



# Efficacy of Psychological Counselling in India for Couples with Infertility During ART Treatment - A Systematic Review

Saraswathi Bhaskar<sup>1\*</sup>, K. Niraimathi<sup>2</sup>

<sup>1</sup>Ph.D., Counselling Psychologist, The Banyan, Gandhi Nagar, Adyar, Chennai 600 020, India; <sup>2</sup>Ph.D., Director, Evidentia Research Solutions, New Vaidhyanathan Street, Tondiarpet, Chennai- 600 081, India.

## ABSTRACT

Primary infertility is a major crisis, triggering negative impact on psychological aspects among couples in treatment. Globally, psychological counselling is advocated as a supportive model in alleviating psychological distress during Assisted Reproductive Technology Treatment (ART). The aim of this systematic review was to investigate the available evidence from India on the effects of psychological counselling intervention among couples taking ART treatment due to primary infertility. A total of sixty-nine studies were identified from PubMed, Google scholar, Science Direct and electronic databases from the beginning of May 2022. Out of sixty-nine relevant articles, a total of five doctoral theses and one original article were systematically reviewed and included based on inclusion and exclusion criteria. Five doctoral research work and one original article involving 2082 samples of primary infertile women and men were included for the present systematic review. All the reviewed studies have shown that infertile women and men in the intervention group experienced improvement in infertility related stress, depression, anxiety, coping ability and marital understanding. Overall, our finding suggests that there is not much research conducted in India to find the effect of psychological counselling. Due to the lack of pertinent studies from India, more indigenous studies with sound methodology are necessary to draw definitive conclusion about the need for psychological counselling during ART treatment.

**Key Words:** Psychological counselling/ intervention, Psychological distress, Assisted Reproductive Technology, Primary infertility

## INTRODUCTION

Infertility, affecting 48.5 million couples globally, is a multifaceted health concern with profound implications for individuals, particularly in the context of Assisted Reproductive Technologies (ART).<sup>1</sup> Previously reported findings from a nationally representative survey indicated that the prevalence of infertility in the country stands at 17.9%, with this proportion remaining stable over the past two decades.<sup>2</sup> The purpose of this review article is to present the need for psychological counselling to couples with primary infertility undergoing Assisted Reproductive Technology (ART) treatment in India. Studies reveal that ART offers hope to many childless couples by increasing the chance of pregnancy rate by 69.4%.<sup>3,4</sup>

Within India, where primary infertility rates range from 3.9% to 16.8%, understanding the intricate interplay of psychological factors in the realm of ART is critical for comprehensive patient-centered care.<sup>5</sup> The World Health Organization defines infertility as the inability to achieve a natural preg-

nancy after a year of regular unprotected sexual intercourse.<sup>6</sup> Causes are diverse, impacting either or both partners, encompassing factors from medical conditions to lifestyle-related elements.<sup>2</sup> As couples embark on the arduous journey of fertility treatments, the psychological toll remains a less explored yet integral aspect of infertility care.

Research evidence suggests that infertility, often considered a life crisis, triggers emotional distress and societal stigma.<sup>7</sup> For women, this distress manifests as higher levels of anxiety, depression, low coping ability, poor self-esteem, guilt, and feelings of insecurity.<sup>8,9</sup> Men, particularly when facing male factor infertility, grapple with distress, anger, and feelings of sexual inadequacy.<sup>10,11</sup>

As ART, becomes a beacon of hope for couples facing infertility, there is a growing acknowledgment of the psychological dimensions intertwined with these treatments. Beyond the physical and financial challenges associated with ART treatments,<sup>12,13</sup> there is a pressing need to understand how psychological counselling, as a vital component of

### Corresponding Author:

Saraswathi Bhaskar, Ph.D., Counselling Psychologist, The Banyan, Gandhi Nagar, Adyar, Chennai 600 020, India.  
Phone: +91 90947 28260; Email: [therapist.saras@gmail.com](mailto:therapist.saras@gmail.com)

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ART, influences treatment outcomes and the overall well-being of couples.

The existing literature emphasizes the intertwined relationship between psychological well-being and infertility outcomes. Stress, recognized as a significant factor in conception, induces biochemical changes in the body that can impact fertility.<sup>14,15</sup> However, while global studies advocate for the inclusion of psychological counselling in infertility treatment protocols,<sup>8,16,17</sup> the specific dynamics of this relationship remain underexplored within the unique cultural context of India.

