and women differed significantly (Table III).

TABLE I. Sociodemographic characteristics of 160 couples

| Characteristic | Women, *n* (%) | Men, *n* (%) |
|---|---|---|
| *Age (years)* | | |
| 20–24 | 13 (8.1) | 5 (3.1) |
| 25–29 | 71 (44.4) | 31 (19.4) |
| 30–34 | 63 (39.4) | 75 (46.9) |
| 35–39 | 13 (8.1) | 42 (26.3) |
| 40–44 | 0 | 7 (4.4) |
| *Education* | | |
| Secondary | 15 (9.4) | 15 (9.4) |
| Higher secondary | 70 (43.8) | 57 (35.6) |
| Graduate | 65 (40.6) | 75 (46.9) |
| Postgraduate | 10 (6.3) | 13 (8.1) |
| *Employment* | | |
| Employed | 23 (14.4) | 160 (100) |
| Home-maker | 137 (85.6) | 0 |
| *Native area of the couple* | | |
| Urban | 23 (14.4) | – |
| Rural | 121 (75.6) | – |
| Semi-urban | 16 (10.0) | – |

TABLE II. Marital and infertility-related variables in 160 couples

| Variable | *n* (%) |
|---|---|
| *Married life (years)* | |
| <5 | 56 (35.0) |
| 5–9 | 70 (43.8) |
| 10–14 | 33 (20.6) |
| >14 | 1 (0.6) |
| *Conceived before* | |
| Yes | 24 (15.0) |
| No | 136 (85.0) |
| *Live birth* | |
| Yes | 7 (4.4) |
| No | 153 (95.6) |
| *Living children* | |
| Yes | 4 (2.5) |
| No | 156 (97.5) |
| *Decision for use of assisted reproductive techniques (ARTs)* | |
| Men | 24 (15) |
| Women | 43 (26.9) |
| Mutual | 93 (58.1) |
| *Cause of infertility* | |
| Men | 18 (11.3) |
| Women | 78 (48.8) |
| Unknown | 56 (35.0) |
| Both | 8 (5.0) |
| *Previous treatment* | |
| Yes | 78 (48.8) |
| No | 82 (51.2) |
| *Duration of marriage before ART (years)* | |
| <3 | 71 (44.4) |
| 4–9 | 80 (50.0) |
| >10 | 9 (5.6) |
| *Duration of treatment (years)* | |
| <1 | 54 (33.8) |
| 1–4 | 89 (55.6) |
| 5–9 | 6 (3.8) |
| ≥10 | 11 (6.9) |

## Association of anxiety with demographic and treatment-related variables

The mean anxiety scores were highest among both genders when the cause of infertility was attributed to both partners and during the first year and after 10 years of treatment. Since the ANOVA values for anxiety scores and duration of treatment were statistically significant, *post hoc* analysis with Tukey honest significant difference (HSD) test was also carried out. Among women, Tukey HSD test revealed statistically significant differences between treatment duration of 1 year with that of >1–4 years and 5–9 years and also between treatment duration of 10 years with that of >1–4 years and 5–9 years. Among men, Tukey HSD test revealed statistically significant difference between treatment duration of 1 year with that of 1–4 years.

Among men, age groups of 20–24 years and 40–44 years and those with no prior treatment had statistically significant association with the highest anxiety scores. Further, Tukey *post hoc* HSD test revealed statistically significant difference between age groups of 35–39 years and 20–24 years only. The remaining associations were not statistically significant (Table IV).

## Association of depression with demographic and treatment-related variables

The mean depression scores showed a statistically significant decline in both genders with increasing age. Among women, Tukey HSD test revealed statistically significant difference between the age group of 35–39 years with the other three age groups (20–24, 25–29 and 30–34 years). Among men, Tukey HSD test revealed significant differences between age group of 20–24 years with 30–34 and 35–39 years.

Among men, the mean depression scores were significantly higher in those with no prior treatment, male cause of infertility and during the first year and after 10 years of treatment. Tukey HSD test revealed statistically significant differences between treatment duration of 1 year with that of 1–4 years and 5–9 years and also between treatment duration of 10 years with that of 5–9 years. The remaining associations were not statistically significant (Table V).

## DISCUSSION

In our study, the overall prevalence of anxiety and depression was 46.2% and 40.9%, respectively. These prevalence rates are comparable with those reported by Maroufizadeh *et al.* using HADS in couples with infertility—anxiety and depression in the range of 49.6% and 33.0%, respectively.[12] However, the prevalence of anxiety and depression in the general population, using HADS, has been reported in the range of 19.5%–22.7% and 11.7%–21.8%, respectively.[13,14] The findings of our study reaffirm that couples undergoing infertility treatment have significantly higher anxiety and depression than the general population.

