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CLINICAL RESEARCH

A randomized study of yoga therapy for the prevention of recurrent reflex vasovagal syncope

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Aims Vasovagal syncope (VVS) is a common cardiovascular dysautonomic disorder that significantly impacts health and quality of life (QoL). Yoga has been shown to have a positive influence on cardiovascular autonomics. This study assessed the effectiveness of yoga therapy on the recurrence of VVS and QoL.

Methods and results We randomized subjects with recurrent reflex VVS (>3 episodes in the past 1 year) and positive head-up tilt test to guideline-directed therapy (Group 1) or yoga therapy (Group 2). Patients in Group 1 were advised guideline-directed treatment and Group 2 was taught yoga by a certified instructor. The primary endpoint was VVS recurrences and QoL. Between June 2015 and February 2017, 97 highly symptomatic VVS patients were randomized (Group 1: 47 and Group 2: 50). The mean age was 33.1 ± 16.6 years, male:female of 40:57, symptom duration of 17.1 ± 20.7 months, with a mean of 6.4 ± 6.1 syncope episodes. Over a follow-up of 14.3 ± 2.1 months Group 2 had significantly lower syncope burden compared with Group 1 at 3 (0.8 ± 0.9 vs. 1.8 ± 1.4, $P < 0.001$), 6 (1.0 ± 1.2 vs. 3.4 ± 3.0, $P < 0.001$), and at 12 months (1.1 ± 0.8 vs. 3.8 ± 3.2, $P < 0.001$). The Syncope functional score questionnaire was significantly lower in Group 2 compared with Group 1 at 3 (31.4 ± 7.2 vs. 64.1 ± 11.5, $P < 0.001$), 6 (26.4 ± 6.3 vs. 61.4 ± 10.7, $P < 0.001$), and 12 months (22.2 ± 4.7 vs. 68.3 ± 11.4, $P < 0.001$).

Conclusion For patients with recurrent VVS, guided yoga therapy is superior to conventional therapy in reducing symptom burden and improving QoL.

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Graphical Abstract

Mechanism of syncope and yoga postures. The figure's central portion shows the posture of dhyana (meditation) and the mechanism of syncope. The 10 asanas used in the study are depicted around the periphery. Counter-clockwise the from 12 o'clock position are Vrikshasana (tree pose), Ardha Kati Chakrasana (half waist wheel pose), Trikonasana (triangle pose), Pada Hastasana (hand under foot pose), Ardha Chakrasana (half wheel pose), Paschimottanasnana (seated forward bend), Ardha Ustrasana (half camel pose), Vakrasana (half spinal twist pose), Vajrasana (diamond pose), Vajrasana (diamond pose), and Setubandhasana (bridge pose).

Keywords Syncope • Vasovagal syncope • Reflex syncope • Yoga therapy

What's new?

- Reflex vasovagal syncope is a common clinical problem, and conventional treatment options offer only modest benefit.
- Yoga has beneficial effects on cardiovascular autonomics.
- Guided yoga therapy is significantly more effective in preventing syncope recurrences and improving quality of life compared with guideline-directed dietary and physical manoeuvres in highly symptomatic patients reflex vasovagal syncope.
- Guided yoga therapy can be considered as a treatment modality for reflex vasovagal syncope.

Introduction

Syncope is a transient, self-limited loss of consciousness (T-LOC) due to global cerebral hypo-perfusion, with spontaneous, complete, and relatively rapid recovery.[1] The predisposition to syncope usually begins in adolescence or early adulthood and persists for decades. Vasovagal syncope (VVS), a form of reflex syncope, is by far the most frequent cause of syncope and is prevalent in all age groups. VVS is often recurrent, may cause fall-related injury, and is associated with a decreased quality of life (QoL).[2]

The hypotension associated with VVS is due to a variable combination of reflex bradycardia and vascular dilation. Factors such as prolonged upright posture, exposure to pain, blood, or medical procedures may trigger VVS. Even in the same patient, VVS triggers

