

Effectiveness of a Mindfulness-Based Programme on Psychological Well-Being Among Women Undergoing Infertility Treatment in Erode, India

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Abstract: Infertility affects 10–15% of couples worldwide and is associated with psychological distress, marital strain, and social stigma, particularly among women in patriarchal societies. Despite advancements in assisted reproductive technologies, psychological support continues to be underutilized. This study evaluated the effectiveness of a mindfulness-based program (MBP) on the psychological well-being of women undergoing infertility treatment and examined its association with demographic variables. A quasi-experimental, non-equivalent pretest–posttest design was used with 30 women (experimental group = 15, control group = 15) at Rakshan Hospital, Eddapadi. The experimental group received a three-week MBP, which included relaxation breathing and Tadasana, alongside routine care, while the control group received routine care only. Psychological well-being was assessed using Ryff's 42-item scale of psychological well-being. Results indicated baseline comparability; pre-test well-being was poor in both groups. Post-intervention, the experimental group demonstrated significant improvement (67% “very good,” 33% “good”) compared to moderate gains in controls (87% “good,” 13% “poor”), with total mean scores increasing from 111.3 to 219.1 versus 72.1 to 141.6 ($t = 14.96$, $p < 0.05$). Post-test psychological well-being was significantly associated with marital consent and pregnancy-related fear in the experimental group. The MBP effectively enhanced psychological well-being, supporting its integration as a culturally relevant, non-pharmacological intervention for infertility care.

Keywords: Infertility, Mindfulness, Psychological Well-Being, Women's Health, India

1. Introduction

Infertility is a major reproductive health concern that affects approximately 10–15% of couples globally. The World Health Organization defines infertility as the inability to achieve pregnancy after 12 months of regular, unprotected sexual intercourse (World Health Organization, 2020). Increasing evidence conceptualizes infertility not only as a biomedical condition but also as a biopsychosocial phenomenon associated with considerable emotional distress, marital disruption, and social stigma, particularly among women living in patriarchal contexts (Peterson et al., 2011). In India, infertility is emerging as a significant public health issue due to its rising prevalence, limited accessibility to assisted reproductive technologies, and persistent social expectations surrounding motherhood (World Bank, 2019).

The psychological burden of infertility frequently manifests as anxiety, depression, guilt, helplessness, and lowered self-esteem, which collectively influence interpersonal relationships and diminish overall well-being (Cousineau & Domar, 2007). Women often experience intense societal pressure to conceive, leading to feelings of inadequacy, social isolation, and suppressed emotional expression (Unisa

2010). The literature further indicates that persistent psychological distress may adversely affect hormonal functioning and reproductive outcomes, thereby perpetuating a cycle in which emotional strain is both a cause and consequence of infertility (Rooney & Domar, 2016).

Despite advancements in assisted reproductive technologies, psychological support continues to be underutilized. (ICMR, 2017). Mental health stigma, lack of awareness, and scarcity of trained counsellors contribute to the underutilization of psychosocial services among women undergoing infertility treatment (Desai et al., 2021). Consequently, many women continue prolonged treatment without receiving emotional support, thereby experiencing increased psychological vulnerability and financial strain (Dyer & Patel, 2012). Therefore, integrating low-cost and evidence-based psychological strategies within infertility services is essential to promote holistic care (Global Burden of Disease Study, 2020).

Mindfulness-based approaches emphasize non-judgmental awareness, emotional acceptance, and self-compassion, facilitating adaptive coping and promoting psychological resilience (Kabat-Zinn, 1990; Shapiro et al., 2006). Research indicates that mindfulness interventions can reduce stress, anxiety, and fertility-related distress and enhance the

psychological well-being of women undergoing infertility treatment (Galhardo et al., 2013). Emerging evidence also suggests potential benefits for treatment adherence, satisfaction, and improved reproductive outcomes (Li et al., 2016; Wang et al., 2023). Given the cultural salience of motherhood in India and the psychosocial implications of infertility, mindfulness-based programs may serve as an accessible and culturally relevant intervention to improve the psychological well-being of women undergoing infertility treatment (Nargund, 2009). In this context, evaluating the effectiveness of a mindfulness-based program within Indian infertility settings is essential for promoting holistic care (Galhardo et al., 2013; Wang et al., 2023).

