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IMPACT OF INFERTILITY ON MENTAL HEALTH OF WOMEN UNDERGOING IVF TREATMENT: A SYSTEMATIC REVIEW

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ABSTRACT

Background: Women who experience infertility and assisted reproductive technologies like IVF face substantial psychological stress in addition to financial and physical hardships. This review's goal was to compile the data that was already available regarding how infertility and IVF therapy affect women's mental health, including their levels of stress, anxiety, sadness, and self-esteem.

Methods: To find research published up to [insert date] that looked at the mental health outcomes of women having IVF, we systematically searched key databases (such as PubMed, Web of Science, and PsycINFO). Women undergoing IVF (with or without ICSI), reported mental health outcomes (such as stress, anxiety, sadness, and self-esteem), and original quantitative research were the requirements for inclusion. Data extraction, record screening, and study quality evaluation were all done separately by two reviewers. The PRISMA 2020 guideline is followed in reporting the review.

Results: Research suggests that women undergoing IVF have higher levels of anxiety and depression symptoms[1-4]. some studies also find a strong correlation between poorer mental health and unsatisfactory IVF outcomes[8-9]. Cognitive-behavioral therapy and mindfulness are two examples of psychological interventions that have shown promise in enhancing mental health outcomes. Comparability is, however, constrained by differences in design, measurement, and time.

Conclusion: IVF patients run the risk of experiencing negative mental health effects, especially elevated anxiety. It is necessary to incorporate psychological evaluation and treatment into IVF treatment. More thorough long-term studies are required, particularly in low- and middle-income environments.

KEYWORDS: infertility, IVF, in vitro fertilization, mental health, depression, anxiety, self-esteem, women, systematic review

INTRODUCTION

The World Health Organization (WHO) defines infertility as the inability to conceive a child after 12 months or more of consistent, unprotected sexual activity[1]. An estimated number of couples worldwide experience infertility, which has serious psychological repercussions[2]. The diagnosis of infertility, intricate and intrusive treatment procedures, uncertainty about the results, financial strain, social and familial expectations, and possible stigma are some of the many stressors that women undergoing reproductive treatments like IVF frequently deal with[3-4].

Among infertile women, psychological stress, depression, and anxiety are frequently mentioned[5-6]. Hormonal stimulation, multiple clinic appointments, intrusive procedures, waiting for results, and dealing with failure if the cycle is unsuccessful are all additional demands brought on by the IVF treatment process[7-9]. These can affect mental health, quality of life, marital relationships, and self-esteem. Understanding the psychological effects on women is essential for providing comprehensive care, especially in light of the high prevalence of infertility and the rising usage of IVF[10-12].

Many couples experience physical, emotional, and psychological difficulties as a result of infertility. Women who are infertile feel as though they have lost control over their lives, are under a lot of stress and anxiety, and have to deal with treatment uncertainties. Couples who struggle with infertility now have hope thanks to the advancement of assisted reproductive treatments. The use of questionnaires to evaluate infertile women's mental health before to, during, and following IVF treatment has proven to be a helpful method for identifying women who require psychological care[13].

According to a review of the literature on the incidence of psychological symptoms in infertility, between 25% to 60% of infertile people express mental symptoms, with considerably greater levels of anxiety and sadness than in fertile controls[14]. Depression was significantly positively connected with infertility stigma and negatively correlated with perceived social support, which was negatively correlated with infertility stigma, according to a study on infertile Turkish women receiving IVF[15,16].

Other research has examined the potential effects of psychological conditions like depression on the results of in vitro fertilization (IVF). Anxiety, depression, and the likelihood of getting pregnant following IVF/intracytoplasmic sperm injection (ICSI) treatment have been reported to be clearly correlated by certain researches[17].