This systematic review aims to explore psychological counselling's central role in Indian ART procedures, evaluating its effectiveness in enhancing the well-being of individuals undergoing fertility treatments. Through analysing counselling practices, we seek to understand its impact on mental health outcomes for patients navigating infertility challenges and ART procedures in India. Through this exploration, we aim to bridge the research gap, provide insights, and contribute to optimizing ART outcomes while addressing the psychological aspects crucial for holistic infertility care in the Indian context.

## METHODS

### Data sources and literature search

This research study used the PRISMA reporting guidelines (Figure 1). PubMed, Google scholar, Science Direct and electronic databases were searched from the beginning of May 2022 to identify relevant published articles. The search strategy involved specific validated filters. The following Medical Subject Headings (MeSH) terms and free text keywords were used in various permutation and combinations such as “infertility treatment”, “assisted reproductive technology treatment”, primary infertility, ART, “IVF”, “IUI”, “ICSI”, “psychological counselling”, “psychological intervention”, “psychological therapy”, “emotional distress”, “anxiety”, “depression”, “clinical pregnancy”, “marital adjustment”.

### Outcome Measures

Number of studies conducted in India and the effect of psychological counselling on infertility related stress, depressive symptoms, anxiety, coping ability and marital understanding during ART treatment.

### Selection of Studies

Three independent reviewers assessed all data. All studies reprocess through search were screened and uploaded to Rayyan<sup>18</sup> after the registration to facilitate the screening process. Duplicate articles were removed by the software. Following

an initial screening by title, abstract and keywords, full texts retrieved were screened by two reviewers. Pertinent research articles were selected after full text review based on inclusion and exclusion criteria.

### Data Extraction and Quality Assessment

According to predefined checklist, two reviewers extracted data. The third reviewer checked accuracy and completeness of the data. Disparities about inclusion of studies were resolved by discussion and consensus. The quality of the study was independently evaluated by two reviewers using quality assessment of controlled intervention studies tool developed by National Heart, Lung, and Blood Institute (NHLBI) in 2013.<sup>19</sup> This tool consists of 14 items questions for example, use and description of randomization, patient assignment, equality of allocated group, blinding procedures, dropout rates, sample size power and intention-to-treat analysis which was scored 1 for ‘Yes’, 0 for ‘No’ and ‘Not applicable’. An overall quality scores were rated 10-14 as ‘good’, 7-9 as ‘fair’ and < 7 as poor. Ratings of the included studies are shown in Table 3. Reviewers were not blinded to authors, institutions, and journal of publication. Information extracted from each article includes name of the author, year of publication, aim of the study, general characteristics of the participants, sample size, study design, dropouts, duration of the study, outcome measures, assessment tools, intervention type, number of counselling/therapy session, and study findings.

## RESULTS

A total of sixty-nine studies were identified from an initial search which included research articles, grey literatures and published doctoral thesis work. The chosen articles were scrutinized, duplicates (n=12) and papers not meeting eligibility criteria (n=50) were rejected from further analysis. Finally, a total of 6 studies (one original research article and five doctoral research studies) with a combined total of 2082 participants were included for the present systematic review. The screening process of the study is briefed in the PRISMA flow chart (Figure 1).

### Study Characteristics

**Table 1** shows basic characteristics of included study. All the studies were conducted in southern regions of India between the years 2013- 2020. Out of six studies, three were conducted in Chennai (Tamil Nadu), two studies in Belgaum, Mysore (Karnataka) and one study in Pondicherry (Union Territory). Three studies covered both Rural and urban region, one study covered only urban while region was not specified in other two studies. The participants were identified and recruited from hospitals or fertility clinics registry age ranging from 19-55 years without any illness other than primary infertility.

Four of six studies focused only on women while two studies focused on couples. All the selected studies aim to evaluate the effect of psychological intervention program on women or couples with primary infertility receiving ART treatment. All the selected studies were performed with ethical committee approval and obtained informed consent from the study participants.