2. Methodology

A quantitative evaluative research approach was adopted using a quasi-experimental, non-equivalent pretest–posttest control group design to determine the effectiveness of a Mindfulness-Based Programme (MBP) on psychological well-being among women undergoing infertility treatment. Participants were allocated to experimental and control groups without randomization. Both groups underwent a baseline assessment (O₁). The experimental group subsequently received MBP (X) in addition to routine infertility care, whereas the control group continued routine care alone. Post-test assessment (O₂) was performed after the intervention.

Setting and Participants

The study was conducted at Rakshan Hospital, Eddapadi, a 75-bedded multispecialty facility with approximately 10–15 gynecological beds and an outpatient volume of 60–70 infertility cases per week. The target population comprised women undergoing infertility treatment in hospitals in Eddapadi, and the accessible population included those who attended Rakshan Hospital during the study period and fulfilled the eligibility criteria.

Sampling and Sample Size

A total of 30 women were recruited through non-probability purposive sampling; 15 participants were included in the experimental group and 15 in the control group. Women were included if they were aged 21–35 years, undergoing assisted reproductive technology for infertility, able to understand Tamil or English, not practicing yoga or relaxation techniques, and willing to participate in the study. Women with an adoption history, major medical or psychiatric illness, substance use, recent major life events, irregular ART schedule, or who attended fewer than ten MBP sessions were excluded.

Intervention Description

The mindfulness-based programme comprised relaxation breathing and Tadasana (mountain poses) delivered through audio-visual demonstrations by the researcher. Relaxation breathing was practiced in a seated posture with focused breathing (inhalation and exhalation counts of 1–4) for 5–10 cycles per session, four sessions per week for three weeks, aiming to reduce stress, enhance emotional regulation, and promote awareness of the present moment. Tadasana was practiced in a standing position with aligned posture, upward stretch, gaze stabilization, and repeated 5–10 times per

session, four sessions per week for three weeks, aiming to reduce physical tension, improve balance, and enhance body awareness. The sessions were conducted for three weeks with reinforcement and follow-up, including daily practice logs. The program was provided in addition to routine infertility care. The control group received routine infertility management only and was offered mindfulness information following the completion of the study to ensure ethical equivalence.

Outcome Variable and Instrumentation

The dependent variable was psychological well-being, assessed using Ryff's 42-item Psychological Well-Being Scale, which contains six domains (Autonomy, Environmental Mastery, Personal Growth, Positive Relations, Purpose in Life, and Self-Acceptance). Each item was rated on a six-point Likert scale, with higher scores indicating greater psychological well-being of the participants. The scoring system categorizes psychological well-being as Very Good (184–252), good (113–183), or poor (42–112). Content validity was established by experts in nursing, psychology, medicine and statistics. Reliability determined using the split-half method yielded a coefficient of $r = 0.81$, indicating good internal consistency.

Pilot Study

A pilot study was conducted among four participants (two per group) to assess the feasibility, instrument clarity, and acceptability of the MBP. No major modifications were made. Pilot responses indicated good feasibility, adherence, and perceived improvement in well-being, supporting the continuation of the main study.

Data Collection Procedure

After obtaining informed consent, demographic and baseline psychological well-being data were collected (pre-test), followed by MBP sessions for the experimental group. Post-test data were collected three weeks after the intervention. Data collection was completed within a four-week period, which included assessment, intervention implementation, follow-up, and post-intervention evaluations.

Ethical Considerations

Ethical approval was obtained before data collection. Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study. To maintain ethical fairness, mindfulness guidance was provided to the control group after the data collection.