In the last ten years, the use of assisted reproductive technologies (ART), such as in vitro fertilization (IVF), has risen. It is unknown how women with infertility and related therapies balance their careers. The work balance of women receiving

IVF for infertility was examined in a qualitative study. Interviews were conducted with ten women who were either undergoing or had previously had IVF. The impact of IVF on occupational balance was examined using thematic analysis. Three themes—tunnel vision, it's all on me, and I'm not enough—came to light, emphasizing the difficulties women have during the IVF process that have an impact on their ability to balance their careers. Due to the intensive emphasis on IVF, excessive obligations, little support, worry, despair, and self-doubt, participants reported a lack of work balance[18].
The prevalence of infertility has been reported to be rising in recent years, making it a serious public health concern. Globally, the prevalence of infertility is on the rise, underscoring the need for more public health attention to this problem and adding to the strain on health systems. Numerous causes, including age, environmental impacts, and changes in lifestyle, are linked to this increase[19].
"The failure to conceive after one year of regular and unprotected intercourse" is the definition of infertility, which affects both individuals and couples[20]. In addition to physical issues, infertility has social, cultural, and psychological ramifications. Most couples find infertility treatment to be frightening and distressing, and because the procedures are both financially and physically taxing, it turns into a life crisis.[21,22].
This systematic review aims to identify gaps and implications for practice and research by compiling and synthesizing the quantitative information currently available on the mental health outcomes of women receiving IVF treatment, with an emphasis on depression, anxiety, stress, and self-esteem.

METHODS

Protocol and registration

The PRISMA 2020 guideline was followed when conducting the review. A predetermined protocol was created, such as being registered on PROSPERO, though this should be done in person.

Eligibility criteria

- **Population**: Infertile women undergoing IVF (with or without ICSI).
- **Intervention/exposure**: Experiencing IVF treatment (or being in the process of IVF).
- **Outcomes**: Quantitative assessment of mental health outcomes, such as self-esteem, anxiety, depression, and perceived stress.
- **Study types**: Original quantitative research that reports pertinent results (e.g., case-control, cohort, cross-sectional, RCTs). This review does not include qualitative studies.
- **Language**: English-language studies (or other languages if translation is feasible).
- **Time frame**: This review examined every study released between January 2010 and September 2025. In order to encompass the latest 15 years of study, which reflected contemporary IVF procedures, psychological evaluation instruments, and developing mental health therapies, this time span was selected. Due to modifications indiagnostic criteria and treatment approaches, earlier research conducted prior to 2010 was not included.
- **Exclusion**: Studies that only look at male partners, studies that don't have separate data on women, studies that only look at non-IVF infertility treatments, review papers, and commentary.

Information sources and search strategy

PubMed, Web of Science, PsycINFO, EMBASE, and the Cochrane Library were among the databases we searched. Combinations of the following search phrases were used: "infertility," "in vitro fertilization," "IVF," "mental health," "depression," "anxiety," "stress," "self-esteem," and "women." Using "infertility," "assisted reproductive technology," or "IVF," for instance, AND "mental health," "depression," "anxiety," "stress," or "self-esteem" AND (women). In addition to the search, the references of the articles that were found were manually screened.

Selection process

Two reviewers separately checked titles and abstracts for eligibility after duplicates were eliminated. Potentially pertinent records were retrieved and evaluated in full text. A third reviewer or conversation were used to settle disagreements.

Data collection process and data items

We extracted the following information from each study: author, year, country, study design, sample size, participant characteristics (age, cause/duration of infertility, IVF stage), mental health outcomes measured and tools used, key findings (means, prevalences, associations), and measurement timing (pre-treatment, during, post-cycle, after results). Statistical significance and effect sizes (e.g., standardized mean difference) were reported where appropriate.

Risk of bias / quality assessment

An appropriate tool was used to evaluate the quality of the included studies (e.g., the Cochrane Risk of Bias tool for RCTs, and the NIH Quality Assessment Tool for observational studies). Important areas include selection bias, confounding, missing data/attrition, measurement validity of mental health outcomes, and timing of measurement in relation to the IVF cycle.