Women had higher anxiety and depression scores compared to men suggesting that women experienced more severe anxiety and depression than men. The findings of our study were similar to those of El Kissi *et al.*[10,15] This is understandable in the context that having children is considered a major life goal by women themselves in addition to the societal pressure and expectations.[16] These cultural beliefs are more entrenched in the developing world, where female literacy rates are low and the blame and burden of infertility are usually borne by the women. Further, infertile women in the developing world run the risk of stigma, ostracism, marital discord and even divorce. Another

TABLE III. Anxiety and depression levels, wherein scores of 0–7, 8–10 and 11–21 indicate non-cases, doubtful cases and cases, respectively

| Item | Women, *n* (%) | Men, *n* (%) | Total, *n* (%) | p value |
|---|---|---|---|---|
| *Anxiety* | | | | |
| Non-cases | 17 (10.6) | 21 (13.1) | 38 (11.9) | 0.13 |
| Doubtful | 60 (37.5) | 74 (46.2) | 134 (41.9) | |
| Cases | 83 (51.9) | 65 (40.6) | 148 (46.2) | |
| *Depression* | | | | |
| Non-cases | 20 (12.5) | 38 (23.8) | 58 (18.1) | 0.032 |
| Doubtful | 71 (44.4) | 60 (37.5) | 131 (40.9) | |
| Cases | 69 (43.1) | 62 (38.8) | 131 (40.9) | |

TABLE IV. Association of mean scores of anxiety with demographic and treatment-related variables

| Item | Women | | | Men | | |
|---|---|---|---|---|---|---|
| | *n* | Mean (SD) | p value | *n* | Mean (SD) | p value |
| *Age group (years)* | | | | | | |
| 20–24 | 13 | 11.77 (3.27) | 0.412 | 5 | 13.00 (3.08) | 0.006 |
| 25–29 | 71 | 10.59 (2.70) | | 31 | 10.77 (3.43) | |
| 30–34 | 63 | 10.87 (2.44) | | 75 | 10.07 (2.07) | |
| 35–39 | 13 | 10.15 (3.07) | | 42 | 9.07 (2.90) | |
| 40–44 | | | | 7 | 10.86 (1.06) | |
| *Duration of treatment (years)* | | | | | | |
| <1 | 54 | 12.28 (2.44) | <0.001* | 54 | 10.91 (2.04) | 0.027 |
| 1–4 | 89 | 9.72 (2.31) | | 89 | 9.67 (2.88) | |
| 5–9 | 6 | 8.50 (1.64) | | 6 | 8.50 (3.20) | |
| ≥10 | 11 | 13.00 (1.94) | | 11 | 10.00 (3.09) | |
| *Gender-based attribution of infertility* | | | | | | |
| Men | 18 | 11.33 (2.11) | <0.001* | 18 | 10.89 (2.27) | <0.001 |
| Women | 78 | 11.06 (2.48) | | 78 | 9.19 (2.12) | |
| Unknown | 56 | 9.79 (2.87) | | 56 | 10.75 (3.29) | |
| Both | 8 | 13.38 (1.68) | | 8 | 12.00 (0.92) | |
| Total | 160 | 10.76 (2.68) | | 160 | 10.07 (2.71) | |
| *Prior treatment* | | | | | | |
| Yes | 78 | 10.85 (2.74) | 0.702 | 78 | 9.62 (2.76) | 0.039 |
| No | 82 | 10.68 (2.64) | | 82 | 10.50 (2.60) | |

TABLE V. Association of mean scores of depression with demographic and treatment-related variables

| Item | Women | | | Men | | |
|---|---|---|---|---|---|---|
| | n | Mean (SD) | p value | n | Mean (SD) | p value |
| *Age group (years)* | | | | | | |
| 20–24 | 13 | 11.62 (1.98) | <0.001 | 5 | 13.40 (0.89) | 0.019 |
| 25–29 | 71 | 9.61 (1.96) | | 31 | 10.35 (2.98) | |
| 30–34 | 63 | 10.19 (1.91) | | 75 | 9.43 (2.30) | |
| 35–39 | 13 | 7.92 (1.60) | | 42 | 9.67 (3.01) | |
| 40–44 | 0 | 0 | | 7 | 9.86 (3.02) | |
| *Duration of treatment (years)* | | | | | | |
| <1 | 54 | 9.54 (2.16) | 0.108 | 54 | 11.04 (2.58) | <0.001 |
| 1–4 | 89 | 10.07 (2.04) | | 89 | 9.16 (2.54) | |
| 5–9 | 6 | 8.50 (1.76) | | 6 | 7.00 (2.00) | |
| ≥10 | 11 | 10.55 (1.29) | | 11 | 10.64 (2.50) | |
| Total | 160 | 9.86 (2.06) | | 160 | 9.81 (2.72) | |
| *Gender-based attribution of infertility* | | | | | | |
| Men | 18 | 9.83 (1.50) | 0.923 | 18 | 10.06 (2.73) | 0.005 |
| Women | 78 | 9.90 (2.04) | | 78 | 9.06 (2.33) | |
| Unknown | 56 | 9.89 (2.31) | | 56 | 10.57 (3.07) | |
| Both | 8 | 9.38 (1.50) | | 8 | 11.25 (1.66) | |
| Total | 160 | 9.86 (2.06) | | 160 | 9.81 (2.72) | |
| *Prior treatment* | | | | | | |
| Yes | 78 | 9.76 (1.95) | 0.527 | 78 | 9.22 (2.57) | 0.007 |
| No | 82 | 9.96 (2.16) | | 82 | 10.38 (2.75) | |