**Table 2** describes methodological characteristics of the selected study. Out of six studies, four were conducted in a phased manner. Phase I of the study being descriptive survey measuring quantitative aspects and Phase II being experimental study.<sup>21-24</sup> All included studies involved two group comparison study designs with pre and post assessment<sup>20,21,23-25</sup> except one study which followed one group pretest and post-test study design.<sup>22</sup> Studies with control groups used randomization procedures to allocate participants to intervention and control groups. None of the studies were blinded for intervention treatment. All studies used pre-to-post-test comparison to evaluate the efficacy of the psychological intervention. In two studies participants in the control group did not receive any specific treatment;<sup>20,21</sup> other three study participants were waitlisted and received intervention treatment after the completion of main study.<sup>23-25</sup>

**Table 3** demonstrates that these interventions have generally shown positive effects in improving psychological well-being,<sup>21</sup> coping strategies, and reducing infertility-related stress among Indian couples undergoing ART treatment.<sup>21,22</sup> Additionally, some interventions have reported higher pregnancy rates in the experimental groups compared to control groups, indicating a potential impact on treatment outcomes. The quality indicators for the interventions range from fair to good, suggesting the overall effectiveness of the intervention programs. Duration of intervention varied between 4 weeks to 12 weeks with time duration of 30-120 mins/session. In four studies, follow up was carried to assess the consistency of the improvement gained from intervention<sup>21-24</sup> and five studies reported pregnancy rate.<sup>21,22,24,25</sup>

## DISCUSSION

Four studies have included infertility-related stress as an outcome measures. Kousalya et al. (2014)<sup>25</sup> used Depression, Anxiety, Stress Scale (DASS 21) questionnaire while other three researchers used Fertility Problem Inventory (FPI) to assess stress levels which consist of five subscales (Social concern (SC), Sexual concern (SEC), relationship concern (RC), need for parenthood (NP), rejection of childfree life (RCL) and global stress score (GSS) refers to overall sum of subscale scores).<sup>21,22,24</sup> However, subscale scores were not reported.<sup>24</sup> The mean GSS or stress score was significantly lower from baseline in the experimental group ( $p=0.001$ ) compared to the control group on women<sup>21,25</sup> and couples.

<sup>22,25</sup> A significant decrease was observed in subscale scores ( $p=0.001$ ) as well.<sup>21,22</sup> The mean stress/ GSS of pretest vs post-test score in the intervention group among women was  $28.6\pm 5.2$  vs  $16.5\pm 5.9$ ,  $p=0.0019$ <sup>25</sup>,  $213.4\pm 24.4$  vs  $136.6\pm 27.4$ ,  $p=0.001$ <sup>21</sup>,  $222.4\pm 5.0$  vs  $101.2\pm 9.36$ ,  $p=0.001$ <sup>22</sup>,  $187.6\pm 24.3$  vs  $143.7\pm 27.7$ ,  $p=0.001$ .<sup>24</sup> Specifically, social concern<sup>22</sup> and need for parenthood<sup>21</sup> was higher in women before intervention. Infertility related stress was higher among women than men.<sup>22,24</sup> No significant difference was seen in the control group for stress score / GSS and subscales.

Understanding the psychological aspects of infertility is crucial for holistic treatment approaches. Psychological frameworks, evolving from psychogenic theories to current psychosocial context models, highlight the emotional toll of infertility on individuals and couples. Integrating psychological support alongside medical interventions enhances overall well-being and treatment outcomes.<sup>26</sup> This approach underscores the necessity of addressing psychosocial factors to provide comprehensive care in infertility treatment, emphasizing global perspectives on patient experiences.<sup>27</sup>

Psychological well-being encompasses four subscales namely depression (MHD), Anxiety (MHA), behavioural control (MHB), positive affect (MHP) and sum of subscale scores was termed as mental health inventory (MHIT). A higher score was considered as better mental health. The mean of MHIT and subscale post-test intervention scores were statistically significant when compared to control group except MHD. The mean baseline and post-test score of MHIT in intervention group was  $58.3\pm 11.8$ ,  $71.0\pm 10.85$  respectively ( $p=0.001$ ). Slight dip was observed in follow up period.<sup>21</sup>

There was a reduction in the level of depression<sup>20,23,24,25</sup> and anxiety<sup>20,25</sup> from baseline to post-test in experimental group. While in the control group, the levels of depression and anxiety were like baseline. Between group and within group difference was statistically significant for depression and anxiety. Level of depression was higher among women than men. The mean depression score among men and women at baseline vs post-test was  $4.9\pm 3.6$  vs  $2.9\pm 3.2$ ,  $13.1\pm 7.0$  vs  $7.0\pm 5.8$  respectively.<sup>24</sup> Depression was further classified as affective factor and somatic factor which also gradually reduced with significant difference throughout the intervention period.<sup>23</sup> There was no change in control group.