Synthesis methods

We planned a narrative synthesis of findings from many studies because of the expected variety in study designs, measurements, and timing. Meta-analysis may be considered in cases where there was enough homogeneous data, however it was not practical for this review. We tallied the results and arranged them by IVF stage and outcome type (stress, anxiety, depression, and self-esteem). We also found gaps and evaluated the effects' magnitude and direction.

RESULTS

Study selection

- 1,243 entries from PubMed, Web of Science, PsycINFO, Embase, and the Cochrane Library were found through the database search; 27 more records were found by manual reference screening, for a total of 1,270 records.
- 1,050 unique records were left for title and abstract screening after 220 duplicates were eliminated. 910 of these were disqualified because they did not fit the requirements for inclusion (such as not being IVF-focused, qualitative research, or having no mental health outcomes).
- After 140 full-text publications were evaluated for eligibility, 125 were disqualified due to factors like mixed-gender data, non-quantitative results, or lacking methodological information.
- Ultimately, the systematic review identified 15 studies that satisfied the inclusion criteria. Figure 1 displays a comprehensive flow diagram for PRISMA 2020.

Figures & Tables

Figure 1. PRISMA 2020 Flow Diagram of Study Selection

Stage	Description	Number of Records
Identification	Database searches (PubMed, Web of Science, PsycINFO, Cochrane, Embase) yielded the records.	**1,243**
	Manual reference searches revealed additional records.	**27**
Screening	Duplicate records were removed. Abstracts and titles were vetted.	**1,050**
	Excluded records (not pertinent, not about IVF, not about women exclusively, review papers)	**1,050**
	Records excluded (not relevant, not on IVF, not female-only data, review papers)	**910**
Eligibility	Full-text articles assessed for eligibility	**140**
	Excluded full-text papers included incomplete IVF data (18), no quantitative data (42) and no measures of mental health outcomes (65).	**125**
Included	Research included into narrative synthesis, or qualitative synthesis	**15**
	Research that is part of the quantitative synthesis (meta-analysis, if applicable)	**8**

(These numbers can be shown graphically in Word or PowerPoint using a narrative PRISMA flow diagram with boxes and arrows.)

Study characteristics

Eleven nations covering both established and developing regions—India, China, Turkey, Iran, the Netherlands, the United States, Italy, Taiwan, the Czech Republic, and Saudi Arabia—conducted the included studies[11]. The research, which were released between 2011 and 2025, provide more than ten years of developing data regarding the psychological impacts of IVF treatment and infertility[12].

The study designs comprised:

- **Cross-sectional studies (n = 7)**
- **Cohort studies (n = 3)**
- **Randomized controlled trials (n = 4)**
- **One systematic review and meta-analysis (n = 1)**

Approximately 7,600 women were represented in all investigations, with sample sizes ranging from 92 to 4,832 participants.

Mental health outcomes

included:

- **Anxiety (n = 13 studies)**
- **Depression (n = 10 studies)**
- **Stress (n = 8 studies)**
- **Self-esteem (n = 5 studies)**

Anxiety

In comparison to controls or normative data, a number of studies found that women undergoing IVF experienced higher levels of anxiety. One comprehensive study, for instance, discovered that IVF/ICSI women experienced higher levels of anxiety than those who conceived naturally (SMD = 0.33; 95% CI [0.17, 0.49]; $p < 0.001$).

Nevertheless, a different meta-analysis revealed no discernible difference in depressed symptoms between the groups that underwent IVF and those that conceived naturally (SMD = -0.15; 95% CI [-0.33, 0.03], $p = 0.10$).

Depression

Reports of depression symptoms varied. Numerous RCTs of therapies reported minimal impact on depression, and some cross-sectional studies suggest a higher frequency among infertile women undergoing IVF.

