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ORIGINAL RESEARCH ARTICLE

Therapeutic Effects of Yoga on Varicose Veins: A Comprehensive Clinical Study

Sunil Sharma[1], Rajit Sharma[2], Ambika Verma[3]

[1]Assistant Professor (Yoga), Department of Yoga, Government College of Yoga Education and Health, Chandigarh, India.
[2]Assistant Professor, Department of Yoga, Dr. Shyama Prasad Mukherjee College of Physical Education, Nurpur, Himachal Pradesh, India.
[3]Yoga Instructor (Freelancer) and Panchkarma Therapist, Sirmour, Himachal Pradesh, India.

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ABSTRACT

Background: Varicose veins, a common venous disorder, result from venous valve incompetence, leading to blood pooling and vein dilation. Conventional treatments such as compression therapy, sclerotherapy, and surgical interventions focus on symptom management rather than addressing underlying causes. Holistic approaches such as Yoga and Ayurveda offer promising complementary strategies by improving circulation, reducing venous stasis, and promoting vascular health.

Aim: This study aimed to evaluate the therapeutic effects of a structured Yogic regimen on primary varicose veins among female subjects, assessing changes in venous function, symptom severity, and overall vascular health.

Materials and Methods: A total of 35 female participants diagnosed with primary varicose veins from Nurpur, Kangra, Himachal Pradesh, were selected through purposive sampling. Participants underwent Doppler ultrasound testing for initial diagnosis. A quasi-experimental pre-test and post-test design was employed, with assessments based on the revised venous clinical severity score (VCSS). Ethical approval was obtained from the Chandigarh Yoga Institutional Ethical Committee.

Intervention: The intervention consisted of a structured 12-week Yogic regimen, including Asanas (Tadasana, Trikonasana, Viparita Karani, and others), Pranayama (Ujjayi, Nadi Shodhana, Bhastrika, and Bhramari), and Relaxation (Shavasana). Sessions were conducted 6 days a week for 60 min, focusing on improving circulation, reducing venous congestion, and strengthening lower limb muscles. Dietary and lifestyle modifications, such as increased fiber intake, hydration, and avoiding prolonged standing, were also incorporated.

Results: The mean VCSS score significantly decreased from 7.67 (pre-test) to 1.94 (post-test), indicating substantial improvement in varicose vein symptoms. The standard deviation reduced from 1.902 to 0.617, reflecting uniform improvement among participants. A paired t-test analysis yielded a $t = 16.9532$ ($P < 0.05$), confirming the statistical significance of the intervention. Participants reported reduced pain, swelling, and discomfort, demonstrating the effectiveness of the Yogic regimen in alleviating varicose vein symptoms.

Conclusion: The findings suggest that Yoga serves as an effective non-pharmacological intervention for managing primary varicose veins. Significant improvements in venous function and symptom relief highlight Yoga's potential in vascular health management. Further studies with larger sample sizes and comparative analysis with conventional treatments are recommended to validate these findings.

1. INTRODUCTION

Varicose veins, a prevalent venous disorder, manifest as swollen, twisted veins visible just beneath the skin's surface, primarily affecting the lower extremities (Beebe-Dimmer *et al*., 2005).[1] The pathophysiology of varicose veins involves venous valve incompetence, leading to blood pooling and vein dilation, which results in symptoms such as pain, swelling, and heaviness in the legs (Evans *et al*., 1999).[2] Conventional treatments for varicose veins include compression therapy, sclerotherapy, and surgical interventions such as vein stripping and laser ablation. However, these methods

Corresponding Author:
Sunil Sharma,
Assistant Professor (Yoga), Department of Yoga, Government College of Yoga Education and Health, Chandigarh, India.
Email: sunilatraye@gmail.com

often address the symptoms rather than the root cause of the condition (Gloviczki *et al*., 2011).[3] Consequently, there is growing interest in holistic approaches, particularly Yoga and Ayurveda, which offer complementary strategies for managing varicose veins through lifestyle modifications, physical postures, and mind–body interventions (Telles *et al*., 2017).[4]