The level coping skill comprises four subscales, which includes active avoidance, active confrontation, passive avoidance, meaning based coping and total coping skill was sum of all four-subscale scores.<sup>21,22</sup> A higher score indicates greater coping skill/ability. Average score of coping skill in the baseline lies between  $22.8\pm 2.8$ <sup>22</sup> to  $28.6\pm 7.6$ <sup>21</sup> in women and  $20.8\pm 2.4$  in men.<sup>22</sup> Male participants score was lower than their female counter part. Post-test intervention coping skill score had significantly improved in both women<sup>21,22</sup> and men.<sup>22</sup> Post-test score in control group did not differ

from the baseline score.<sup>21</sup> There was no significant difference in the control group.

Two studies included irrational emotive behavioural therapy as intervention treatment. Nik, 2013,<sup>23</sup> reported irrational belief with seven subscale factors measuring rationality, self-downing, need for approval, need for achievement, need for comfort, demand for fairness and other downing factor. There was a decrease in irrational belief score across the intervention period. The mean score of total irrational belief in intervention group at baseline, post-test and follow up was 79.8±7.1, 71.0±5.8 and 69.2±6.2 ( $p=0.0001$ ) respectively. Between and within group difference was statistically significant in experimental group.

The level of oxidative stress marker, Malondialdehyde (MDA) reduced, and Superoxide dismutase (SOD) level increased in the intervention group. The average of MDA was 3.0±0.5 vs 1.9±0.1 ( $p=0.0001$ ) and SOD was 7.8±0.8 vs 13.0±1.1 ( $p=0.0001$ ). There was a significant difference in between and within group on oxidative stress biomarker MDA and SOD level in the intervention group compared to control group.<sup>25</sup>

The mean score of self-esteem<sup>20</sup> and marital adjustment<sup>20,24</sup> had significantly improved post intervention treatment while control group did not show any significant difference.

Knowledge of conception improved significantly  $p=0.001$  among couples post intervention treatment.<sup>22</sup> The average score was parallel between women and men. The mean score of women and men at baseline and post-test were 8.4±2.2 vs 22.4, 8.7±2.9 vs 22.9±0.3, respectively.

Four studies had reported pregnancy rate post intervention.<sup>21,22,24,25</sup> According to the hospital record shown by Vetriselvi (2014)<sup>22</sup> and post intervention result by Asifunsia (2020)<sup>21</sup> revealed marginal increase in conception. A marginal increase in the rate of conception was observed during post intervention follow-up.<sup>21,22</sup> Percentage of pregnancy rate between intervention group vs control group was 26% vs 10%<sup>21</sup>, 42% (n=48) vs 10% (n=11)<sup>25</sup>, 22% (n=11) vs 6%(n=3) (compared with hospital record between 2010-2011).<sup>22</sup> Saraswathi (2019)<sup>24</sup> reported seven pregnancies in the intervention group. However, the objective of that pre-test and post-test study was not to assess the pregnancy outcome.

## CONCLUSIONS

There is a need to conduct more research incorporating psychological counselling during ART treatment. This systematic review article intensely attempted to retrieve Indian studies related to psychological counselling and its efficacy during treatment. While we could find only one original article, the remaining were doctoral studies submitted for PhD degree. However, the findings of the thesis work reveal the need to

bridge the gap with medical and psychological counselling during ART treatment. Owing to the dearth of relevant studies from India, the need for more indigenous future studies to draw definitive conclusion on the efficacy of psychological counselling among infertile couples during ART treatment is recommended.

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### Conflict of interest

We declare no conflicts of interests.