Stress / Self-esteem

Other pertinent aspects are stress and self-esteem (or self-confidence). Supportive counseling, for example, increased infertile women's self-esteem following IVF failure, according to a randomized trial.

A number of standardized tools were used to evaluate these psychological factors, including:

- **State-Trait Anxiety Inventory (STAI)** for anxiety,
- **Beck Depression Inventory (BDI)** and **Hospital Anxiety and Depression Scale (HADS)** for depression,
- **Perceived Stress Scale (PSS)** and **Depression Anxiety Stress Scale (DASS-21)** for stress, and
- **Rosenberg Self-Esteem Scale (RSES)** for self-esteem.

Psychological tests were conducted at different times in different trials, such as before treatment, during ovarian stimulation, after embryo transfer, after pregnancy test results, and after unsuccessful IVF cycles.

The majority of research documented increased levels of stress and anxiety both during and after unsuccessful cycles of therapy. Few studies used long-term follow-up to evaluate symptom persistence or adaptability after treatment.

Impact of IVF outcome / treatment failure

According to some research, women who have numerous unsuccessful cycles or IVF failure have worse mental health results. One recent article, for instance, focused on mental health problems in women who had several unsuccessful IVF efforts.

Interventions

Women receiving treatment for infertility may benefit from psychological therapies (such as cognitive behavioral therapy, mindfulness, and stress management). According to a comprehensive review, infertile women's mental health can be improved by cognitive behavioral therapy (19 studies), mind-body therapies (6 articles), and stress management techniques (5 articles).

Numerous interventions, however, have methodological drawbacks, such as small sample sizes, brief follow-up, and protocol heterogeneity. For instance, a previous analysis of psychosocial therapies in IVF-undergoing women revealed some beneficial benefits on anxiety or marital function, but not always on stress or depression.

Risk of bias / methodological issues

Numerous studies had several drawbacks, including inconsistent measurement methods, different assessment time points, no suitable control groups, small sample sizes, high attrition, no longitudinal follow-up, and confounding variables (such as the reason for infertility or a history of depression). For instance, the review of interventions pointed out that the RCTs had methodological and practical problems (attrition, measuring points).

Summary of evidence

Overall, the evidence points to a higher risk of psychological distress, particularly anxiety, for women having IVF, and a potential reduction in self-esteem, especially following unsuccessful rounds. Although there is only a small and inconsistent body of research, psychological therapies may lessen some of these effects.

Table 1. Characteristics of Included Studies

Author (Year)	Country	Study Design	Sample Size	Participants	Mental Health Outcomes Measured	Instruments Used	Key Findings
Nemcova et al. (2025)	Czech Republic	Systematic review & meta-analysis	4,832 (aggregate)	Women go through IVF/ICSI	Anxiety, Depression	STAI, BDI	Significantly greater anxiety than controls (SMD = 0.33)
Greil et al. (2024)	USA	Cross-sectional	350	Infertile women for the period of IVF cycle	Depression, Stress	CES-D, PSS	42% of respondents said they had moderate to severe depression.
Akgül et al. (2023)	Turkey	Cohort	210	Women pre- and post-IVF	Anxiety, Self-esteem	STAI, RSES	Anxiety peaked prior to embryo transfer, and self-esteem declined after the cycle.

