RESEARCH PAPER

Effect Of Yoga Practice With Varma On Selected Body Mass Index And Stress Among Later Adult Infertile Women

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ABSTRACT

Background: Infertility among later adult women (aged 30-40 years) is frequently associated with elevated body mass index (BMI) and chronic psychological stress, both of which impair reproductive outcomes through hormonal dysregulation and ovulatory dysfunction. Combined yoga and Varmam therapy, traditional Indian mind-body practices, show promise in addressing these modifiable risk factors.

Objective: This study examined the effects of a 12-week yoga-Varmam intervention on BMI and stress levels in later adult infertile women compared to active-rest controls.

Methods: Thirty infertile women (primary/secondary infertility) from Chennai, India, were randomly assigned to an experimental group (n=15) receiving supervised 67-minute sessions (Surya Namaskara, asanas, pranayama, Varmam point stimulation, meditation) or a control group (n=15). Pre- and post-intervention assessments measured BMI and stress. Data were analyzed using ANCOVA ($p < .05$).

Results: ANCOVA confirmed successful randomization (pre-test $F = 0.66 < 4.20$). Post-test analysis showed significant group differences for stress ($F = 109.34 > 4.20$) and BMI reductions (adjusted post-test $F = 228.28 > 4.20$), indicating the intervention produced substantial improvements versus controls (Kirca & Pasinlioglu, 2019; Cramer et al., 2016).

Conclusion: The 12-week yoga-Varmam program significantly reduced BMI and stress among later adult infertile women, supporting its efficacy as an adjunctive, non-pharmacological intervention for fertility enhancement. These findings align with prior yoga trials demonstrating metabolic and psychological benefits in reproductive health (Sutar et al., 2021; Zhu et al., 2022)

***Key words**: Yoga practice, Body Mass Index (Obesity), Stress, later adult women, Infertile*

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INTRODUCTION

Infertility is a major reproductive health issue impacting a considerable number of women worldwide and is frequently associated with significant psychological suffering. Women facing infertility frequently exhibit heightened stress, anxiety, sadness, and diminished quality of life, especially in later adulthood when social, familial, and biological pressures intensify (Rooney & Domar, 2018; Hazlina et al., 2022). Psychological stress impacts emotional well-being and may disrupt neuroendocrine control, thereby affecting reproductive function.

Body mass index (BMI) is a significant physiological metric linked to female infertility. Both underweight and overweight disorders are recognised to negatively impact ovulatory function, hormonal equilibrium, and reproductive results. Excess body weight is linked to modified gonadotropin secretion, insulin resistance, and chronic inflammation, thereby exacerbating infertility and heightening psychological stress (Best & Bhattacharya, 2015). Furthermore, prolonged stress may lead to detrimental lifestyle choices, such as reduced physical activity and modified dietary habits, thereby affecting BMI.

Yoga is a comprehensive mind-body practice that incorporates physical postures (asanas), breathing methods (pranayama), relaxation, and meditation. Increasing scientific data substantiates the efficacy of yoga in alleviating psychological stress, optimising autonomic balance, and augmenting overall well-being. Systematic reviews and clinical trials have shown that consistent yoga practice markedly alleviates stress, anxiety, and depressive symptoms by regulating the hypothalamic–pituitary–adrenal (HPA) axis and sympathetic nervous system activity (Pascoe & Bauer, 2015). Moreover, yoga has demonstrated efficacy in enhancing body composition and decreasing BMI via increased physical activity, metabolic regulation, and stress alleviation (Lauche et al., 2016).

Numerous research examining women receiving infertility treatment have indicated positive effects of yoga on perceived stress, emotional well-being, and quality of life. Yoga-based interventions are deemed safe, cost-effective, and culturally acceptable, rendering them appropriate as adjunct therapy in the management of infertility (Dumbala et al., 2020; Patil et al., 2023).