reason could be the more invasive, intrusive and complex evaluation and treatment techniques in women compared to men.[17]

The anxiety and depression among both genders showed a gradual decline with age. These findings are in agreement with those of Chiaffarino *et al.*, who also found higher psychological distress among younger women.[15] The mean depression scores in women above 35 years of age were significantly lower than those in the remaining age groups among women in our study and by Ben Shlomo *et al.*[18] This trend of reduction in distress with age probably reflects a coming to terms with infertility and seeking alternative (e.g. adoption) measures. However, Ogawa *et al.* found conflicting results in which depression scores increased with age.[19] This difference in findings could be explained by a relatively smaller sample size (*n*=83) and higher percentage (45%) of patients above 35 years of age in the study by Ogawa *et al.*[19]

The younger (20–24 years) as well as older (40–44 years) age groups in men experienced significantly more anxiety and depression. These findings could be explained by the initial adjustment difficulties with the diagnosis of infertility, which would peak again after a long duration of infertility treatment with repeated unsuccessful results. These observations are in concurrence with the existing literature, which report that anxiety and/or depression increase with duration of infertility and became especially worse from 4 to 9 years onwards.[20] However, the findings of our study are in contrast with an old study that reported significant psychological distress during 2–3 years of treatment.[21]

The mean scores of anxiety in both genders and depression scores among men were highest when the cause of infertility was identified in both the partners compared to remaining causes. These findings of our study differ from previous studies which reported higher anxiety and depression in the partner with the fertility problem.[12,22,23]

Prior treatment did not have a significant relationship with mean anxiety or depression scores in women. These findings were contrary to the findings of Ogawa *et al.*,[19] who reported that prior treatment increases likelihood of depression in infertile women. The difference could be attributable to the fact that our study population was relatively younger (92% were <35 years of age in the current study *v.* 52% in the comparison study) and under treatment from a government-sponsored hospital without any financial implications, which could have reduced the psychological impact. Further, other factors such as personality traits and coping mechanisms should be taken into consideration in predicting psychiatric morbidity in addition to prior treatment history.[24]

An interesting finding of the study was that unlike women, psychological distress in terms of both anxiety and depression was significantly higher in men without prior treatment. This is an unknown area and could be explained by the assumption that men with no prior treatment had not undergone infertility assessment and could be worried that the cause of infertility might rest with them. It is stigmatizing as men's sense of masculinity/identity is more closely associated with sexual performance, and infertility is equated with impotence especially in the Southeast Asian region.

The strength of our study is that it is a relatively large sample with a homogeneous socioeconomic profile. Some of the limitations are that it was a cross-sectional study with a self-administered screening questionnaire. Further, the study was conducted on a relatively homogeneous socioeconomic sample at a state-funded tertiary care hospital and the couples did not have the additional financial stress of expensive ART treatment. ART treatment is a cyclical stressor and psychological distress can vary as per the phase of the menstrual cycle. Longitudinal studies incorporating detailed personal interviews and diagnostic assessments would address all the above limitations.

## Conclusion

The prevalence of anxiety and depression among infertile couples undergoing treatment with ART was 46.2% and 40.9%, respectively, and thus twice as high as that in the general population. The mean anxiety scores were significantly associated with duration of treatment and gender-based attribution in both genders; however, age and prior treatment were associated with only men. The mean scores of depression were significantly associated with age in both genders, while duration of treatment, gender-based attribution and prior treatment were significantly associated with only men. Hence, we suggest that psychological assessment and intervention be an integral part of the ART regimen.

*Conflicts of interest.* None declared

## REFERENCES

1 Gerrits T, Van Rooij F, Esho T, Ndegwa W, Goossens J, Bilajbegovic A, *et al.* Infertility in the Global South: Raising awareness and generating insights for policy and practice. *Facts Views Vis Obgyn* 2017;**9:**39–44.

2 Boivin J, Bunting L, Collins JA, Nygren KG. Reply: International estimates on infertility prevalence and treatment seeking: Potential need and demand for medical care. *Human Reprod* 2009;**24:**2380–3.