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and presentation may vary between spells.[1] Cardiovascular dysautonomia seems to play a significant role in the pathophysiology of VVS. The prevailing hypothesis on the pathophysiology of VVS is that a decreased venous return related to positional or emotional or reflex activities results in a cascade of events that result in reduced preload, exaggerated myocardial contractility, and a paradoxical autonomic response. The abnormal autonomic response causes marked bradycardia, a fall in blood pressure, or both, leading to cerebral hypoperfusion and loss of consciousness.[3]

Currently, conventional treatment options for VVS range from dietary modification, 'tilt training' (also known as standing training), physical counter-pressure manoeuvres, medications, and on rare occasions, permanent pacemaker implantation. Unfortunately, most VVS treatment strategies have only modest benefits, which proves frustrating for both patients and clinicians alike.[4]

Yoga is an ancient form of exercise and lifestyle modification that consists of physical postures (asanas), breathing exercises (pranayama), and meditation (dhyana) that has its roots in the Indus valley civilization. Yoga is increasingly adopted globally for improving physical health and mental well-being and is beneficial as adjunctive therapy in several cardiovascular conditions.[5–7] Yoga has a significant positive effect on the cardiovascular autonomic system, thereby improving its plasticity and preventing significant swings in the autonomic tone that can impact haemodynamics.[8,9] An earlier observational study of yoga in patients with VVS has shown a reduction in syncope symptom score and improvement in QoL.[10] However, there is no randomized study examining guided yoga as a treatment modality in patients with VVS. The present report provides outcomes of a single-centre randomized controlled study designed to assess guided yoga therapy's efficacy in patients with recurrent VVS with a positive head-up tilt test (HUTT).

Methods

This study is a prospective, randomized study done at Sri Jayadeva Institute of Cardiovascular Sciences and Research (Bengaluru, India). The hospital has a separate dedicated cardiac rehabilitation centre of 500 m^2 (5882 ft^2) with four qualified physiotherapists and two qualified yoga instructors. Consecutive patients with a history of T-LOC were screened in the syncope clinic using a standard questionnaire based on the Calgary Syncope Symptom Score.[11] Study subjects underwent a detailed clinical examination, 12-lead electrocardiogram (ECG), a transthoracic echocardiogram, and a 24-h Holter ambulatory ECG. Study subjects consisted of individuals with >3 episodes of T-LOC in the previous year in whom the history was suggestive of VVS (see Inclusion criteria below). Only patients with positive HUTT were included in the study. The syncopal response to HUTT was classified using the modified Vasovagal Syncope International Study (VASIS) classification.[12] The institutional review board approved the study, and all subjects provided written informed consent. None of the patients were receiving any form of therapy and had been referred to the Syncope unit for evaluation of TLOC.

Inclusion criteria: we included the following patients for randomization:

(1) Patients (≥ 12 and ≤ 60 years of age) with a history compatible with recurrent VVS (≥3 episodes in the past year) and a positive HUTT study.
(2) HUTT-induced syncope was deemed by the patient to be similar to spontaneous events.
(3) Only those subjects who could perform the recommended yoga postures (asanas), as recommended and consented to, were included in the study.

Exclusion criteria: we excluded patients with the following criteria from the study:

(1) History of any structural heart disease such as coronary artery disease, valvular heart disease, cardiomyopathies, and congestive heart failure.
(2) Patients with carotid stenosis, carotid sinus hypersensitivity, or abnormal ECG, arrhythmias, and implanted cardiac devices.
(3) Conditions that prevented the participants from performing yoga, such as those with psychiatric illness, epilepsy, and subjects unwilling to participate in the study.
(4) Subjects on drugs such as fludrocortisone, alpha-agonists, beta-blockers, vasodilators, diuretics, or selective serotonin reuptake inhibitors (SSRIs).