Yoga, an ancient practice integrating physical postures (*asanas*), breathing exercises (*pranayama*), and meditation, is increasingly recognized for its role in promoting vascular health and circulation (Cramer *et al*., 2014).[5] Research suggests that specific yoga postures can enhance venous return, strengthen the muscular system, and improve the elasticity of blood vessels, thereby alleviating the symptoms of varicose veins (Woodyard, 2011).[6] Moreover, *pranayama* techniques such as deep breathing and alternate nostril breathing are known to regulate autonomic function and optimize oxygenation, which may contribute to improved circulatory efficiency (Jerath *et al*., 2006).[7] Meditation and relaxation practices further aid in stress reduction, a critical factor in vascular health maintenance (Pascoe *et al*., 2017).[8]

Ayurveda, the traditional system of Indian medicine, conceptualizes varicose veins as "*Siragranthi*," which is predominantly a Vata disorder influenced by *Vyana Vayu,* responsible for blood circulation (Sharma and Dash, 2001).[9] Ayurvedic texts such as the Charaka Samhita and Astānga Hrdaya suggest that an aggravated *Vata dosha* leads to venous congestion, while imbalances in *Ranjaka Pitta* contribute to blood impurities, potentially leading to complications such as venous ulcers (Murthy, 2016).[10] *Ayurvedic* interventions, including dietary modifications, herbal formulations, and external therapies like leech therapy (Jalaukavacharana), have been traditionally used to manage venous disorders (Singh *et al*., 2018).[11]

This study aims to investigate the therapeutic effects of a structured Yogic regimen on varicose veins, integrating Yogic and Ayurvedic principles to assess their impact on vascular function. By evaluating physiological parameters and biomarkers related to venous health, this research seeks to contribute empirical evidence to the growing body of literature on the holistic management of varicose veins.

1.1. Objective of this Study

The objective of this study is to study the effect in primary varicose vein experimental subjects after undergoing yogic interventions.

2. MATERIALS AND METHODS

2.1. Participants

This study was conducted with a total of 35 female subjects diagnosed with primary varicose veins from Nurpur, Kangra, Himachal Pradesh. The selection criteria included individuals with confirmed varicose vein conditions as identified by Doppler Ultrasound, without any significant comorbidities that could interfere with the study results. Participants were selected through purposive sampling to ensure homogeneity in terms of severity and physical condition.

2.2. Study Design and Intervention

The study employed a quasi-experimental design with a pre-test and post-test assessment framework. The intervention consisted of structured Yogic practices tailored to the needs and physical limitations of the participants. The Yogic regimen was implemented gradually to prevent strain and ensure maximum therapeutic benefits. The intervention period spanned over 12 weeks, with sessions conducted 6 days a week.

2.3. Yogic Practices Administered

The Yogic intervention was carefully curated to address the physiological and circulatory issues associated with varicose veins. The following practices were included:

Asanas: *Tadasana* (enhances leg muscle function and venous return), *Trikonasana* (stimulates circulation and reduces venous stasis), *Parsvakonasana* (strengthens leg muscles and improves overall lower limb function), *Swastikasana* (promotes circulation and enhances venous return), *Vajrasana* (aids digestion and prevents excessive venous pooling), *Supta-Vajrasana* (stretches and strengthens the lower limbs, reducing venous congestion), *Simhasana* (improves blood circulation and reduces tension in the lower extremities), *Pachimottanasana* (enhances flexibility and prevents venous stasis), *Purvottanasana* (strengthens lower limb muscles and promotes circulation), *Janushirsasana* (improves venous return by facilitating blood flow in the lower limbs), *Pavanamuktasana* (reduces bloating and enhances circulation), *Bhujangasana* (stimulates circulation and relieves pressure on the lower limbs), *Shalabhasana* (strengthens posterior leg muscles, promoting venous function), *Saral Dhanurasana* (enhances blood circulation and improves muscle tone), *Makarasana* (aids relaxation and promotes venous return), *Paryankasana* (relieves tension in the lower limbs and enhances circulation), *Baddha Konasana* (opens up the pelvic area, reducing venous congestion), *Upavistha Konasana* (enhances flexibility and venous return), *Jathara Parivartanasana* (improves digestion and circulation), *Viparita Karani-Mudra* (reverses venous pooling and promotes healthy circulation), and *Uttanapadasana* (strengthens leg muscles and prevents venous congestion).