Varmam (Varma) therapy is a classic Siddha technique that stimulates specific key areas thought to govern pranic energy and organ function. Varmam therapy, traditionally employed in South India, has been utilised for the management of pain, neurological diseases, and functional imbalances. Recent evidence indicates that the stimulation of particular Varmam sites may affect neurovascular and neuroendocrine pathways, therefore facilitating homeostasis and stress control (Venkatraman, 2025). Despite the little scientific evidence on Varmam therapy for infertility, its non-invasive characteristics and capacity to improve physiological equilibrium render it a promising adjunctive method.

The integration of yoga practice with Varmam therapy may provide synergistic advantages by targeting both psychological and physiological dimensions of infertility. Yoga primarily relies on stress alleviation, autonomic regulation, and lifestyle alteration, but Varmam therapy may offer precise stimulation of crucial areas linked to reproductive and hormonal equilibrium. Nevertheless, there is an absence of empirical research investigating the synergistic benefits of yoga and Varmam treatment on objective physiological metrics such as BMI and psychological factors such as stress in infertile women in later adulthood.

This study is to assess the impact of yoga practice in conjunction with Varmam therapy on specific physiological (body mass index) and psychological (stress) variables in infertile women in later adulthood.

Hypothesis

It is hypothesized that later adult infertile women who undergo yoga practice combined with Varmam (Varma) therapy will show significant improvements in the selected physiological variable (body mass index) and psychological variable (stress) compared to women in the control group.

It is further hypothesized that yoga practice combined with Varmam therapy will be more effective in reducing body mass index and stress levels among later adult infertile women, owing to the combined effects of mind–body regulation and targeted vital point stimulation, as supported by previous studies on yoga-based interventions and traditional therapeutic practices (Pascoe & Bauer, 2015; Lauche et al., 2016; Dumbala et al., 2020).

Methodology

The present study used a random-group experimental design to evaluate the effects of a combined yoga and Varmam (Varma) therapy intervention on body mass index (BMI) and stress among later adult infertile women, following mind–body intervention models previously applied in women's health and infertility research (Cramer et al., 2016; Sutar et al., 2021; Tang et al., 2024). Sixty infertile women aged 30–40 years residing in Chennai and diagnosed with primary or secondary infertility were approached, and thirty eligible participants were selected via simple random sampling, consistent with recommendations for controlled trials in infertility clinics (Ministry of Health & Family Welfare, n.d.; Domar et al., 2024). These thirty participants were randomly assigned to an experimental group (Group I, n = 15), which received yoga plus Varmam therapy, and a control group (Group II, n = 15), which was maintained under active rest without structured yoga or Varmam practice, as is standard in behavioral and lifestyle comparison studies (Sutar et al., 2021; Tang et al., 2024). The experimental group underwent a 12-week supervised program, with each session lasting approximately 67 minutes, a duration aligned with prior yoga interventions that demonstrated significant improvements in stress and anthropometric outcomes in women with obesity or infertility (Cramer et al., 2016; Kirca & Pasinlioglu, 2019; Zhang et al., 2023; Alabdulmohsin et al., 2025). Each session included an opening prayer, warm-up

exercises, progressively increased Surya Namaskara across weeks 1–12, selected asanas, pranayama, Varmam point stimulation, meditation, and a closing prayer, reflecting integrated yoga modules and documented Siddha Varmam protocols targeting reproductive and endocrine points (Morarji Desai National Institute of Yoga, n.d.; Jeyaraman, 2024; Rajalakshmi et al., 2024). The sequence, duration, repetitions, breathing patterns, and stimulation parameters were standardized and implemented according to a pre-specified training schedule to maintain intervention fidelity (Sutar et al., 2021; Tang et al., 2024). Both groups completed pre-intervention and post-intervention assessments for BMI and stress using validated measures comparable to those employed in earlier BMI–infertility and yoga–stress studies (Zhu et al., 2022; Kirca & Pasinlioglu, 2019; Alabdulmohsin et al., 2025). Data were analyzed using analysis of covariance (ANCOVA) to compare adjusted post-test means between groups while controlling for baseline values, with statistical significance set at $p < .05$, in line with analytic procedures commonly used in yoga and mind–body intervention research among infertile women (Zhang et al., 2023; Alabdulmohsin et al., 2025; Tang et al., 2024).