Randomization

Consecutive study subjects underwent prospective randomization in a 1:1 fashion using an internet-based randomization application (https://randomizer.org/) to guideline-directed conventional therapy (Group 1) or yoga therapy (Group 2). Group 1 subjects underwent thorough counselling to increase salt intake of 6–9 g/day, liberal fluid intake of >3 L/day, and physical counter-pressure manoeuvres.[4] Physical counter-pressure manoeuvres such as crossing legs, tensing of thigh and buttock muscles, arm counter-pressure, and a handgrip was taught with the advice to use them at the onset of premonitory symptoms. The manoeuvres were reinforced during each clinic follow-up visit.[4]

Subjects randomized to Group 2 were not given any specific advice regarding diet, fluid, or physical counter-pressure manoeuvres but underwent guided yoga training for 5–7 sessions by a certified yoga instructor/therapist. None of the subjects randomized to the yoga group had practiced or were practicing yoga at the time of randomization. Dr R. Nagarathna, co-founder, and director of Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA), with extensive knowledge of yogic practices, designed the yoga therapy module. The yoga postures chosen by Dr R. Nagarathna were specifically selected for the improvement of vascular tone, balancing the sympathetic, and parasympathetic nervous system, to reduce anxiety and the ease of performance. *Graphical Abstract* and *Table 1* show the yoga module of pranayama (breathing techniques), asanas (postures), and dhyana (meditation) for 60 min per session. The Group 2 subjects were advised and supported to perform yoga for 60 min at least 5 days/week for the subsequent 12 months.

Follow-up and endpoint

Both groups were followed up in the syncope unit every month. All subjects were instructed to keep a log of the number of syncope events occurring 6 months after their enrolment. The study's primary endpoint was the number of syncopal events in the 6- and 12-month follow-up period. The syncope functional score questionnaire (SFSQ) served as the secondary endpoint and was used at baseline 6- and 12-month follow-up to monitor the QoL scores in both groups.[13] The SFSQ score measures both physical and psychosocial components of impairment and is helpful in measuring outcomes in syncope patients. A low score indicates less, and a high score indicates more impairment. We assessed subjects in both groups for adherence to the therapy, and we reinforced instruction to follow the recommended therapy at every visit.

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Table 1 Yoga module employed in the present study (See Supplementary data for details)

Yoga practices	Duration
1. Loosening and breathing exercises (warmup)	15 min
• Breathing and stretching hands in and out breathing, hands stretch breathing, and tiger breathing	4 min
• Stationary jogging, loosening of arm, shoulder, neck, wrist, knee, and ankle	3 min
• Pavanamuktasana (wind relieving pose)	2 min
• Lumber stretch	2 min
• Surya Namaskar (3 rounds, sun salutations)	4 min
2. Yoga postures (asanas)	15 min [15 s of Shavasana (corpse pose) in between postures]
• Vrikshasana (tree pose)	1 min
• Ardha Kati Chakrasana (half waist wheel pose)	1 min
• Trikonasana (triangle pose)	1 min
• Pada Hastasana (hand under foot pose)	1 min
• Ardha Chakrasana (half wheel pose)	1 min
• Paschimottanasnana (seated forward bend)	1 min
• Ardha Ustrasana (half camel pose)	1 min
• Vakrasana (half spinal twist pose)	1 min
• Vajrasana (diamond pose)	1 min
• Setubandhasana (bridge pose)	1min
3. Pranayama (breath-control)	15 min
• Sectional breathing (abdominal, thoracic, and clavicular breathing)	4 min
• Right nostril breathing	2 min
• Left nostril breathing	2 min
• Nadishudhi (alternate nose breathing)	4 min
• Bhramari (bee breathing)	3 min
4. Meditation (dhyana)	5 min
• Om meditation	Five rounds of om chanting followed by meditation
5. Deep relaxation technique (DRT)	10 min

The primary study outcome was comparing the syncopal recurrence in the two study arms at 3rd, 6th, and 12th months employing the intention-to-treat principle. At each visit, the number of syncopal episodes was collected from the patient log. We counted only frank syncope as it is a definitive endpoint. Because of the difficulty of assigning pre-syncope (i.e. near syncope) as a reflex in origin, it was not counted as an endpoint.