3 Macro OR. Infecundity, infertility, and childlessness in developing countries. In: *Demographic and health surveys (DHS) comparative reports*. Vol. 9. Geneva:World Health Organization; 2004.

4 Greil AL. Infertility and psychological distress: A critical review of the literature. *Soc Sci Med* 1997;**45:**1679–704.

5 Hasanpoor-Azghdy SB, Simbar M, Vedadhir A. The emotional-psychological consequences of infertility among infertile women seeking treatment: Results of a qualitative study. *Iran J Reprod Med* 2014;**12:**131–8.

6 Chen TH, Chang SP, Tsai CF, Juang KD. Prevalence of depressive and anxiety disorders in an assisted reproductive technique clinic. *Hum Reprod* 2004;**19:** 2313–18.

7 Smeenk JM, Verhaak CM, Eugster A, van Minnen A, Zielhuis GA, Braat DD. The effect of anxiety and depression on the outcome of *in-vitro* fertilization. *Hum Reprod* 2001;**16:**1420–3.

8 Sanders KA, Bruce NW. Psychosocial stress and treatment outcome following assisted reproductive technology. *Hum Reprod* 1999;**14:**1656–62.

9 Gdañska P, Drozdowicz-Jastrzêbska E, Grzechociñska B, Radziwon-Zaleska M, Wêgrzyn P, Wielgoœ M. Anxiety and depression in women undergoing infertility treatment. *Ginekol Polska* 2017;**88:**109–12.

10 El Kissi Y, Romdhane AB, Hidar S, Bannour S, Ayoubi Idrissi K, Khairi H, *et al.* General psychopathology, anxiety, depression and self-esteem in couples undergoing infertility treatment: A comparative study between men and women. *Eur J Obstet Gynecol Reprod Biol* 2013;**167:**185–9.

11 Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale. An updated literature review. *J Psychosom Res* 2002;**52:**69–77.

12 Maroufizadeh S, Ghaheri A, Almasi-Hashiani A, Mohammadi M, Navid B, Ezabadi Z, *et al.* The prevalence of anxiety and depression among people with infertility referring to Royan Institute in Tehran, Iran: A cross-sectional questionnaire study. *Middle East Fertil Soc J* 2018;**23:**103–6.

13 Risal A, Manandhar K, Linde M, Steiner TJ, Holen A. Anxiety and depression in Nepal: Prevalence, comorbidity and associations. *BMC Psychiatry* 2016;**16:**102.

14 Hinz A, Krauss O, Hauss JP, Höckel M, Kortmann RD, Stolzenburg JU, *et al.* Anxiety and depression in cancer patients compared with the general population. *Eur J Cancer Care (Engl)* 2010;**19:**522–9.

15 Chiaffarino F, Baldini MP, Scarduelli C, Bommarito F, Ambrosio S, D'Orsi C, *et al.* Prevalence and incidence of depressive and anxious symptoms in couples undergoing assisted reproductive treatment in an Italian infertility department. *Eur J Obstet Gynecol Reprod Biol* 2011;**158:**235–41.

16 Wright J, Duchesne C, Sabourin S, Bissonnette F, Benoit J, Girard Y. Psychosocial distress and infertility: Men and women respond differently. *Fertil Steril* 1991;**55:**100–8.

17 Ying L, Wu LH, Loke AY. Gender differences in emotional reactions to *in vitro* fertilization treatment: A systematic review. *J Assist Reprod Genet* 2016;**33:** 167–79.

18 Ben Shlomo S, Skvirsky V, Taubman-Ben-Ari O, Azuri Y, Horowitz E. Mental health of women entering fertility treatment: What role do age and internal resources play? *Stress Health* 2017;**33:**470–6.

19 Ogawa M, Takamatsu K, Horiguchi F. Evaluation of factors associated with the anxiety and depression of female infertility patients. *Biopsychosoc Med* 2011;**5:**15.

20 Abedinia N, Ramazanzadeh F, Aghsa MM. Relationship between anxiety and depression with duration of pregnancy. *Quarternary J Payesh* 2003;**4:**153–8.

21 Domar AD, Broome A, Zuttermeister PC, Seibel M, Friedman R. The prevalence and predictability of depression in infertile women. *Fertil Steril* 1992;**58:**1158–63.

22 Erica MT. The stress of infertility. *Hum Ecol* 2002;**95:**12.

23 Dhaliwal LK, Gupta KR, Gopalan S, Kulhara P. Psychological aspects of infertility due to various causes – Prospective study. *Int J Fertil Womens Med* 2004;**49:** 44–8.

24 Gibson DM, Myers JE. The effect of social coping resources and growth-fostering relationships on infertility stress in women (Doctoral Dissertation, University of North Carolina at Greensboro). Available at *http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.612.4485&rep=rep1&type=pdf* (accessed on 15 Jan 21).