TRAINING SCHEDULE EXPERIMENTAL GROUP FOR LATER ADULT INFERTILE WOMEN

SL NO	Name of Yogic Practice	DURATION (Seconds)	REST TIME (Seconds)	NO of REP/ROUNDS/STROKES	BREATH	No of Sets	TOTAL DURATION (Seconds)	GRAND TOTAL DURATION(In Minutes)
1	**PRAYER**	60	0	1	FREE	na	60	1
2	**WARM-UP**							
	Neck rotation (Greeva Sanchalana)	10	0	6	FREE	na	60	1
	Shoulder rolls (Skandha chakra)	10	0	6	FREE	na	60	1
	Elbow and wrist rotations	10	0	6	FREE	na	60	1
	Hip rotations	10	0	6	FREE	na	60	1
	Knee and ankle rotations	10	0	6	FREE	na	60	1
3	**SURYA NAMASKARA**							
	Week 1-2	240	60	3	nhale/Exhale	na	300	5
	Week 3-6	480	60	6	nhale/Exhale	na	540	9
	Week 7-12	600	60	9	nhale/Exhale	na	660	11
4	**ASANA**							
	Vrikshasana	20	10	2	nhale/Exhale	na	60	1
	Pavanamuktasana	20	10	2	nhale/Exhale	na	60	1
	Trikonasana	20	10	2	nhale/Exhale	na	60	1
	Ardha matsyendrasana	20	10	2	nhale/Exhale	na	60	1
	Bhujangasana	20	10	2	nhale/Exhale	na	60	1
	Navasana	20	10	2	nhale/Exhale	na	60	1
	Setu Bhandhasana	20	10	2	nhale/Exhale	na	60	1
	Shavasana	300						5
5	**PRANAYAMA**							
	Anulom vilom	20	0	15	nhale/Exhale	na	300	5
	Nadi shodhana	14.4	0	25	nhale/Exhale	na	360	6
	Bhramari Pranayama	15	0	12	nhale/Exhale	na	180	3
6	**VARMAM POINTS**							
	Kondaikolli	30	5	2		na	60	1
	Chunnambu kalam	30	5	2		na	60	1
	Koombu varmam	30	5	2		na	60	1
	Poruthu varmam	30	5	2		na	60	1
	Kottai varmam	30	5	2		na	60	1
	Manikattai varmam	30	5	2		na	60	1
	Ner varmam	30	5	2		na	60	1
7	Mediation	120				na	120	2
8	**CLOSING PRAYER**	60	0	1		na	60	1
	Total duration							67

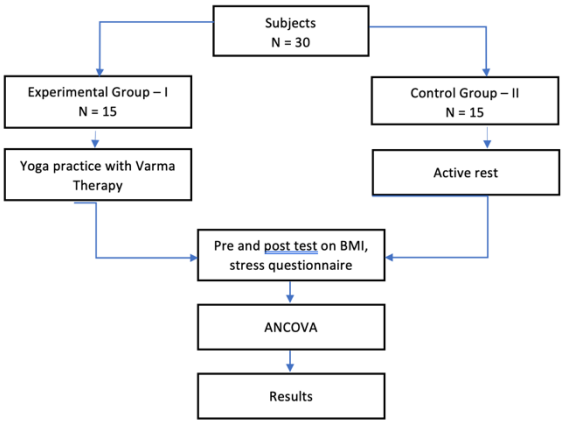


Figure 1. Flowchart of Research Methodology

RESULTS AND DISCUSSION:

TABLE I

COMPUTATION OF ANALYSIS OF COVARIANCE OF TRAINING GROUP AND CONTROL GROUP ON BMI (SCORE)

Test	Group-A Yoga Practice	Group-B Control Group	Source Of Variation	Degrees of Freedom	Sum of Squares	Mean Sum of Squares	F-Ratio
Pre	37.50	34.43	**Between**	1	34.43	34.43	**1.80**
			With in	28	535.73	19.13	
Post	31.43	39.03	**Between**	1	433.20	433.20	**43.97**
			With in	28	275.87	9.85	
Adjusted Post	30.47	40.00	**Between**	1	601.46	601.46	**251.91**
			With in	27	64.47	2.39	