3. Results and Interpretation

Demographic Variables

The experimental ($n = 15$) and control ($n = 15$) groups were demographically homogeneous, ensuring comparability and minimizing confounding factors. Most participants in both groups were aged 21–25 years (experimental = 46%; control = 40%). Most women belonged to joint families (experimental = 60%; control = 53%) and were engaged in business or government employment, indicating similar occupational profiles between the groups. Arranged marriages predominated in both groups (experimental: 54%; control: 67%). The prevalence of psychiatric illness was low

(experimental group = 13%; control group = 7%), and most women were physically healthy (experimental group = 67%; control group = 73%). Very few participants reported fear of pregnancy (experimental = 13%; control = 7%), while approximately one-third had a history of miscarriages (experimental = 40%; control = 33%). Overall, the experimental and control groups were comparable across demographic variables, ensuring that the observed changes

in psychological well-being were attributable to the intervention rather than baseline differences.

Assessment of Psychological Well-Being

• Within-Group Comparisons

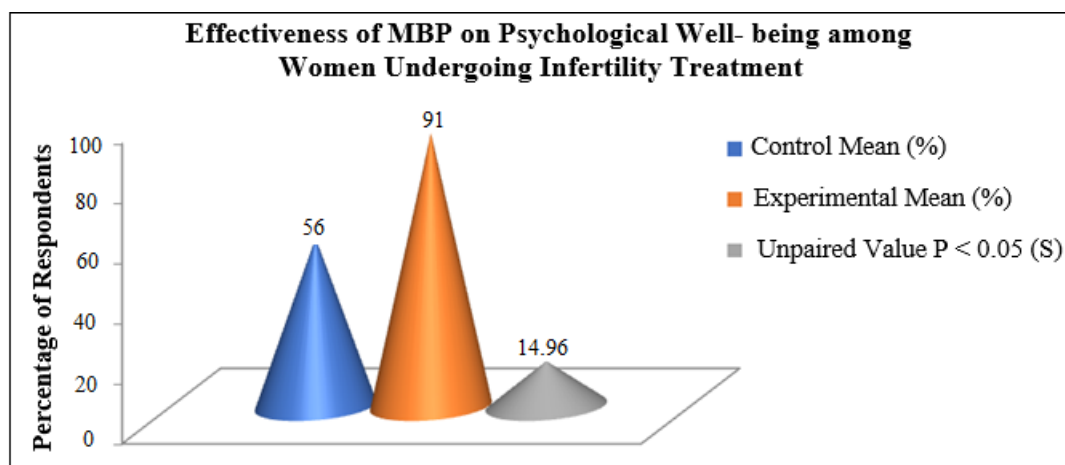
S. No	Psychological Well-being in Experimental Group	Pre - Test			Post - Test			Difference in Mean (%)	Paired <i>t</i> value	Significance (p)
		Mean	SD	Mean (%)	Mean	SD	Mean (%)			
1	Autonomy	18.8	0.52	44.8	35	0.22	83.3	38.5	18.7	p < 0.05 (S)
2	Envi. mastery	18.9	0.31	45	36.2	0.4	86.2	41.2	21.8	p < 0.05 (S)
3	Personal growth	18.2	0.48	43.3	37.8	0.36	90	46.7	21.9	p < 0.05 (S)
4	Positive relations	18.4	0.48	43.8	35.5	0.6	84.5	40.7	19.41	p < 0.05 (S)
5	Purpose in life	18.4	0.72	43.8	36.6	0.68	87.1	43.3	18.52	p < 0.05 (S)
6	Self-acceptance	18.6	1.78	44.3	38	1.54	90.5	46.2	17.42	p < 0.05 (S)
Total (6 domains)		111.3	—	44.2	219.1	—	86.9	42.7	23.52	p < 0.05 (S)

- Paired t-test analyses revealed significant improvements in all six domains of psychological well-being **in the experimental group**. The mean pre-test scores increased from 18.8 to 35.0 in autonomy ($t = 18.7$, $p < 0.05$), 18.9 to 36.2 in environmental mastery ($t = 21.8$, $p < 0.05$), 18.2 to 37.8 in personal growth ($t = 21.9$, $p < 0.05$), 18.4 to 35.5 in positive relations ($t = 19.41$, $p < 0.05$), 18.4 to 36.6 in purpose in life ($t = 18.52$, $p < 0.05$), and 18.6 to 38.0 in self-acceptance ($t = 17.42$, $p < 0.05$). The total mean score across the six domains increased from 111.3 to 219.1, reflecting a mean percentage increase of 86.9% ($t = 23.52$, $p < 0.05$). These findings suggest that the mindfulness-based program substantially improved psychological well-being.

