

# Psychiatric Impact of Infertility and Assisted Reproductive Technologies A Prospective Study

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## ABSTRACT

**Objective:** The purpose of this research would be to explore the psychological effects of infertility and ART treatment as experienced by patients who received such treatments.

**Study Design:** A Prospective Study.

**Place and Duration of Study:** This study was conducted at the Department of Psychiatry & GYN&E & OBS department Mardan Medical Complex (MMC) Mardan, Khyber Pakhtunkhwa Pakistan from 2<sup>nd</sup> February 2021 to 3<sup>rd</sup> August 2021.

**Methods:** A total of 98 respondents in the study consisted of infertile patients who underwent evaluation and treatment. Patients who met the criteria were included; Aged between 20 and 45 years, Diagnosis of infertility based on the WHO definition meaning failure to conceive for 12 months of engaging in unprotected intercourse, and Giving informed consent to participate in the study.

**Results:** This study was conducted among 98 participants where 60 of the participants were female (61.2%) while 38 were male (38.8%). The mean age of participants was found to be 34.5±4.2 years. The average duration of infertility was 4.1±2.3 years. The mid-treatment phase's average BDI score increased from 14.5 ±7.6 The median age ranged at baseline to 42.3±9.7, indicating a significant rise in depressive symptoms (p<0.05).

**Conclusion:** Infertility and ART are correlated with high levels of psychiatric disturbance – with more focus on depression and anxiety. The fact that depressive symptoms can remain a problem even after the end of IVF treatment underscores the necessity of mental health assessment in infertility.

**Key Words:** Infertility, Assisted Reproductive Technologies (ART), Psychiatric Impact.

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## INTRODUCTION

Some of these comparisons include that infertility is a common problem affecting between 10-15% of couples internationally. Infertility means that one cannot naturally get pregnant and this has some negative emotions or psychological impacts on individuals [1, 2]. Physical; Since the longing for children is culturally and biologically rooted, difficulties in conception undermine one's hopes for motherhood/fatherhood and, therefore, their self-esteem and dream for the future [3]. It is then pressured to conceive given the social and cultural expectations towards fertility which may

exacerbate loneliness and shame. The technological development in recent years has given hope to so many couples struggling with infertility through the use of Assisted Reproductive Technologies or ART<sup>[4]</sup>. ART refers to a group of treatments intended to achieve pregnancy, including IVF, ICSI, use of donor eggs/sperm among others<sup>[5]</sup>. Despite the advancements that have brought about the revolution in reproductive medicine, these technologies have inherent difficulties that surround the chances of having children<sup>[6]</sup>. The processes applied in the context of ARTs are frequently physically challenging, costly, and may have adverse effects on the emotional state of a person. The emotional importance of infertility and the effects of ART on it cannot be over-emphasized<sup>[7]</sup>. Past research has also noted that different levels of stress, anxiety, and depression are very rife among those undergoing ART. The waiting and prognosis of treatment results, combined with the effect of hormonal changes that occur in the use of Fertility-enhancing medicines also leads to increased emotional stress. Further, RTC analysis in patients expecting ART highlights how this emotional rollercoaster, repeated throughout consecutive cycles of ART, adversely impacts patients'

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psychological being<sup>[8]</sup>. As it is evident that the psychological aspect of infertility and cancer is a strain on the patient, the mental health support provided to patients undergoing infertility treatment is usually very limited. It has largely been established that there is a lack of mainstream medical and mental health service integration that encompasses essential treatment and management needs among these patients<sup>[9]</sup>. The present research has significant implications for the field of psychiatric care for infertile patients and those using ART as it reveals the extent to which infertility affects the mental health of the individuals and therefore calls for further psychiatric support and more specifically the development of new therapeutic approaches to attend to the needs of the patients to optimize their treatment and recovery. About the objectives of this research, this study seeks to understand the psychiatric effect that is caused by infertility and ART during the treatment process. This research aims to identify the levels of depression and anxiety experienced by such patients at different phases of the treatment process to offer a comprehensive insight into the psychological barriers met by the affected individuals. In addition to the overall goal of comparing the levels of psychiatric distress between the two groups, this study seeks to examine what factors may help explain why people with certain characteristics are more likely to have or develop higher levels of these symptoms and subsequently, recommends appropriate and effective mental health interventions.

