

Nadanusandhana and Flute-Based Nada Yoga: An Integrative Approach to Stress Attenuation

Neeraj A.V.¹, Spoorthy R Savanth¹, Niveditha Dravid A.¹, Aafreen Zainab¹
Dr. Parameshwara M.N.²

¹Bachelor of Naturopathy and Yogic Sciences (BNYS) Students

²Associate Professor & HOD Dept of Research Methodology & Recent Advances

Tapovana Medical College of Naturopathy and Yogic Sciences (TMCNYS), Doddabathi, Davangere –
577566, Karnataka, India

(Affiliated to Rajiv Gandhi University of Health Sciences, Bengaluru)

Abstract

Background: Stress has become a pervasive feature of contemporary life and is strongly linked to physical, psychological, and social morbidity. Traditional yogic sound-based practices such as Nadanusandhana and flute-based Nada Yoga are proposed to attenuate stress through neurophysiological and psychoacoustic pathways.

Objectives: To evaluate the effectiveness of a combined Nadanusandhana and flute-based Nada Yoga intervention in reducing perceived stress, depression, and anxiety among healthy adults.

Materials and Methods: A single-group pre-post interventional study was conducted on 12 healthy adults aged 18–35 years with moderate to high stress on the Perceived Stress Scale (PSS-10). Subjects underwent a 45-minute daily session (5 min preparation + 20 min Nadanusandhana + 20 min flute-based Nada Yoga), 6 days a week for 2 weeks. Stress was assessed using PSS-10 and the Depression Anxiety Stress Scale (DASS-21) before and after the intervention. Data were analysed using paired t-tests.

Results: Following the 2-week intervention, mean PSS-10 scores decreased significantly from 24.92 ± 3.70 to 7.92 ± 2.43 ($t = 12.99$, $p < 0.001$). Significant reductions were also observed in DASS-21 Depression (16.00 ± 3.16 to 4.83 ± 2.62 ; $p < 0.001$), Anxiety (10.58 ± 1.88 to 3.67 ± 2.42 ; $p < 0.001$), and Stress (19.50 ± 3.15 to 9.75 ± 2.34 ; $p < 0.001$) subscales. All subjects shifted from moderate/high to low/normal perceived stress category.

Conclusion: The combined practice of Nadanusandhana and flute-based Nada Yoga appears to be an effective, low-cost, and non-invasive approach for reducing perceived stress, depression, and anxiety in healthy adults. It may be considered as an integrative practice for stress management, pending confirmation in larger controlled trials.

Keywords: *Nadanusandhana; Nada Yoga; flute therapy; stress attenuation; PSS-10; DASS-21; yoga therapy*

1. Introduction

Stress, in varying degrees, has become an inseparable part of modern human life. The transition from traditional, nature-aligned patterns of living to fast-paced, technology-driven, and highly competitive lifestyles has exposed individuals to continuous physical, psychological, and social demands. Stress may be defined as a psychophysiological response that is commonly perceived as a negative emotional state, arising when the demands placed upon an individual exceed the perceived resources available to cope with them [1]. When such demands are persistent, perseverative cognition—worry, rumination, and anticipatory anxiety—keeps the physiological stress response chronically activated, predisposing individuals to a wide range of psychosomatic and lifestyle disorders [1].

The World Health Organization has repeatedly identified stress-related disorders as a leading contributor to the global burden of non-communicable disease. Chronic activation of the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic nervous system has been associated with hypertension, anxiety, depression, sleep disturbance, and metabolic dysregulation [10]. This growing burden has renewed scientific interest in low-cost, non-pharmacological, and sustainable methods of stress management.

Naturopathy and Yoga have long emphasized restoration of mind–body balance through natural means. Among classical yogic techniques, sound-based meditative practices occupy a unique position because they combine the meditative discipline of concentration (*dhāraṇā*) with the physiological and psychological effects of sound and vibration.

1.1 Nadanusandhana

Nadanusandhana, literally the “contemplation of inner sound,” is a traditional yogic meditative technique in which the practitioner directs attention toward internal or external subtle sounds (*Nāda*) to attain mental concentration, inner awareness, and deep meditative absorption. It progressively withdraws attention from external distractions and turns consciousness inward, thereby promoting relaxation and emotional balance [2]. The practice typically involves sequential chanting of the sounds A, U, M, and the combined sound Om, with sustained awareness of the vibration produced in different regions of the body and skull.

1.2 Music Therapy and Flute-Based Nada Yoga

Music therapy is the systematic use of music within a therapeutic relationship to restore, maintain, and enhance emotional, physical, and mental health. It has consistently been shown to promote relaxation, reduce stress, improve mood, and support overall wellbeing [3]. Music promotes dopamine release and activates brain regions associated with memory, attention, and emotional regulation [4].