- In the control group**, paired t-tests also demonstrated significant but smaller improvements in the outcomes. Autonomy increased from a mean of 18.1 to 26.6 ($t = 8.7$, $p < 0.05$), environmental mastery from 16.1 to 21.8 ($t = 9.65$, $p < 0.05$), personal growth from 21.2 to 22.9 ($t = 8.82$, $p < 0.05$), positive relations from 19.4 to 23.3 ($t = 8.8$, $p < 0.05$), purpose in life from 18.6 to 29.4 ($t = 8.21$, $p < 0.05$), and self-acceptance from 16.3 to 26.3 ($t = 10.62$, $p < 0.05$). The total mean score increased from 72.1 to 141.6, reflecting a mean percentage change of 56.2%. The results suggest that routine infertility care may contribute to modest improvements in well-being, although the gains are considerably smaller than those observed in the experimental group.

S. No	Psychological Well-being in Control Group	Max. Score	Pre - Test			Post - Test			Difference in Mean (%)	Paired <i>t</i> value	Significance (p)
			Mean	SD	Mean (%)	Mean	SD	Mean (%)			
1	Autonomy	42	18.1	0.32	43.1	26.6	0.42	63.3	20.2	8.7	p < 0.05 (S)
2	Envi. mastery	42	16.1	0.38	38.3	21.8	0.42	52	13.7	9.65	p < 0.05 (S)
3	Personal growth	42	21.2	0.42	50.5	22.9	0.42	54.8	4.3	8.82	p < 0.05 (S)
4	Positive relations	42	19.4	0.51	46.2	23.3	0.67	55.5	9.3	8.8	p < 0.05 (S)
5	Purpose in life	42	18.6	0.97	44.3	29.4	1.15	70	25.7	8.21	p < 0.05 (S)
6	Self-acceptance	42	16.3	1.9	38.8	26.3	8.06	62.6	23.8	10.62	p < 0.05 (S)
Total (6 domains)		252	72.1	—	28.6	141.6	—	56.2	27.6	13.21	p < 0.05 (S)

• Between-Group Comparison and Effectiveness of MBP



Post-test comparisons using unpaired t-tests demonstrated that the experimental group had significantly higher scores across all domains compared with the control group. Autonomy scores were higher in the experimental group ($M = 35.0$, $SD = 0.22$) than the control group ($M = 26.6$, $SD = 0.42$), $t = 10.2$, $p < 0.05$. Environmental mastery ($t = 9.36$, $p < 0.05$), personal growth ($t = 9.22$, $p < 0.05$), positive relations ($t = 8.53$, $p < 0.05$), purpose in life ($t = 10.96$, $p < 0.05$), and self-acceptance ($t = 9.42$, $p < 0.05$) similarly showed significantly greater improvement in the experimental group. The total mean post-test score in the experimental group ($M = 231.5$, $SD = 35$) was markedly higher than in the control group ($M = 141.6$, $SD = 27.6$), $t = 14.96$, $p < 0.05$. These findings confirm the effectiveness of the mindfulness-based programme in enhancing psychological well-being among women undergoing infertility treatment.

Association with Demographic Variables

Chi-square analyses revealed that in the experimental group, post-test psychological well-being was significantly associated with consent to marriage ($\chi^2 = 4.29$, $p < 0.05$) and fear of pregnancy ($\chi^2 = 4.92$, $p < 0.05$). Other variables, including age, type of family, occupation, psychiatric or physical illness, and history of miscarriage, were not significantly associated with the outcomes. In the control group, only consent to marriage was significantly associated with post-test well-being ($\chi^2 = 5.36$, $p < 0.05$), while all other demographic variables showed no significant effect. These results highlight the influence of specific sociocultural factors, such as marital consent and pregnancy-related anxiety, may influence the psychological outcomes of women undergoing infertility treatment.