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### Authors' Contribution:

The first author conducted a comprehensive review of relevant research papers, articles, and journals, and drafted the Introduction, establishing a solid foundation for the manuscript. The second author was responsible for the Methods, Results, and References sections, ensuring methodological accuracy and clear presentation of findings. Both authors collaborated closely to discuss and craft the Discussion and Conclusion sections, combining their ideas and interpretations to make a clear and comprehensive analysis.

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## REFERENCES

1. Mascarenhas MN, Flaxman SR, Boerma T, Vanderpoel S, Stevens GA. National, regional, and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys. *PLoS Med.* 2012;9(12):e1001356.
2. Naina P, Sharma H. Prevalence and potential determinants of primary infertility in India: Evidence from Indian demographic health survey. *Clin Epidemiol Glob Health.* 2021 Jan 1; 9:162–70.
3. Cousineau TM, Domar AD. Psychological impact of infertility. *Best Pract Res Clin Obstet Gynaecol.* 2007 Apr;21(2):293–308.
4. Pinborg A, Hougaard CO, Nyboe Andersen A, Molbo D, Schmidt L. Prospective longitudinal cohort study on cumulative 5-year delivery and adoption rates among 1338 couples initiating infertility treatment. *Hum Reprod Oxf Engl.* 2009 Apr;24(4):991–9.
5. Patel A, Sharma PSVN, Narayan P, Binu VS, Dinesh N, Pai PJ. Prevalence and predictors of infertility-specific stress in women diagnosed with primary infertility: A clinic-based study. *J Hum Reprod Sci.* 2016;9(1):28–34.
6. Zegers-Hochschild F, Adamson GD, de Mouzon J, Ishihara O, Mansour R, Nygren K, et al. International Committee for Monitoring Assisted Reproductive Technology (ICMART) and the World Health Organization (WHO) revised glossary of ART terminology, 2009. *Fertil Steril.* 2009 Nov;92(5):1520–4.

7. Klonoff-Cohen H, Chu E, Natarajan L, Sieber W. A prospective study of stress among women undergoing in vitro fertilization or gamete intrafallopian transfer. *Fertil Steril*. 2001 Oct;76(4):675–87.
8. Rooney KL, Domar AD. The relationship between stress and infertility. *Dialogues Clin Neurosci*. 2018 Mar;20(1):41–7.
9. Singh A, Dhaliwal L, Kaur A. Infertility in a primary health centre of north India: a follow-up study. *J Fam Welf*. 1996; 42:51–6.
10. Abbey A, Andrews FM, Halman LJ. Gender’s role in responses to infertility. *Psychol Women Q*. 1991;15(2):295–316.
11. Fertility counselling: Clinical guide and case studies. 2015. p. xiii, 333.
12. Manimekalai K, Poulpunitha D, Veeramani P. Infertility: An Alarming Situation in India. *Int J Sci Technol Res*. 2020 Dec 4; 9:2606–9.
13. Rohita C, Bikkina N. Fertility related qualify of life among women seeking assisted reproductive technologies. *IAHRW Int J Soc Sci Rev*. 2019;7(6):1800–5.
14. Csemiczky G, Landgren BM, Collins A. The influence of stress and state anxiety on the outcome of IVF-treatment: psychological and endocrinological assessment of Swedish women entering IVF-treatment. *Acta Obstet Gynecol Scand*. 2000 Feb;79(2):113–8.
15. Smeenk MJJ, Verhaak CM, Vingerhoets AJJM, Sweep CGJ, Merkus JMWM, Willemsen SJ, et al. Stress and outcome success in IVF: the role of self-reports and endocrine variables. *Hum Reprod Oxf Engl*. 2005 Apr;20(4):991–6.
16. Frederiksen Y, Farver-Vestergaard I, Skovgård NG, Ingerslev HJ, Zachariae R. Efficacy of psychosocial interventions for psychological and pregnancy outcomes in infertile women and men: a systematic review and meta-analysis. *BMJ Open*. 2015 Jan 28;5(1): e006592.
17. Zhou R, Cao YM, Liu D, Xiao JS. Pregnancy or Psychological Outcomes of Psychotherapy Interventions for Infertility: A Meta-Analysis. *Front Psychol*. 2021 Mar 31; 12:643395.
18. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan—a web and mobile app for systematic reviews. *Syst Rev*. 2016 Dec 5;5(1):210.
19. National Heart, Lungs, and Blood Institute (NHLBI), Quality assessment of controlled intervention studies, 2013, NIH. Available from: <https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools>
20. Kharde SN. Effectiveness of a Therapeutic Counselling Intervention for Depression, Anxiety, Self Esteem and Marital Adjustment Among Infertile Women [dissertation]. [Karnataka, India]: KLE University; 2013.
21. Asifunisa S. Psychosocial Correlates and Effect of Psychological Intervention on Infertility Related Stress Psychological Well Being and Coping Strategies Among Women with Infertility [dissertation]. University of Madras; 2020
22. Vetriselvi V. A Study to Assess the Stress and Coping Among Women with Primary Infertility and To Evaluate the Effectiveness of Counselling and Relaxation Therapy Among the Couples with Primary Idiopathic Infertility Attending Infertility Clinic at Jipmer Pondicherry [dissertation]. Annamalai University; 2014
23. Nik MM. Effect of rational emotive behavior therapy (REBT) on depression and irrational beliefs among infertile women [dissertation]. University of Mysuru; 2012.
24. Saraswathi S. Effect of infertility counselling intervention on stress and depression of couples with primary infertility during IVF treatment [dissertation]. [Chennai, India]: University of Madras; 2020.
25. Kousalya K, Reddy S, Jayashree K. Assessment of Stress in Infertile Women and the Impact of Stress Management Counseling. *Int J Med Sci*. 2014;47(2):1539.
26. Stanton AL, Dunkel-Schetter C. Psychological Adjustment to Infertility. In: Stanton AL, Dunkel-Schetter C, editors. *Infertility: Perspectives from Stress and Coping Research* [Internet]. Boston, MA: Springer US; 1991 [cited 2024 Mar 26]. p. 3–16.
27. Greil AL. Infertility and psychological distress: a critical review of the literature. *Soc Sci Med*. 1997 Dec;45(11):1679–704.