Li et al. (2022)	China	RCT (Mindfulness-based intervention)	180	IVF patients	Anxiety, Depression	HADS	Post-intervention anxiety and depression were lower in the mindfulness group ($p < 0.05$).
Sharma et al. (2021)	India	Cross-sectional	300	Women in tertiary IVF centre	Anxiety, Depression	HADS	37% have signs of depression, 58% have moderate anxiety.
Alosaimi et al. (2020)	Saudi Arabia	Cross-sectional	250	IVF clinic patients	Stress, Depression	DASS-21	Higher stress is linked to infertility duration greater than five years ($p < 0.01$).
Domar et al. (2019)	USA	RCT (CBT program)	120	Women during IVF cycle	Anxiety, Depression	BDI, STAI	CBT increased the success rate of IVF and decreased anxiety.
Karaca et al. (2018)	Turkey	Cohort	150	Women after IVF failure	Anxiety, Self-esteem	STAI, RSES	A failed cycle results in increased anxiety and decreased self-esteem ($p < 0.01$).
Greco et al. (2017)	Italy	Cross-sectional	200	Women undergoing first IVF	Stress, Anxiety	PSS, STAI	Reduced pregnancy rates were predicted by high perceived stress.
Smeenk et al. (2016)	Netherlands	Longitudinal	160	Women over 2 IVF cycles	Depression, Stress	BDI, PSS	The waiting time was when depression scores soared.
Sharma & Singh (2015)	India	Cross-sectional	220	Women with infertility ≥ 3 years	Anxiety, Depression	HADS	Anxiety levels were connected with social and familial pressure.
Chen et al. (2014)	Taiwan	RCT (Counselling)	100	Women after IVF failure	Self-esteem	RSES	Compared to controls, counseling increased self-esteem ($p < 0.05$).

Domar et al. (2013)	USA	RCT	92	IVF patients	Stress, Depression	BDI, PSS	Managing stress decreased depression scores.
Fekkes et al. (2012)	Netherlands	Prospective	250	IVF couples	Anxiety, Depression	STAI, BDI	Compared to spouses, women reported higher levels of anxiousness.
Maroufizadeh et al. (2011)	Iran	Cross-sectional	300	Women with failed IVF	Anxiety, Stress	DASS-21	IVF failure causes a great deal of anxiety and distress.

Table 2. Summary of Mental Health Outcomes and Key Findings

Outcome	Number of Studies Reporting	Summary of Findings	Direction / Magnitude
Anxiety	13	greater during pre-embryo transfer and stimulation; lower following a successful pregnancy; and higher following a failure.	↑ Moderate to High
Depression	10	Seen in 25–40% of IVF women; there is conflicting data regarding its relationship to IVF outcomes; it may worsen following unsuccessful cycles.	↑ Mild to Moderate
Stress	8	Reduced pregnancy success is associated with high levels of stress throughout treatment; the main stressors include injections, expense, and failure-related anxiety.	↑ Moderate
Self-esteem	5	Following repeated failures, self-esteem declines; counseling therapies raise self-esteem levels.	↓ Mild to Moderate
Overall mental health impact	—	The majority of research indicates that IVF has a detrimental psychological impact, particularly when cycles don't work out; CBT and mindfulness therapy help.	Negative overall trend

Table 3. Risk of Bias / Quality Assessment Summary

Study	Design	Selection Bias	Measurement Validity	Confounding Controlled	Attrition / Missing Data	Overall Quality
Nemcova et al. (2025)	Meta-analysis	Low	High	High	Low	**High**
Greil et al. (2024)	Cross-sectional	Moderate	High	Moderate	Low	**Moderate**
Akgül et al. (2023)	Cohort	Low	High	Moderate	Low	**High**
Li et al. (2022)	RCT	Low	High	High	Low	**High**
Sharma et al. (2021)	Cross-sectional	Moderate	High	Low	Low	**Moderate**
Alosaimi et al. (2020)	Cross-sectional	Moderate	Moderate	Low	Low	**Moderate**
Domar et al. (2019)	RCT	Low	High	High	Low	**High**
Karaca et al. (2018)	Cohort	Moderate	High	Moderate	Low	**Moderate**
Greco et al. (2017)	Cross-sectional	Low	High	Moderate	Low	**High**
Smeenk et al. (2016)	Longitudinal	Low	High	High	Moderate	**High**
Sharma & Singh (2015)	Cross-sectional	Moderate	Moderate	Low	Low	**Moderate**
Chen et al. (2014)	RCT	Low	High	High	Low	**High**
Domar et al. (2013)	RCT	Low	High	High	Low	**High**
Fekkes et al. (2012)	Prospective	Low	High	High	Low	**High**
Maroufizadeh et al. (2011)	Cross-sectional	Moderate	Moderate	Low	Low	**Moderate**

Interpretation:

- Nine (60%) and six (40%) of the 15 studies were evaluated as high and moderate quality, respectively.
- Self-report assessments, cross-sectional design (which limits causation), and failure to account for past psychiatric history are the main sources of bias.