4. Results and Discussion

Demographic Profile and Group Comparability

The experimental ($n=15$) and control ($n = 15$) groups were comparable in all major demographic and clinical variables, including age, employment status, type of marriage, history of miscarriage, and presence of psychiatric or physical illness. Nearly half of the participants in both groups belonged to the 21–25 years age category (46% and 40%, respectively). Comparable distributions of baseline characteristics indicated sample homogeneity, thereby minimizing selection bias and ensuring the validity of group comparisons.

Similar demographic comparability was reported in previous studies prior to mindfulness-based interventions have been reported in infertility studies conducted by Galhardo et al. (2013) and Chayadi et al. (2019) and mindfulness clinical trials by Carmody and Baer (2008), supporting the methodological soundness of the present study.

Psychological Well-Being Before and After Mindfulness-Based Programme

Pre-test findings showed that psychological well-being was poor among women in both groups (80% experimental; 73% control), consistent with the literature that infertility is strongly associated with anxiety, depression, and emotional distress (Cousineau & Domar, 2007; Greil et al., 2010).

After the intervention, there was a marked improvement in all domains of psychological well-being in the experimental group, with 67% categorized as Very Good and 33% as Good, whereas the control group showed only mild natural improvement (87% Good and 13% Poor). Domains such as autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance showed significant improvement, and the total well-being score nearly doubled after the programme.

In the present study, the control group also demonstrated improvement in psychological well-being between the pre-test (Mean = 72.1; Mean% = 28.6) and post-test (Mean = 141.6; Mean% = 56.2), with a statistically significant paired t value of $t = 13.21$ ($p < 0.05$). However, the magnitude of improvement was considerably lower than that observed in the experimental group, which increased from a pre-test mean of 111.3 (mean% = 44.2) to a post-test mean of 231.5 (mean% = 86.9), with a higher paired-t value of $t = 23.52$ ($p < 0.05$). Furthermore, the post-test difference between the groups was statistically significant, as evidenced by the unpaired t-value of $t = 14.96$ ($p < 0.05$), indicating that the enhancement in psychological well-being was markedly greater in the experimental group. This relative difference may be explained by the fact that psychological improvement can occur naturally during infertility treatment and routine psychosocial support, and also because the mindfulness program was not an isolated intervention but was delivered in addition to routine infertility care, whereas the control group continued to receive only routine care.

Similar improvements following mindfulness training among infertile women were reported by Galhardo et al. (2013), Li et al. (2016), and Wang et al. (2023), who demonstrated reductions in distress, enhanced emotional functioning, and improvement in fertility-related quality of life.

Effectiveness and Associations of Mindfulness-Based Programme

The post-test scores of the experimental group were significantly higher across all domains than those of the control group, indicating that the mindfulness program effectively enhanced psychological well-being. Practices such as mindful breathing, relaxation, and yoga-based postures (e.g., Tadasana) may have contributed to emotional regulation, reduced stress, and improved coping, consistent with the mechanisms proposed by Kabat-Zinn (2003) and supported by clinical mindfulness research (Shapiro et al., 2006; Carmody & Baer, 2008).

Significant associations were found between post-test psychological well-being and variables such as marital consent and pregnancy-related fear in the experimental group, whereas only marital consent was significant in the control group. Similar associations between psychosocial variables and emotional well-being have been reported in infertility studies by Peterson et al. (2011) and Desai et al. (2021), who demonstrated that social acceptance and reproductive concerns substantially influenced psychological outcomes.

Variables such as age, employment, and type of marriage did not show significant influence, suggesting that mindfulness benefits were consistent across sociodemographic categories.

5. Conclusion

This study confirms that a mindfulness-based program is an effective non-pharmacological intervention for enhancing psychological well-being among women undergoing infertility treatment. These findings align with previous clinical and infertility mindfulness research (Galhardo et al., 2013; Li et al., 2016; Wang et al., 2023), highlighting mindfulness as a valuable supportive strategy for managing infertility-related emotional distress. The study achieved all objectives successfully and provides a strong justification for integrating mindfulness practice within infertility care in the Indian context.

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