Pranayama: Ujjayi (helps in maintaining optimal oxygenation and circulation), *Nadi Shodhana* (improves vascular health by balancing the autonomic nervous system), *Bhastrika* (stimulates circulation and boosts oxygenation), and *Bhramari* (reduces stress, which indirectly benefits venous circulation).

2.4. Relaxation

Shavasana **(**induces deep relaxation and reduces stress-related venous issues as well as enhances recovery and ensures deep relaxation for better circulation).

Each session began with preliminary Yogic preparation, ensuring gradual adaptation to the interventions. The sequence was structured as follows: *Asanas* (40 min), *Pranayama* (15 min), and *Relaxation Techniques* (5 min). Thus, each session lasted for a total duration of 60 min, ensuring a balanced practice that maximized therapeutic outcomes.

2.5. Dietary and Lifestyle Modifications

Alongside the yogic intervention, participants were educated on the benefits of healthy food habits and an ideal lifestyle for managing varicose veins. Dietary recommendations included increased fiber intake, reduced sodium consumption, and enhanced hydration. Participants were also advised on avoiding prolonged standing or sitting and incorporating mild daily physical activity to complement the Yogic practices.

2.6. Assessment and Measurement

Initially, all subjects were diagnosed with Doppler Ultrasound Tests, but for the study to assess the effectiveness of the Yogic intervention, revised venous clinical severity score (VCSS) was conducted at baseline and post-intervention. The parameters analyzed included venous reflux, valve competence, and blood flow velocity. In addition, subjective symptom relief, including pain, swelling, and discomfort, was recorded through participant self-reports and observational assessments.

2.7. Revised VCSS

In response to the need for a disease severity measurement, the American Venous Forum Committee on Outcomes Assessment developed the Venous Severity Scoring system[12] in 2000. The Revised VCSS was developed by the American Venous Forum to assess changes in chronic venous disease severity over time and in response to treatment. It refines the original VCSS by clarifying ambiguities, updating terminology, and improving ease of application. This scoring system evaluates 10 clinical parameters, each rated from 0 (none) to 3 (severe):

1. Pain/discomfort (Venous Origin): Ranges from none (0) to severe (3), based on frequency and impact on daily activities.
2. Varicose veins (≥3 mm in Standing Position): Classified from none (0) to severe (3), depending on extent (isolated, confined to one area, or widespread).
3. Venous edema: Scored from none (0) to severe (3), based on its spread (foot, ankle, below knee, or above knee).
4. Skin pigmentation: Rated from none (0) to severe (3), depending on distribution.
5. Inflammation (Erythema, Cellulitis, Dermatitis): Assessed from none (0) to severe (3), based on area affected.
6. Induration (Fibrosis, Lipodermatosclerosis): Scaled from none (0) to severe (3).
7. Number of active ulcers: Scored 0 (none) to 3 (≥3).
8. Ulcer duration: Categorized as <3 months (1), 3–12 months (2), or >1 year (3).
9. Ulcer size: Ranges from <2 cm (1) to >6 cm (3).
10. Compression therapy compliance: Rated from none (0) to full compliance (3).

Periodic revisions enhance its clinical applicability and improve treatment outcome comparisons.

2.8. Ethical Considerations

The study adhered to ethical guidelines, ensuring informed consent from all participants. Confidentiality was maintained, and the intervention was conducted under expert supervision to prevent adverse effects. The study protocol was reviewed and approved by Chandigarh Yoga Institutional Ethical Committee (CYIEC).

2.9. Expected Outcomes

Based on previous research and theoretical foundations, the study anticipated improvements in venous blood flow, reduced reflux in affected veins, and symptomatic relief among participants. The expected reduction in venous pooling and improved muscular engagement were hypothesized to contribute to better overall vascular health.

2.10. Statistical Analysis

The data collected from pre-test and post-test measurements were analyzed using statistical software. Paired *t*-tests were conducted to compare the mean values of the physiological parameters before and after the intervention. A significance level of $P < 0.05$ was considered to indicate statistical significance.