Statistical analysis

Continuous variables are expressed as mean ± SD, and categorical variables are presented as proportions. Categorical variables were analysed using the χ^2 test with Fisher's exact as appropriate. Continuous variables were analysed using independent samples *t*-test. Univariate analyses and multivariate analyses were performed to determine the predictors of response to yoga therapy. All statistics were performed using the SPSS software, version 21 (IBM Corp., Armonk, NY, USA). We analysed all variables using a two-tailed Student *t*-test, and a *P*-value of <0.05 is considered statistically significant. The calculated number of patients needed to randomized with > 50% reduction of syncope recurrence in patients with >3 episodes of syncope in the past 1 year with 80% power at a significance of $P = 0.05$ was 96 based on the previous study by Sumner *et al.*[14]

Results

We prospectively enrolled and randomized 100 patients to the two groups, of whom 49 were in Group 1 and 51 in Group 2, between June 2015 and February 2017. Three subjects in Group 1 did not complete the study, and they were excluded from the analysis, leaving 97 subjects, of which Group 1 had 47 subjects, and Group 2 had 50 for the final analysis. The patients' mean age was 33.1 ± 16.6 (Group 1: 32.7 ± 16.3 years vs. Group 2: 33.4 ± 17.0 years; $P = 0.844$). There were 40 males and 57 females (Group 1: M:F 19:28 vs. Group 2: M:F 21:29; $P = 0.876$). The mean BMI was 20.4 ± 1.6 kg/m^2 (Group I: 20.5 ± 1.5 kg/m^2 vs. Group 2: 20.3 ± 1.7 kg/m^2; $P = 0.4966$). Before the study, the mean duration of symptoms was 17.1 ± 20.7 months (Group 1: 16.1 ± 22.8 months vs. Group 2: 17.8 ± 19.1 months; $P = 0.694$). The mean number of syncopal episodes was 6.36 ± 6.06 (Group 1: 6.8 ± 8.0 vs. Group 2: 6.0 ± 4.0; $P = 0.551$, *Table 2*). The most common VVS classification was VASIS type I (Group 1: 58.3% and Group 2: 50.9%), and the least common was VASIS type 2A, with no association between the type of syncopal episodes and the assigned treatment study group ($P = 0.561$, *Table 3*). The patients' log in Group 2 log revealed that the group performed 3.4 ± 1.1 sessions of yoga per week.

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Table 2 Clinical characteristics of patients

Characteristics	Group 1 ($n = 47$)	Group 2 ($n = 50$)	*P*-value
Age (years), mean ± SD	32.7 ± 16.3	33.4 ± 17.0	0.844
Gender M:F	19:28	21:29	0.876
BMI (kg/m^2), mean ± SD	20.51 ± 1.54	20.27 ± 1.72	0.496
Duration of symptoms (months), mean ± SD	16.1 ± 22.8	17.8 ± 19.1	0.694
Mean no. of syncopal at baseline	6.8 ± 8.0	6.0 ± 4.0	0.551

Table 3 Type of response in HUTT according to modified VASIS classification

Type of syncope	Group 1 (*N*: 47)	Group 2 (*N*: 50)
Type 1	23 (58.27%)	26 (50.98%)
Type 2A	2 (5.13%)	5 (9.80%)
Type 2B	4 (10.26%)	9 (17.65%)
Type 3	10 (25.64%)	11 (21.57%)

Type 1 (mixed response): blood pressure decreases before the heart rate drops but the ventricular rate does not fall to <40 b.p.m., or falls to <40 b.p.m. for <10 s. Type 2A (cardioinhibition without asystole): blood pressure decreases before the heart rate drops, with the ventricular rate falling to <40 b.p.m. for >10 s, without asystole >3 s. Type 2B (cardioinhibition with asystole): heart rate fall coincides with or precedes blood pressure fall with asystole >3 s. Type 3 (vasodepressor): blood pressure falls, but the heart rate does not fall >10% from its peak of.[12]
HUTT, head-up tilt test; VASIS, Vasovagal Syncope International Study.

During a total follow-up of 14.3 + 2.1 months, there were fewer syncope recurrences in Group 2 compared with Group 1 at the 3rd month (Group 1: 1.8 ± 1.4 vs. Group 2: 0.8 ± 0.9, $P < 0.001$), at the 6th month (Group 1: 3.4 ± 3.0 vs. Group 2: 1.0 ± 1.2, $P < 0.001$), and at 12th month (Group 1: 3.8 ± 3.2 vs. Group 2: 1.1 ± 0.8, $P < 0.001$, *Figure 1*).