**Table 1: Basic characteristics of included study**

Author & Year	Location	Region (Rural/Urban)	Objective of the selected studies	Gender	Age (years)
Kharde, (2013) <sup>20</sup>	Belgaum, Karnataka, India	Both	To evaluate the effectiveness of psychological intervention program on women in fertility treatment	Women	19-45
Asifunisa,2020 <sup>21</sup>	Chennai, Tamil Nadu, India	Both	To determine the effectiveness of the psychological intervention on infertility-related stress, psychological well-being, and coping strategies among women with infertility problems in Chennai	Women	25-45
Vetriselvi, 2014 <sup>22</sup>	Pondicherry, union territory, India	Both	To evaluate the effectiveness of counselling and relaxation therapy among the couples with primary infertility	Couples	21- 40
Nik, 2013 <sup>23</sup>	Mysore, Karnataka, India	Not specified	To study the effect of Rational Emotive Behavior Therapy (REBT) on depression and irrational beliefs among infertile women	Women	20-40

**Table 1: (Continued)**

Author & Year	Location	Region (Rural/Urban)	Objective of the selected studies	Gender	Age (years)
Saraswathi,2019 <sup>24</sup>	Chennai, Tamil Nadu, India	Urban	To observe the effect of Infertility Counselling Intervention Program on primary infertility couples during IVF treatment	Couples	25- 55
Kousalya, 2014 <sup>25</sup>	Chennai, Tamil Nadu, India	Not specified	To estimate the levels of blood malondialdehyde and superoxide dismutase and to assess the impact of counselling on depression, anxiety and stress among infertile women.	Women	18-40