2.11. Analysis and Interpretation of the Data

2.11.1. Yogic practices on Varicose veins among female subjects

To study, the statistical analysis of specific Yogic practices on varicose veins among female subjects has been conducted using the collected data. The computed statistical measures have been presented in table and figure for reference and analysis.

The table presents a comparative analysis of pre-test and post-test scores of a Yoga intervention on varicose veins among female subjects. The statistical evaluation examines the effectiveness of Yoga in reducing the severity of varicose veins by assessing mean scores, standard deviations, and the significance of the observed differences.

The mean score of the pre-test group (before the Yoga intervention) was 7.67, indicating a higher severity of varicose veins among the participants. After the intervention, the mean score significantly dropped to 1.94 in the post-test group. This notable reduction suggests that the Yoga intervention was effective in alleviating symptoms related to varicose veins.

The standard deviation for the pre-test group was 1.902, while it was significantly lower at 0.617 in the post-test group. A lower standard deviation in the post-test group indicates reduced variability in the severity of symptoms among participants, suggesting a more uniform improvement. The standard error of difference (SED) was calculated as 0.338, which helps determine the significance of the difference between pre-test and post-test mean scores.

The obtained t = 16.9532 with a degree of freedom (df) of 68 indicates a highly significant difference between pre-test and post-test scores. The statistical analysis reveals that this result is "Extremely statistically significant," confirming that the observed improvement is not due to random chance but is directly attributed to the Yoga intervention shown in Figure 1.

The findings clearly demonstrate the positive impact of Yoga intervention on reducing the severity of varicose veins among female subjects. The substantial decrease in mean scores and the statistical significance of the t-value suggest that Yoga serves as an effective non-pharmacological approach for managing varicose veins. These results highlight the potential of Yoga as a therapeutic intervention, warranting further research to explore its long-term benefits and applicability to broader populations.

Future studies could focus on different Yoga protocols, varied duration of interventions, and comparative analysis with other treatment modalities to establish a more comprehensive understanding of Yoga's role in vascular health.

3. DISCUSSION

The findings of this study provide compelling evidence for the effectiveness of Yoga as a non-pharmacological intervention in reducing the severity of varicose veins among female subjects. The significant reduction in mean scores from 7.67 in the pre-test to 1.94 in the post-test suggests that consistent Yoga practice contributed to alleviating symptoms associated with varicose veins. This aligns with previous research indicating that Yoga enhances venous return, improves circulation, and strengthens the vascular system (Sengupta, 2012).[13]

The reduction in standard deviation from 1.902 in the pre-test to 0.617 in the post-test group indicates a more uniform improvement among participants. This finding suggests that Yoga offers consistent benefits in managing varicose veins, reducing individual variability in symptom severity. Furthermore, the calculated SED of 0.338 supports the precision of the observed difference between pre-test and post-test mean scores, reinforcing the reliability of the intervention outcomes (Field, 2018).[14]

The obtained t = 16.9532 with 68° of freedom underscores the statistical significance of the results. The extremely significant *P*-value confirms that the improvements in varicose vein severity were unlikely to be due to random chance but were directly attributable to the Yoga intervention. These findings align with previous studies that suggest Yoga as an effective strategy for enhancing lower limb circulation and reducing venous pooling (Satish and Mohan, 2020).[15]

The study highlights the potential of Yoga as a viable and accessible therapeutic approach for individuals suffering from varicose veins. Future research should explore different Yoga protocols, intervention durations, and comparative analyses with conventional treatments to establish a more comprehensive understanding[1] of Yoga's role in vascular health. Long-term follow-ups could also help determine the sustainability of these benefits over time.

4. CONCLUSION

The findings of this study highlight the effectiveness of Yoga as a therapeutic intervention for managing varicose veins among female subjects. The observed improvements suggest that regular Yoga practice can significantly alleviate the symptoms associated with varicose veins, providing a natural and holistic approach to vascular health. By incorporating specific *asanas*, breathing techniques, and relaxation practices, Yoga appears to enhance circulation, reduce venous pressure, and improve overall leg health.