The average percentage reduction of syncope recurrence in Group 1 was significantly lower compared with Group 2 at 3rd month (Group 1: 74% vs. Group 2: 87%), 6th month (Group 1: 50% vs. Group 2: 83%), and 12th month (Group 1: 44% vs. Group 2: 81.6%) intervals. The SFSQ score was significantly lower in Group 2 compared with Group 1 at the 3rd month (Group 1: 64.1 ± 11.5 vs. Group 2: 31.4 ± 7.2, $P < 0.001$) at the 6th month (Group 1: 61.4 ± 10.7 vs. Group 2: 26.4 ± 6.3, $P < 0.001$), and at the 12th month (Group 1: 68.3 ± 11.4 vs. Group 2: 22.2 ± 4.7, $P < 0.001$, *Figure 2*). There were no complications, including injury or deaths in either study arms during the study period.

Discussion

Main findings

The principal findings are as follows. First, yoga therapy proved superior to guideline-based diet/physical counter-pressure manoeuvres in reducing syncopal episodes over 12 months of follow-up. Secondly, guided yoga therapy's benefits were apparent as early as 3 months after treatment initiation and were sustained at 6 and 12 months. Finally, guided yoga therapy resulted in a significantly better QoL.

The pathophysiology of VVS remains poorly understood, but there is evidence that recurrent VVS is associated with poor sympathovagal balance.[15] In a significant proportion of patients with recurrent neurally mediated syncope, alterations of neural-cardiovascular reflexes result in an inability to adequately respond to orthostatic stress.[15] In patients with VVS, spectral analysis of heart rate variability showed that the LF/HF power ratio positively correlated with head-up tilt results after only 5 min of tilt, suggesting that in patients susceptible to VVS, the cycle of events begins very soon after tilt, but only becomes clinically evident later on.[15]

There are important and well-defined differences between patients with recurrent syncope and healthy normal subjects who faint only when they are tilted. In patients with recurrent syncope, there is severe impairment in muscle sympathetic neural activity (MSNA) at low levels of tilt. The maximal increase in sympathetic activity is earlier, followed by a progressive decrease in MSNA, finally ending in total neural silence.[16] The maximal increase in plasma venous norepinephrine in VVS patients is less than in controls preceding the syncopal episode.[16] There is evidence that in patients with VVS, there is a transient alteration in baroreflex function resulting in the inability to increase sympathetic outflow in response to reductions in pressure.[16] It is now evident that VVS may result from the withdrawal of sympathetic tone, baroreflex failure, a fall in the cardiac output, or a combination.[16]

Yoga and autonomic nervous system

Evidence from several studies shows that yoga is beneficial as adjunctive therapy in hypertension, heart failure, and atrial fibrillation.[5–7] Yoga is also potentially helpful for managing VVS.[10] The regular practice of yoga has several beneficial effects on the autonomic nervous system. Shashikiran *et al.*[9] showed that yoga practitioners had a lower heart rate and respiratory rate, indicating increased parasympathetic activity. In patients with NYHA I-II heart failure, yoga therapy improves the parasympathetic activity and decreases sympathetic activity.[17]

In the present study, subjects performed slow yoga exercises along with pranayama (slow breathing). There is a comparative difference in the effects of yoga training when done either in a slow or fast/rapid manner. The results of yoga exercises performed rapidly are similar to those of physical aerobic exercise with increased muscular endurance and power. The effects of yoga exercises performed slowly with co-ordinated breathing results in shifting cardiovascular parameters towards normal values.[18] In the study by Turankar