## METHODS

A total of 98 respondents in the study consisted of infertile patients who underwent evaluation and treatment. Patients who met the criteria were included; Aged between 20 and 45 years, Diagnosis of infertility based on the WHO definition meaning failure to conceive for 12 months of engaging in unprotected intercourse, and Giving informed consent to participate in the study. Participants were excluded from the study; They had one or more existing psychiatric disorders diagnosed before they were treated for infertility, were Current users of psychotropic medications, and had severe medical conditions that are unrelated to infertility. Firstly, the data collected by the questionnaire were collected from the participants during their first consultation of the study. Smear test results, lifestyle habits including smoking, drinking alcohol, and taking drugs, and demographic data such as age, duration of infertility, earlier treatments, medical history, and cause of infertility were also recorded. Barton & Tampari, conducted a Mid-treatment Assessment whereby all Participants were asked to complete their BDI and STAI twice, amid the cycle of ART. This stage usually complements hormonal stimulation and the process of oocyte collection. Pre-treatment assessment The final

assessment was taken at least one month after completion of the ART cycle, irrespective of its outcome. Finally, participants had to fill out the BDI and STAI questionnaires for the assessment of any changes in the patient's psychiatric symptoms. The dependent variables were Depression and Anxiety scores on the BDI and STAI respectively, before and post-intervention, and at the 6-month follow-up. Secondly, other factors such as demographic and clinical characteristics that could be related closely to higher scales of psychiatric distress were also determined.

**Data Collection:** All the participants were evaluated at three time points which include Baseline before they commenced the ART therapy, Mid-treatment which in this study was during the ART cycle, and Post-treatment, which in this study was one month after completing the ART cycle.

**Statistical Analysis:** In an analysis of data, the Statistical Package for Social Sciences (SPSS) software version 20.0 was adopted. The data related to the demographic as well as the clinical features of the sample were described using measures of descriptive statistics. The difference in the BDI and STAI scores between the pre-intervention, post-intervention, and follow-up was evaluated using the repeated measures ANOVA. Multiple comparisons were again used by applying Bonferroni tests to help determine the exact difference across the periods.

**Ethical Considerations:** As for the ethical consideration, the current study was reviewed and approved by the Mardan Medical Complex (MMC), Mardan, Institutional Review Board. All respondents consented to participate in the study with written informed consent being provided before their participation. They were also informed about Voluntary participation and anonymity; they were informed that their information would be kept confidential and their rights to withdraw from the study without prejudice to their right to access any medical care at any time in the course of the study.

## RESULTS

This study was conducted among 98 participants where 60 of the participants were female (61.2%) while 38 were male (38.8%). The mean age of participants was found to be  $34.5 \pm 4.2$  years. The average duration of infertility was  $4.1 \pm 2.3$  years. Among the participants, 55 patients (56.1%) were treated with the first cycle of ART, while 43 (43.9%) patients had previously received one, and more previous ART cycles. In general at baseline, 65% (64) of the participants were affected by symptoms of depression based on their BDI scores. The remaining participants 19.4% (19) had moderate to severe depression. The data obtained by using the STAI test demonstrated that 70%(69) participants experienced state anxiety the average state

anxiety score was  $45.2 \pm 10.1$  and a different category of anxiety, the trait anxiety score, was  $42.3 \pm 9.7$ . The mid-treatment phase's average BDI score increased from  $14.5 \pm 7.6$ . The median age ranged at baseline to  $42.3 \pm 9.7$ , indicating a significant rise in depressive symptoms ( $p < 0.05$ ). State anxiety scores also increased significantly with a mean score of  $50.1 \pm 9.3$  ( $p < 0.01$ ), while the trait anxiety score tended to remain constant.

**Table No.1: Demographic Characteristics of Participants**

| Characteristic                       | Total Patients (n=98) | Frequency (%) |
|--------------------------------------|-----------------------|---------------|
| Mean Age (years)                     | 34.5±4.2              |               |
| Gender                               |                       |               |
| Male                                 | 38                    | 38.8%         |
| Female                               | 60                    | 61.2%         |
| Mean Duration of Infertility (years) | 4.1±2.3               |               |
| First ART Cycle                      | 55                    | 56.1%         |
| Multiple ART Cycles                  | 43                    | 43.9%         |