*** Significant at 0.05 level of BMI. (Table F ratio at 0.05 level of bmi for 1 and 28 (df) = 4.2, 1 and 27 (df) = 4.21)**

The obtained F value on pre-test score 1.80 was lesser than the required F value of 4.20 to be significant at 0.05 level. This proved that there was a significant difference between the groups, a pre-test and post-test and the randomization at the pre-test was equal. The post test scores analysis proved that there was significant difference between the groups, as obtained F value 43.97 was greater than the required F value of 4.20. This proved that the differences between the post-test means of the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value 251.91 was greater than the required F value of 4.20. This proved that there was a significant difference on Body mass index improved due to 12 weeks of yoga practices among later adult infertile women.

The ordered adjusted means on BMI were presented through bar diagram for better understanding of the results of this study in Figure – I.

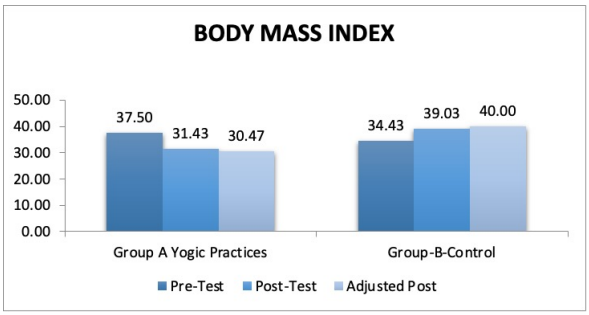


Figure – 1
BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEANS OF EXPERIMENTAL AND CONTROL GROUPS ON BMI (SCORE)

***Significant at 0.05 level of BMI**

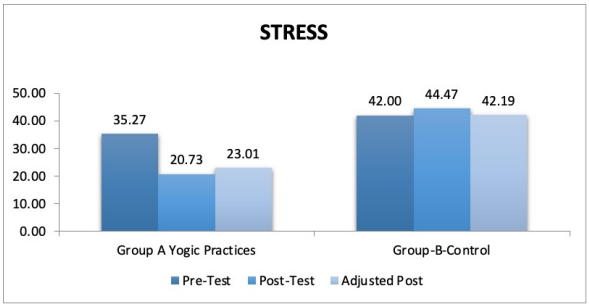
TABLE II
COMPUTATION OF ANALYSIS OF COVARIANCE OF TRAINING GROUP AND CONTROL GROUP ON STRESS (SCORE)

Test	Group-A Yoga Practices	Group-B Control Group	Source Of Variation	Degrees of Freedom	Sum of Squares	Mean Sum of Squares	F-Ratio
Pre	35.27	42.00	Between	1	42.00	42.00	0.66
			With in	28	1773.33	63.33	
Post	20.73	44.47	Between	1	4224.53	4224.53	109.34
			With in	28	1081.87	38.64	
Adjusted Post	23.01	42.19	Between	1	2317.26	2317.26	228.28
			With in	27	274.07	10.15	

*** Significant at 0.05 level of STRESS. (Table F ratio at 0.05 level of STRESS for 1 and 28 (df) = 4.2, 1 and 27 (df) = 4.21)**

The analysis of covariance for stress scores indicated that the pre-test F value (F=0.66)(*F*=0.66) was lower than the critical value (F0.05,1,27=4.20)(*F*0.05,1,27=4.20), showing no statistically significant difference between the experimental and control groups at baseline and thereby confirming successful randomization. In contrast, the post-test comparison produced a highly significant F value (F=109.34>4.20)(*F*=109.34>4.20), demonstrating a marked reduction in stress in the yoga-with-Varma group relative to the active-rest control group after the 12-week intervention. After adjusting for baseline scores, the ANCOVA yielded an F value of 228.28, which again exceeded the critical value (F0.05,1,26=4.20)(*F*0.05,1,26=4.20), confirming that the combined yoga and Varma protocol resulted in a substantial and statistically significant decrease in stress among later adult infertile women. These findings are congruent with earlier reports that structured yoga and mind–body interventions significantly reduce psychological distress and infertility-related stress in women undergoing fertility treatment (Kirca & Pasinlioglu, 2019; Domar et al., 2024; Sutar et al., 2021). For clarity of interpretation, the adjusted mean stress scores of the experimental and control groups are depicted in a bar diagram in Figure 2.