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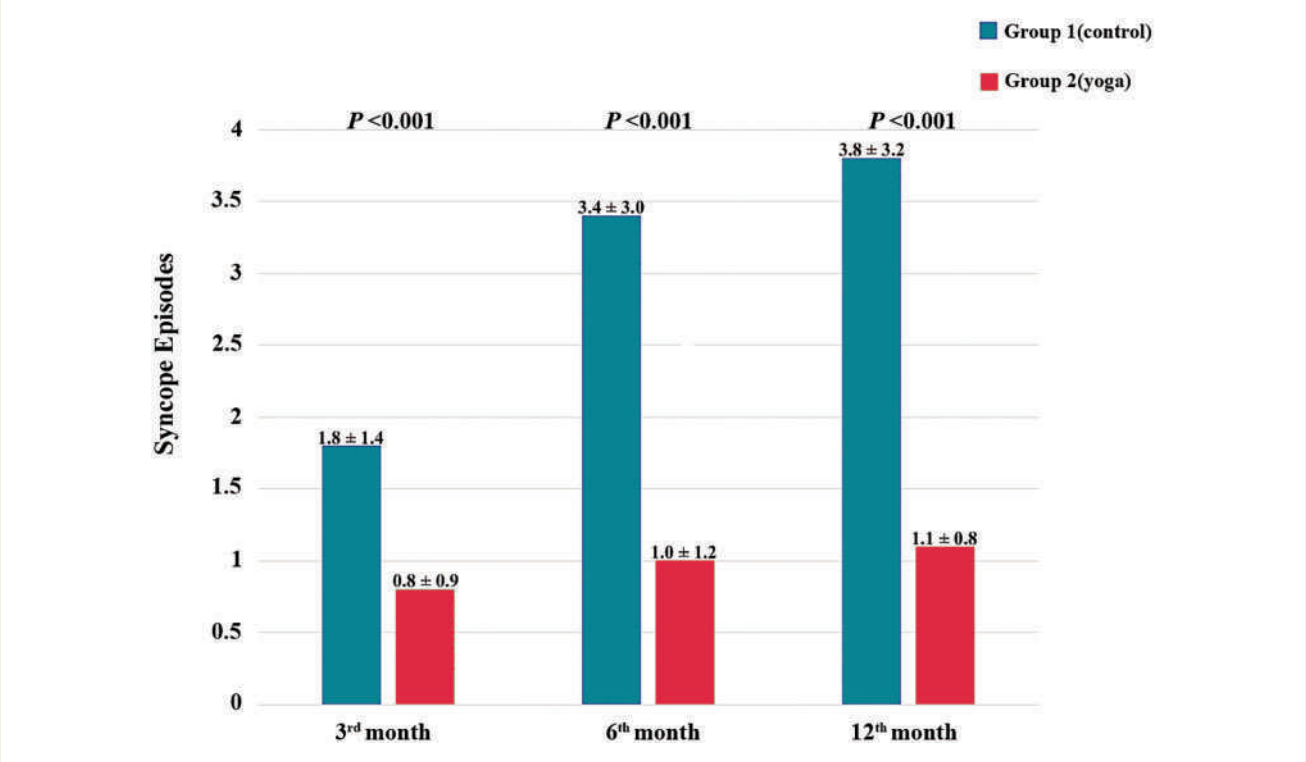

Figure 1 Comparison of syncope recurrence between Group 1 and Group 2 at 3rd, 6th, and 12th months. The bar diagram shows significantly lower recurrences of syncopal episodes in Group 2 (yoga therapy) compared with Group 1 (guideline-directed therapy) at the 3rd (Group 1: 1.8 ± 1.4 vs. Group 2: 0.8 ± 0.9, $P<0.001$), 6th (Group 1: 3.4 ± 3.0 vs. Group 2:1.0 ± 1.2; $P\leq0.001$), and 12th months (Group 1: 3.8 ± 3.2 vs. Group 2: 1.1 ± 0.8, $P<0.001$).

et al.,[19] the beneficial effects of pranayama (slow breathing) started appearing within a week of regular practice, and the first change was a reduction in sympathetic tone.

In the present study, the yoga therapy group practiced yoga 3.4 ± 1.1 times a week for 60 min. A study by Polsgrove *et al.*[20] has shown that biweekly yoga practice for 60 min has beneficial effects. Thus, it appears that practicing yoga therapy for 60 min at least 2–3 times a week has beneficial effects. A weekly yoga program with home practice is safe, feasible, and an acceptable activity even for older adults with a broad range of comorbidities and leads to improvements in physical function and mental and social well-being.[21]

Yoga and VVS prevention

Regular yoga practice may benefit patients with VVS via several mechanisms. Yoga prevents extreme fluctuations in autonomic tone and modulates the autonomic nervous system favourably. Yoga increases the parasympathetic tone and reduces sympathetic activity leading to improved sympathovagal balance.[7] Regular performance of 'asanas' improves muscular and vascular tone, thereby aiding venous return, thus preventing excessive gravitational pooling of blood during prolonged orthostatic stress.