One of the key takeaways from this study is the potential of Yoga to serve as a non-invasive, non-pharmacological alternative for individuals suffering from varicose veins. Given the limitations of conventional treatments, such as surgical procedures or medication-related side effects, Yoga emerges as a promising complementary therapy that can be integrated into daily routines with minimal risk. Furthermore, the consistency in improvements among participants underscores the reliability of Yoga in promoting vascular well-being.

Beyond symptom reduction, Yoga's influence extends to overall physical and mental health, fostering stress relief, improved mobility, and enhanced quality of life. The structured intervention in this study supports the notion that Yoga not only addresses the symptoms but also contributes to long-term well-being by encouraging a healthier lifestyle. This reinforces the growing recognition of Yoga as a preventive and rehabilitative tool in modern healthcare.

These findings open new avenues for future research to explore the long-term impact of Yoga on venous disorders. Further investigations can compare different Yoga protocols, intervention durations, and their efficacy against other treatment modalities. Expanding the study to a broader population can provide deeper insights into the generalizability of Yoga's benefits for vascular health. Overall, this study underscores the potential of Yoga as an accessible and effective intervention for managing varicose veins and improving circulatory health.

5. ACKNOWLEDGMENT

Nil.

6. AUTHOR'S CONTRIBUTIONS

All the authors contributed equally to the design and execution of the article.

7. FUNDING

Nil.

8. ETHICAL APPROVALS

This study was approved by the CYIEC under no- EC/NPW111/2025/302 dated 09/03/2025 Yog Institutional Ethical Committee.

9. CONFLICTS OF INTEREST

Nil.

10. DATA AVAILABILITY

This is an original manuscript and all data are available for only review purposes from principal investigators.

11. PUBLISHERS NOTE

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Table 1: Pre and post-mean score with standard deviation score±of mean value of Yoga Intervention on Varicose veins among female subjects

S. No.	Categories	Pre-test score		Post-test score	
		Mean value	±SD value	Mean value	±SD value
1	Pain	8.7	1.17	2.5	1.1
2	VV	8.1	1.93	2.1	0.02
3	Edema	7.8	2.24	1.8	0.9
4	Pigmentation	7.7	1.88	1.9	0.8
5	Inflammation	8.9	2.02	2.1	0.02
6	Induration	8.3	2.58	1.6	1.1
7	Active ulcers	7.3	2.38	2.2	0.98
8	Size	7.0	1.62	2.4	0.23
9	Duration	6.8	1.81	1.7	0.19
10	Compression	6.1	1.39	1.1	0.83
Total VCSS		7.67	1.902	1.94	0.617

SD: Standard deviation, VCSS: Venous clinical severity score

Table 2: Comparison between pre-test and post-test of Yoga intervention on varicose of veins among female subjects in respect to mean scores and SD

Groups	N	Mean	SD	SE_D	df	t-value	Level of significance
Pre-test score	35	7.67	1.902	0.338	68	16.9532	Extremely statistically significant
Post-test score	35	1.94	0.617				

SD: Standard deviation

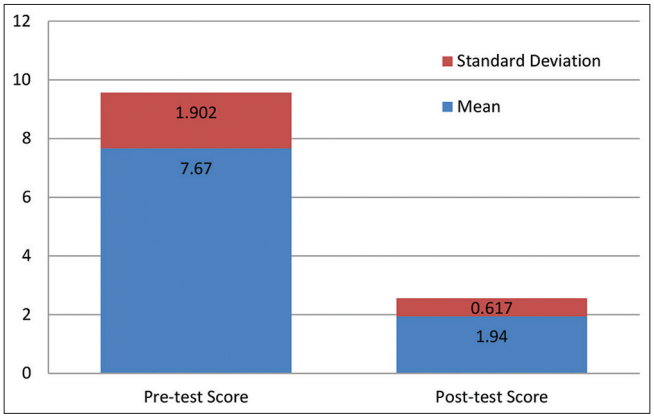

Figure 1: Comparison between pre-test and post-test score of Yoga intervention on varicose veins among female subjects in respect of mean scores and standard deviation