Figure – II - BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEANS OF EXPERIMENTAL AND CONTROL GROUPS ON STRESS (SCORE)



***Significant at 0.05 level of Stress**

ANALYSIS OF HYPOTHESIS

This study posited that yoga practice would provide substantial differences in specific physiological and psychological characteristics, specifically Body Mass Index (BMI) and stress, in later adult infertile women compared to a control group. The study's findings corroborate this idea, as the experimental group exhibited a notable decrease in BMI and stress levels post-yoga intervention, while the control group showed no similar enhancement.

The noted decrease in BMI within the experimental group can be ascribed to the synergistic benefits of yoga postures, Surya Namaskara, and controlled breathing techniques, which together augment energy expenditure, boost metabolic efficiency, and facilitate improved lifestyle management. Prior research indicates that consistent yoga practice leads to beneficial alterations in body composition and weight-related results by enhancing physical activity levels and regulating stress (Lauche et al., 2016).

The notable decrease in stress levels among infertile women in later adulthood after engaging in yoga practice aligns with prior studies demonstrating that yoga successfully alleviates psychological distress by modulating autonomic nervous system function and the hypothalamic–pituitary–adrenal (HPA) axis. Infertility is frequently linked to increased emotional stress, anxiety, and societal pressure, especially in older adult women. Yoga practices that include relaxation, pranayama, and meditation have demonstrated efficacy in reducing stress and enhancing emotional well-being in women receiving infertility therapy (Dumbala et al., 2020).

Moreover, mind–body therapies like yoga enhance self-awareness, emotional resilience, and coping skills, perhaps aiding infertile women in managing stress

more efficiently. Systematic studies have repeatedly shown that yoga therapies correlate with decreases in stress, anxiety, and depressive symptoms among various adult populations (Pascoe & Bauer, 2015). The outcomes of this study align with previous scientific literature and offer further evidence supporting yoga as a supplemental intervention for enhancing both physiological and psychological wellness in infertile women.

CONCLUSION

The current study concludes that yoga practice significantly enhances Body Mass Index (BMI) and lowers stress levels in infertile women in later adulthood. The organised yoga intervention shown efficacy in enhancing physiological equilibrium and psychological wellness relative to the control group engaged in active rest. Consequently, yoga might be regarded as a useful, non-invasive, and economical supplemental method for infertile women in later adulthood to sustain a healthy BMI and alleviate stress. Integrating yoga practices into daily routines or infertility treatment programs may enhance general health and quality of life in this demographic**.**

LIMITATIONS

This study has several limitations inherent to its design and scope. Lifestyle factors (e.g., physical activity levels, occupational demands), body composition variations, and social activities were not controlled or assessed, potentially influencing BMI and stress outcomes independently of the intervention (Cramer et al., 2016). Familial heredity, motivational influences, and psychological confounders were excluded from consideration, limiting generalizability to genetically or motivationally diverse populations (Zhu et al., 2022). Environmental variables such as climatic conditions, daily work routines, and socioeconomic status were not monitored, despite their established roles in stress modulation and metabolic health (Kirca & Pasinlioglu, 2019). Dietary intake remained uncontrolled, a critical oversight given nutrition's direct impact on BMI and hormonal balance in infertile women (Sutar et al., 2021). Finally, concurrent medications, personal habits (e.g., smoking, alcohol use), and fertility treatments were neither documented nor restricted, introducing potential confounding effects on physiological and psychological variables (Domar et al., 2024). These unmeasured factors necessitate cautious interpretation of results and highlight areas for future research with stricter controls.

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