We noted a significant improvement in the SFSQ score in the yoga therapy group as early as the third month that persisted for up to 12 months. Whether there were any differences between the participants in the yoga group who were more compliant with practice (5 times/week) compared with those who were less compliant cannot be answered at this time due to the small number of patients in each treatment group. A larger prospective trial will be needed to address this query with confidence. In a pilot observational study by Gunda *et al.*,[10] regular practice of yoga significantly reduced the number of syncopal episodes during follow-up, an outcome which is similar to the findings of the present study. However, the present study differs from the report by Gunda *et al.* in several ways. First, ours is a randomized controlled study that compared guided yoga therapy vs. conventional guideline-directed treatment with dietary modification and physical counter-pressure manoeuvres. Secondly, in the present study, yoga was taught to subjects by a certified yoga therapist, unlike the study by Gunda *et al.* in which self-learning using a yoga DVD was done. A yoga teacher's personalized attention makes yoga practice better as there is no substitute for a live teacher for improving alignments and techniques during yoga practice. Thirdly, we included patients of both sexes, unlike Gunda *et al.*'s report that included females predominantly. Finally, none of our patients were on drug therapy, in contrast to the study by Gunda *et al.*, where ~80% of the patients were on drugs for VVS. And finally, the present randomized study was adequately powered to find a statistically significant difference between them.

To the best of our knowledge, this is the first randomized controlled study comparing guided yoga therapy vs. guideline-directed dietary modification and physical counter-pressure manoeuvres therapy in patients with recurrent VVS.

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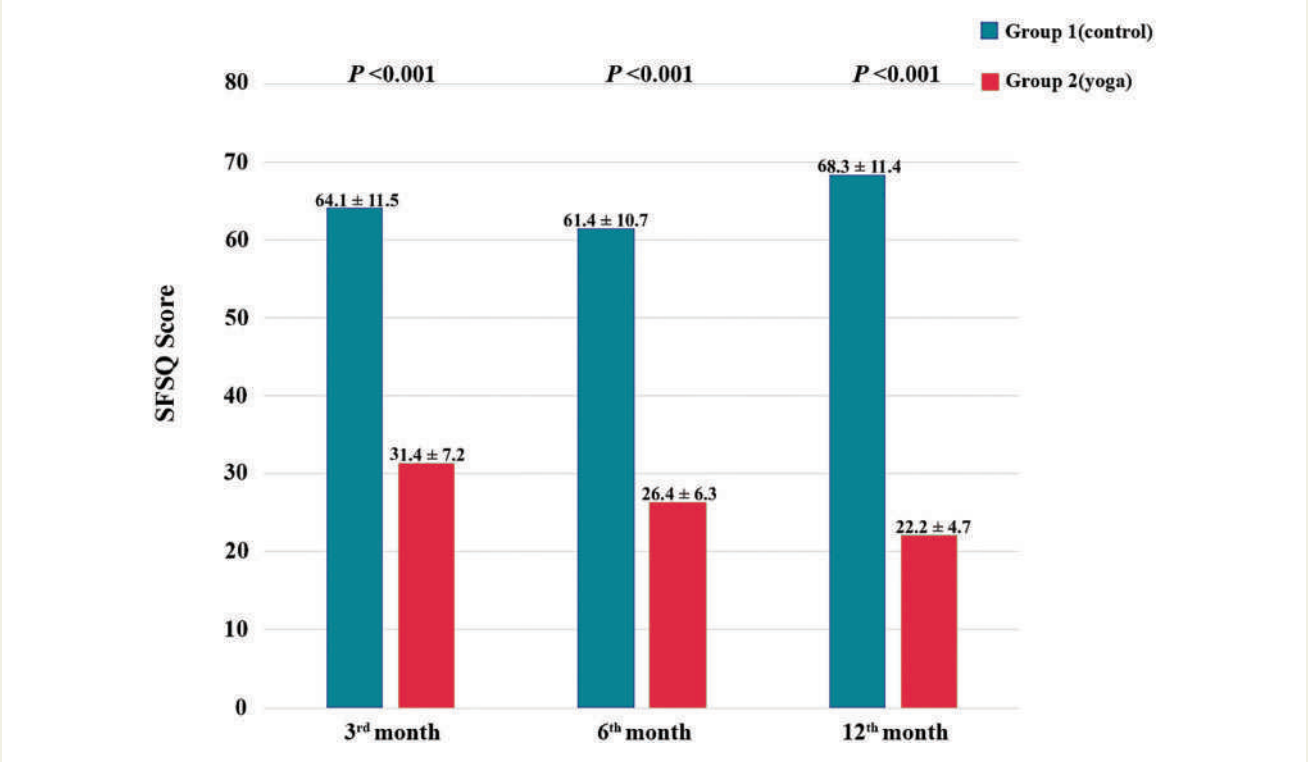