Flute-based Nada Yoga extends this principle by exposing the practitioner to therapeutic flute music composed in ragas traditionally associated with calming effects, such as Raga Yaman and Raga Bhairavi. The slow tempo, sustained tones, and melodic simplicity of the flute are believed to entrain the listener’s attention and breathing, promoting a state of passive, receptive relaxation that complements the more active, internally directed focus cultivated during Nadanusandhana.

The present study was undertaken to evaluate the effect of a combined 45-minute daily protocol of Nadanusandhana and flute-based Nada Yoga, administered over two weeks, on perceived stress and on the depression, anxiety, and stress domains measured by the Perceived Stress Scale (PSS-10) [6] and the Depression Anxiety Stress Scale (DASS-21) [7] in healthy young adults with moderate to high baseline stress.

2. Aims and Objectives

Aim: To evaluate the effectiveness of Nadanusandhana and flute-based Nada Yoga practices in reducing stress among healthy adult subjects.

Objectives:

1. To assess pre- and post-intervention stress levels using the Perceived Stress Scale (PSS-10) and the Depression Anxiety Stress Scale (DASS-21).
2. To evaluate the effect of the combined intervention on perceived stress, depression, and anxiety scores.
3. To explore the feasibility and tolerability of the protocol as a complementary approach to stress management.

3. Review of Literature

Stress is derived from the Latin stringere (“to draw tight”) and entered biomedical usage through Hans Selye, who defined it as the non-specific response of the body to any demand [8]. Lazarus and Folkman’s transactional model later conceptualized stress as a dynamic person–environment relationship mediated by cognitive appraisal [9]. When demand–resource mismatches persist, perseverative cognition sustains physiological activation and predisposes to psychosomatic disorders [1]. Within the classical Indian framework, stress is understood to manifest across the Pañca Kośa (five sheaths), providing a rationale for multi-modal interventions that address more than one layer simultaneously [1].

Epidemiological data confirm a high and rising burden of stress. Gallup’s State of the Global Workplace 2024 reported that approximately 41% of employees worldwide experienced “a lot of stress” on the preceding day [12]. In India, a 2025 multi-city survey of 1,628 college students found that 70.3% reported moderate-to-high distress [14]. These findings underscore the public-health relevance of accessible, low-cost interventions.

Nadanusandhana has been described as a true technique of meditation that promotes deep mental focus and emotional stability [2]. Immediate effects of Nadanusandhana and music therapy on cognitive functions have been demonstrated among university students [27]. A randomized crossover pilot study reported significant improvement in energy and relaxation parameters after a single session of Nada Yoga [18]. Exposure to Raga Bhairavi has been shown to reduce stress-related psychophysiological markers [28]. Related practices such as Om chanting, prāṇāyāma, and Yoga Nidra favour parasympathetic dominance and reduce depression, anxiety, and stress scores [25,26].

The PSS-10 [6] and DASS-21 [7] are widely validated instruments for measuring perceived stress and the overlapping constructs of depression, anxiety, and stress, respectively, and were therefore selected as outcome measures in the present study.

4. Materials and Methods

4.1 Study Design

A single-group, pre-test/post-test interventional study was conducted to evaluate the effect of a combined Nadanusandhana and flute-based Nada Yoga protocol on perceived stress, depression, and anxiety.

4.2 Study Setting and Population

The study was conducted at Tapovana Medical College of Naturopathy and Yogic Sciences (TMCNYS), Doddabathi, Davangere, Karnataka. A total of 30 individuals from the college campus were screened; 12 subjects who satisfied the inclusion and exclusion criteria were enrolled ($n = 12$).

4.3 Inclusion and Exclusion Criteria

Inclusion criteria:

- Age between 18 and 35 years
- Either gender
- Willingness to participate and provide written informed consent
- Moderate or high stress levels on the PSS-10

Exclusion criteria:

- Severe psychiatric or neurological disorders
- Current pharmacological treatment for stress, anxiety, or depression
- Hearing impairment or speech disorders
- Any chronic systemic illness

4.4 Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee of TMCNYS. Written informed consent was obtained from each participant. Participants were free to withdraw at any stage without consequence, and confidentiality of all data was strictly maintained.

4.5 Intervention Protocol

The intervention consisted of a combined session of Nadanusandhana and flute-based Nada Yoga, administered once daily, 6 days a week, for 2 weeks. Each session lasted 45 minutes: 5 minutes of preparation, 20 minutes of Nadanusandhana, and 20 minutes of flute-based Nada Yoga.

Preparation (5 min):

Subjects sat in a comfortable meditative posture (Padmāsana, Siddhāsana, Sukhāsana, or Vajrāsana) with the spine erect, closed the eyes, and practised slow deep breathing for 2–3 minutes to calm the mind.