**Table No.2: Baseline Psychiatric Assessment**

| Psychiatric Symptom                 | Total Patients (n=98) | Prevalence (%) |
|-------------------------------------|-----------------------|----------------|
| Depression (BDI)                    | 64                    | 65%            |
| Moderate to Severe Depression (BDI) | 19                    | 19.4%          |
| Elevated State Anxiety (STAI)       | 69                    | 70%            |
| Mean State Anxiety Score (STAI)     | 45.2±10.1             |                |
| Mean Trait Anxiety Score (STAI)     | 42.3±9.7              |                |

**Table No.3: Psychiatric Scores Over Treatment**

| Assessment Time Point | BDI Score (Mean ± SD) | State Anxiety Score (Mean ± SD) | Trait Anxiety Score (Mean ± SD) |
|-----------------------|-----------------------|---------------------------------|---------------------------------|
| Baseline              | 14.5 ± 7.6            | 45.2 ± 10.1                     | 42.3 ± 9.7                      |
| Mid-Treatment         | 17.2 ± 8.3            | 50.1 ± 9.3                      | 42.9 ± 9.1                      |
| Post-Treatment        | 16.5 ± 7.8            | 46.7 ± 10.2                     | 42.0 ± 9.5                      |

Looking at the outcome one month after the ART cycle, the average BDI score slightly diminished to  $16.5 \pm 7.8$  but remained higher than the baseline level ( $p < 0.05$ ). They found the State anxiety score decreased to the average of  $46.7 \pm 10.2$  however they did not get to nearly normal levels ( $p < 0.05$ ). Trait anxiety showed a trend toward lower scores equaling no overall impact. Gender Differences, Regarding the comprehensive

comparison of BDI and state anxiety at the three phases, we found that women had significantly higher scores than men in both BDI and state anxiety at all three time points ( $p < 0.01$ ).

**Table No.4: Gender Comparison of Psychiatric Symptoms**

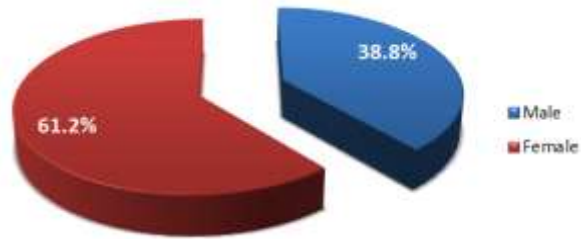
| Psychiatric Symptom                  | Women (Mean ± SD) | Men (Mean±SD) |
|--------------------------------------|-------------------|---------------|
| BDI Score (Baseline)                 | 16.8 ± 7.4        | 11.2 ± 7.1    |
| BDI Score (Mid-Treatment)            | 19.6 ± 8.0        | 13.7 ± 7.8    |
| BDI Score (Post-Treatment)           | 18.9 ± 7.6        | 12.4 ± 7.4    |
| State Anxiety Score (Baseline)       | 49.6 ± 10.2       | 39.8 ± 9.9    |
| State Anxiety Score (Mid-Treatment)  | 54.3 ± 8.7        | 44.5 ± 9.5    |
| State Anxiety Score (Post-Treatment) | 50.5 ± 10.1       | 41.5 ± 9.8    |

**Table No.5: ART Cycle Comparison of Psychiatric Symptoms**

| Psychiatric Symptom                  | First Cycle (Mean ± SD) | Multiple Cycles (Mean ± SD) |
|--------------------------------------|-------------------------|-----------------------------|
| BDI Score (Baseline)                 | 12.9 ± 6.8              | 16.6 ± 7.9                  |
| BDI Score (Mid-Treatment)            | 15.3 ± 7.6              | 19.1 ± 8.4                  |
| BDI Score (Post-Treatment)           | 14.8 ± 7.4              | 18.4 ± 7.9                  |
| State Anxiety Score (Baseline)       | 42.5 ± 9.8              | 48.5 ± 9.7                  |
| State Anxiety Score (Mid-Treatment)  | 47.2 ± 9.2              | 53.5 ± 8.7                  |
| State Anxiety Score (Post-Treatment) | 43.8 ± 9.7              | 50.1 ± 10.0                 |