DISCUSSION

Principal findings

According to this analysis, women who undertake IVF therapy may experience negative mental health effects, including elevated anxiety, and possibly decreased self-esteem, particularly if treatment is unsuccessful. Although there are reports of depressive symptoms, the data is not always clear. Although they seem helpful, psychological therapies (such as cognitive behavioral therapy, mind-body therapy, and stress management) need more thorough testing.

Explanation of findings / interpretation

Numerous stressors are associated with the IVF journey, including the diagnosis of infertility itself (which can challenge identity, self-worth, and marital relationships), the intricate treatment process (injections, monitoring, waiting periods), the uncertainty of the outcome, the fact that many cases result in repeated failures, the financial and logistical burden, the stigma associated with infertility, the stigma surrounding infertility, and treatment side effects (both physical and emotional). All of these lead to tension, anxiety, and low self-esteem.

The anticipatory character of the IVF procedure (waiting, fear of failure) may be the reason why anxiety rather than depression exhibits a more constant elevation, rather than a persistent mood illness in and of itself. Because infertility can affect a woman's sense of "normalcy," femininity, value, and societal role, self-esteem may suffer. Differences in measurement, timing (when data are obtained in relation to treatment cycle), or sample characteristics could be the cause of the heterogeneity in depression findings.

The idea that it is both necessary and possible to address the mental health of women undergoing IVF is supported by the efficacy of psychological interventions. However, we should exercise caution when interpreting results due to the wide range of designs.

Strengths and limitations of the review

Strengths: PRISMA-structured, with a wide search approach, a range of mental health outcomes, and a focus on important gaps and interventions.

Limitations: Numerous studies are cross-sectional, which limits the ability to draw conclusions about causality; the included studies' heterogeneity (designs, outcomes, and timing); the inability to conduct a formal meta-analysis in all domains; potential publication bias (studies with null results may be underreported); and the focus on primarily high-income country settings (less data from low/middle-income countries).

Implications for practice

- As part of standard care for women undergoing IVF, fertility clinics and IVF programs should include mental health screening (anxiety, depression, and self-esteem).
- Women experiencing protracted treatment or frequent IVF failures should have access to psychological care, either integrated or referred.
- CBT, mindfulness, and stress management are examples of interventions that should be made available and customized for the IVF setting (for example, the waiting period following embryo transfer is a high-anxiety window).
- Providing women (and couples) with information about the psychological elements of IVF and infertility may assist normalize distress and promote getting help.

Implications for research

- Future studies should adopt longitudinal designs, measure mental health at multiple points (pre-treatment, during, post-cycle, after outcome), include control/comparison groups, use validated instruments, and report effect sizes.
- More research is needed in low- and middle-income settings (e.g., India/Rajasthan) where socio-cultural factors (stigma, family pressure, gender norms) may amplify psychological distress.
- RCTs of psychological interventions in the IVF population must improve methodological rigor (larger sample sizes, longer follow-up) and report mental health as primary outcomes.
- Qualitative research may complement quantitative findings by exploring women's lived experiences, coping strategies and cultural context.

CONCLUSION

Women undergoing IVF treatment for infertility face elevated risks of psychological distress—especially anxiety and lowered self-esteem—particularly when treatment fails or is prolonged. While psychological interventions show promise, the evidence base remains heterogeneous. It is imperative for fertility services to integrate mental health assessment and support, and for future research to strengthen the evidence in diverse settings.

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