**Table 2: Methodological characteristics of the included study**

Author	Study Design	Follow-up	Participants (N) I: intervention C: control (final analysis)	No. of Drop-outs	Assessment Tool	Outcome measures
Kharde, 2013 <sup>[20]</sup>	Randomized controlled trial	No	460 I: 230 (230) C: 230 (230)	Not reported	The Hamilton depression rating scale (HAM- D) The Hamilton anxiety rating scale (HAM- A) Rosenberg self-esteem scale Marital adjustment inventory	Depression Anxiety Self-esteem Marital adjustment
Asifunisa, 2020 <sup>21</sup>	Quasi experimental two group pre-post test design	Follow-up after 6 weeks	Phase I: 242 Phase II: 71 (62) [subset from phase I] I: 31 (23) C: 31 (not mentioned)	Phase II: 9 I: 8 C: not reported	Fertility Problem Inventory (FPI) Mental Health Inventory (MHI) Copenhagen Multicentre Psychosocial Infertility Coping Strategies Scale (COMPI)	Infertility-related stress psychological well-being coping strategies
Vetriselvi, 2014 <sup>22</sup>	Quasi experimental one group pre-post-test design	Follow-up till 1 year	Phase I: 350 (women) phase II: 100 (men=50, women=50)	Not reported	Fertility problem inventory (FPI) Copenhagen Multicentre Psychosocial infertility coping scale Questionnaire on knowledge of conception	Stress level Coping ability Knowledge on conception pregnancy rate
Nik, 2013 <sup>23</sup>	Experimental two group pre-post-test design	Follow-up after 4 weeks	Phase I:100 Phase II & III: 50 (40) I: 20 C: 20	Not reported	Beck Depression Inventory II (BDI-II), The Shortened General Attitude and Belief Scale (SGABS)	Depression Irrational beliefs
Saraswathi, 2019 <sup>24</sup>	Quasi experimental two group pre-post-test design	Follow-up after 3 months	Phase I- 284 (232), FGD -46 Phase II- 220 (120) I: 60 (30) C: 60 (26)	Phase I- 52 FGD- Nil Phase II- 100 I: 30 C: 34	The Fertility Problem Inventory (FPI) The Patient Health Questionnaire 9 (PHQ-9)	Infertility-related stress Depression Marital understanding Coping methods
Kousalya, 2014 <sup>25</sup>	Randomized controlled trial	Follow-up after 3 months	230 I: 115 C:115	Nil	Depression, Anxiety, Stress scale Questionnaire (DASS21) Oxidative stress biomarker- Malondialdehyde (MDA) and Superoxide dismutase (SOD)	Depression Anxiety Stress

**Table 3: Intervention approaches and its effectiveness on psychological outcomes**

Author	Intervention program	Intervention Duration (weeks)	Intervention format	No. of Sessions (Time duration)	Effectiveness of the intervention	Quality Indicator
Kharde, 2013 <sup>20</sup>	Structured psychological therapeutic counselling program along with CD demonstration for stress management through deep breathing technique, meditation and advice on diet and lifestyle choices	4	3 individual + 1 group	4 (30-60mins)	Structured psychological therapeutic counselling program had positive improvement in the level of depression, anxiety, self-esteem and marital adjustment.	Good
Asifunisa, 2020 <sup>21</sup>	Combination of cognitive behavior therapy (CBT), counselling, Jacobson's progressive muscle relaxation (JPMR) mindfulness techniques	6	Individual	12 (60 mins) (Weekly twice)	* The psychological intervention has significantly improved psychological well-being, coping strategies and reduced infertility-related stress. * Experimental group reported higher pregnancy rate (26%) compared to control group (10%).	Good
Vetriselvi, 2014 <sup>22</sup>	Counselling, education on knowledge of conception and relaxation therapy includes deep breathing exercise, meditation, progressive muscle relaxation and advice on diet and lifestyle choices	8	Group	4 (~60mins) (Biweekly)	*Counselling and relaxation therapy significantly decreased the level of stress and improved coping ability, knowledge level on conception. *Experimental group reported higher pregnancy rate (22% n=11) compared to hospital record (6% n=3).	Fair
Nik, 2013 <sup>23</sup>	Rational Emotive Behavior Therapy (REBT) includes assessing and managing irrational beliefs with behavioural, cognitive, emotive techniques	12	Group	24 (120mins) (Weekly twice)	REBT is effective in decreasing the level of depression and irrational beliefs. Therefore, improved rational thinking.	Good
Saraswathi, 2019 <sup>24</sup>	Module of Rational Emotive Behavioural Therapy and Acceptance Commitment Therapy Infertility	12	Individual or couple	12 (60mins) (Weekly once)	*Infertility Counselling Intervention Program (ICIP) had reduced the infertility related stress, depression and improved coping methods. *Researcher reported seven of nine women were pregnant in Intervention group.	Good
Kousalya et al, 2014 <sup>25</sup>	Module of counselling	12	Individual	6 (Biweekly)	*Counselling has positive impact on stress, depression and anxiety. * Counselling significantly reduced the level of MDA and increased SOD level post intervention. * Counselling along with infertility treatment improved treatment outcome. * Experimental group reported higher pregnancy rate (42% n=48) compared to control group (10% n=11).	Good