The participants' average BDI score at the beginning of the analysis was  $16.8 \pm 7.4$  compared to men's  $11.2 \pm 7.1$ . Mid-treatment and post-treatment scores were also similar in terms of difference, highlighting the possibilities of disparities. ART Cycle Frequency, patient undergoing their initial ART cycle were less likely to have a mean baseline BDI score  $12.9 \pm 6.8$  and state anxiety scores of  $42.5 \pm 9.8$  compared to those undergoing multiple cycles (BDI:  $16.6 \pm 7.9$ ; post-intervention:  $48.5 \pm 9.7$  ( $p < 0.01$ )). The magnitude of depressive and anxiety symptoms was comparatively higher in the multiple cycles group during mid-treatment and at the post-treatment phase. Infertility coupled with ART is adversely linked with substantial levels of psychiatric IR. Both Main and Secondary depression and anxiety also showed an increase during the treatment process however, less symptoms were persisting after the treatment process. Consequently, the

change in ART utilization and the degree of psychiatric concern observed among women and individuals receiving multiple ART cycles can be attributed to sociocultural influences.



**Figure No.1: Demographic Characteristics of Participants**

## DISCUSSION

The conclusions of this study extend an understanding of the marked psychiatric concerns related to infertility and ART in patients, as this review of literature shows. The depression and anxiety from baseline to completion of the treatment phase highlight that the experience of infertility is complex and can affect patients in numerous ways. Accepting previously published studies, it can be said that the rates of depression at the baseline (65%) and the rate of elevated state anxiety (70%) in our cohort were within the normal range for similar populations. Different researchers have established varying degrees of depression in clients attending infertility treatment, with a degree as high as 65%, and state anxiety at 75% as found by some researchers<sup>[10]</sup>. Thus, the flow of the study and the obtained results only confirm the essential focus on the issue of PPD and the orientation toward cross-sectional and cultural perspectives.

Additionally, the parameters of the study also reveal that depressive symptoms enhance and state anxiety scales increase during the mid-treatment phase, which is also similar to the results of other longitudinal research. The implementation of ART procedures and hormonal imbalance are also proven to cause stress which intensifies the emotional issue and results in temporary degeneration of psychiatric conditions<sup>[11]</sup>. Still, the cues of slightly improved values for anxiety on the following post-treatment assessments indicate a possibility of reduced psychological suffering in participants who have completed the ART cycle. We also noted that there existed a sharp difference in psychiatric symptoms between genders in that women had more symptoms of depression and anxiety than men. These preliminary results are consistent with the findings reported by other authors that women are more sensitive to psychological stress arising from infertility and ART interventions<sup>[12]</sup>. The social and cultural demands that come along with being a mother together with the physical requirements of infertility treatments and the overall effects on the bodies of women make them more prone to develop psychiatric morbidity. Depressive and anxiety symptoms were higher among

patients who underwent multiple ART cycles compared to first-cycle patients. This result supports earlier studies indicating that combined time-sensitive pressure to feel and act emotionally and physically challenged by the fertility treatments may have an accumulative debasing effect on mental health<sup>[13]</sup>. It calls for more focus and intervention to seek ways and means of easing the continuous toll that infertility treatments take on the mental aspect of the affected patient. The aforementioned study findings highlight several aspects that bear important clinical implications regarding the management of infertility. First, the authors stress the need to implement psychiatric treatment in infertility treatment plans. It was determined that measures should be taken in different phases of the treatment process to enhance the evaluation and treatment of symptoms of psychiatric disorders to increase patient benefits and treatment efficacy. Second, understanding the differences in the frequency of having psychiatric symptoms across genders touches on the importance of practicing patient-centered care with attention given especially to the gender of the patient. Specific focuses which have relation to psychological problems in men and women who are undergoing infertility treatments are the key necessity for a detailed guided approach for patients<sup>[14]</sup>.

## CONCLUSION

The present research findings have significant implications for the study of infertility and ART treatment on the occurrence, course, and antecedents of psychiatric disorders among the patient population. To ensure that our work is commensurate with prior studies and scholarship, we align our outcomes with extant research to conclude theoretical underpinnings, research trends, and unfortunate phenomena that demand attention and additional empirical research. In the end, therefore, it is crucial to meet the psychological fares of people seeking fertility treatments as a way of ensuring that holistic and patient-centered care is being achieved in the field of reproductive medicine.

### Author's Contribution:

|                            |                                   |
|----------------------------|-----------------------------------|
| Concept & Design of Study: | Fatima                            |
| Drafting:                  | Naila                             |
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| Revisiting Critically:     | Zafar Ahmad Khan                  |
| Final Approval of version: | Muhammad Muslim Khan              |

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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