Figure 2 Comparison of SFSQ score for Group 1 with Group 2 at 3rd, 6th, and 12th months. The bar diagram depicts the syncope functional score questionnaire (SFSQ) score in Group 1 (guideline-directed therapy) vs. Group 2 (yoga therapy), the 3rd (Group 1: 64.1 ± 11.5 vs. Group 2: 31.4 ± 7.2, *P*<0.001), 6th (Group 1: 61.4 ± 10.7 vs. Group 2: 26.4 ± 6.3, *P*<0.001), and 12th months (Group 1: 68.3 ± 11.4 vs. Group 2: 22.2 ± 4.7, *P*<0.001).

Limitations and future implications

The interpretation of the findings in this study is limited in several respects. It is a relatively small single-centre study comprising a select group of relatively young patients with normal left ventricular function. Thus, our study findings do not apply to patients with structural heart disease, older patients with VVS, and other reflex syncope forms. The drawbacks of open-labelled design, including the expectation effect, are difficult to avoid with this treatment intervention, as it is impossible to blind the patient. We have included a reduction of only the syncopal episodes and not a pre-syncope as an endpoint. However, syncope is a harder endpoint, and it is challenging to assign a pre-syncope as being reflex in origin, which is similar to many previous studies. The certified yoga instructor with in-person-guided yoga therapy likely improved compliance. Though 60 min/day of yoga, 5 days a week, maybe considered a considerable burden, we used the classical slow yoga therapy with proven beneficial effects on the autonomic nervous system.[18] Whether a shorter period of yoga therapy is likely to be equally effective needs to be addressed in future studies. We encouraged patients to follow treatment instructions at each clinic visit. However, we cannot assure therapy compliance outside of the medical centre. On the other hand, it may be reasonable to assume that this limitation applies to both treatment groups. The possibility that outcomes may have been influenced favourably towards yoga by more time having been invested in the yoga group during treatment sessions than was the case for the conventional treatment group cannot be excluded. To minimize this effect, the study team did take time to review the treatment plan and made every effort to encourage its maintenance in the conventional arm patients. Although the study is sufficiently powered, the findings need confirmation from a larger multi-centre randomized study. A study to assess the effects of yoga on the autonomic changes in VVS is necessary.

Conclusion

Our study suggests that guided yoga therapy is superior to conventional guideline-directed dietary modification and physical counter-pressure measures in reducing the number of syncopal episodes. Yoga therapy reduces the number of syncopal attacks and improves QoL in patients with recurrent VVS. Consequently, yoga therapy may be a useful therapeutic option for VVS patients.

Supplementary material

Supplementary material is available at *Europace* online.

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Data availability

According to the institutional policy, data cannot be shared for privacy reasons. Loss of consciousness is equated with 'seizures' in India and has a social stigma attached to it. However, the data will be shared on reasonable request to the corresponding author if the institutional board permits it. Before sharing the data, we will also need to get written consent from each patient who participated in the study to share the data.

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