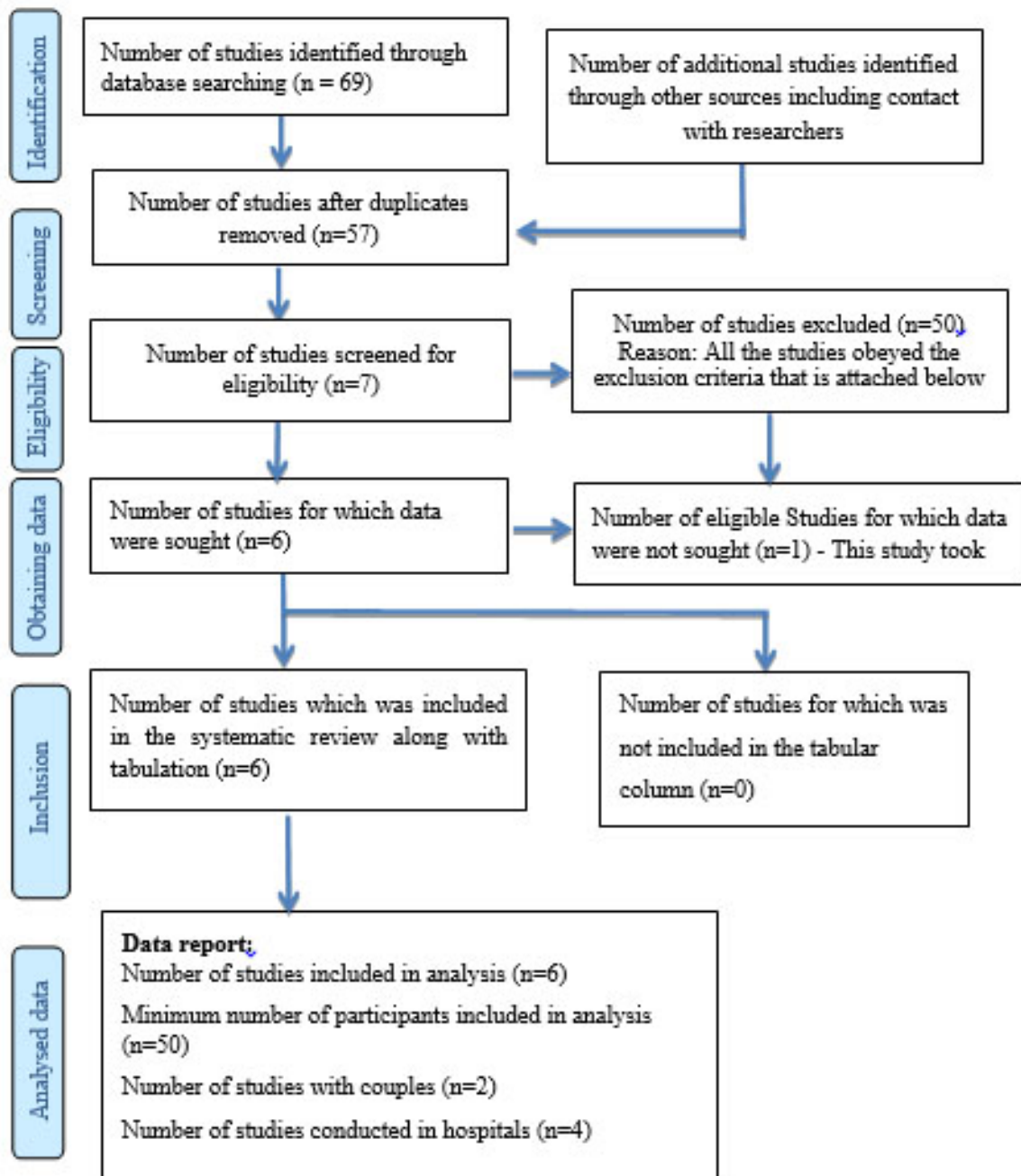


Figure 1: PRISMA flow chart of selection of studies.