Nadanusandhana (20 min):

Practitioners adopted Cin Mudra and performed sequential chanting: A-kāra (9 times, awareness in the abdomen), U-kāra with Chinmaya Mudra (9 times, awareness in the chest), M-kāra with Ādi Mudra (9 times, awareness in the throat and head), and AUM with Brahma Mudra (9 times, awareness throughout the body). The practice concluded with a few deep breaths and observation of bodily sensations and emotional state.

Flute-based Nada Yoga (20 min):

Subjects remained in a relaxed posture and listened attentively to recorded therapeutic flute music in calming ragas (Raga Yaman and Raga Bhairavi), maintaining passive awareness of the sound vibrations [27,28].

4.6 Assessment Tools

Perceived Stress Scale (PSS-10): A validated 10-item self-report questionnaire measuring the degree to which situations in one's life are appraised as stressful. Total score ranges from 0 to 40; higher scores indicate greater perceived stress [6].

Depression Anxiety Stress Scale (DASS-21): A 21-item self-report questionnaire comprising three subscales (depression, anxiety, stress), each with seven items. Raw subscale scores are doubled and interpreted using standard severity categories [7].

4.7 Procedure and Statistical Analysis

Baseline (pre-intervention) assessment was performed using PSS-10 and DASS-21. After the 2-week intervention, post-intervention assessment was repeated under similar conditions. Data were expressed as mean $\pm$ standard deviation (SD). Pre- and post-intervention scores were compared using the paired Student's t-test. A p-value < 0.05 was considered statistically significant. Analyses were performed using SPSS.

5. Results

All 12 enrolled subjects completed the 2-week protocol with no dropouts and no reported adverse events.

5.1 Demographic Profile

Table 1 presents the age and gender distribution of the study subjects.

Sl. No.	Parameter	Category	Value
1	Age (years)	Mean $\pm$ SD	21.2 $\pm$ 1.64
2	Age Range	Min – Max	19 – 24 years
3	Gender	Male	5 (41.7%)
4		Female	7 (58.3%)
5	Total Subjects	n	12

Table 1. Age and gender-wise distribution of study subjects (n = 12)

5.2 Primary and Secondary Outcomes

Tables 2–5 summarize the pre- and post-intervention comparisons.

Parameter	Pre (Mean $\pm$ SD)	Post (Mean $\pm$ SD)	t, p-value
PSS-10 (0–40)	24.92 $\pm$ 3.70	7.92 $\pm$ 2.43	t = 12.99 p < 0.001

Table 2. Comparison of pre- and post-intervention PSS-10 scores

The mean PSS-10 score reduced from 24.92 $\pm$ 3.70 (moderate-to-high stress range) at baseline to 7.92 $\pm$ 2.43 (low/normal range) after the intervention. This reduction was statistically highly significant (p < 0.001).

Parameter	Pre (Mean $\pm$ SD)	Post (Mean $\pm$ SD)	t, p-value
DASS-21 Depression	16.00 $\pm$ 3.16	4.83 $\pm$ 2.62	t = 8.39 p < 0.001

Table 3. Comparison of pre- and post-intervention DASS-21 Depression scores

Parameter	Pre (Mean $\pm$ SD)	Post (Mean $\pm$ SD)	t, p-value
DASS-21 Anxiety	10.58 $\pm$ 1.88	3.67 $\pm$ 2.42	t = 7.61 p < 0.001

Table 4. Comparison of pre- and post-intervention DASS-21 Anxiety scores

Parameter	Pre (Mean $\pm$ SD)	Post (Mean $\pm$ SD)	t, p-value
DASS-21 Stress	19.50 $\pm$ 3.15	9.75 $\pm$ 2.34	t = 7.41 p < 0.001

Table 5. Comparison of pre- and post-intervention DASS-21 Stress scores

All three DASS-21 subscales showed statistically significant reductions (p < 0.001), with mean scores shifting from the mild–moderate range into the normal range.

Table 6 shows the severity-wise shift in PSS-10 categories.

PSS-10 Severity Category	Pre-Intervention (n)	Post-Intervention (n)
Low / Normal (0–13)	0	12
Moderate (14–26)	8	0
High (27–40)	4	0

Table 6. Severity-wise distribution of subjects (PSS-10) – pre vs post intervention

Prior to the intervention, all subjects were classified in the moderate-to-high perceived stress categories. Following the intervention, all 12 subjects shifted into the low/normal category.

6. Discussion

The present study evaluated the effect of a combined 2-week Nadanusandhana and flute-based Nada Yoga protocol on perceived stress, depression, and anxiety among 12 healthy adults with baseline moderate-to-high stress. Consistent with the study hypothesis, all four outcome measures—PSS-10 and the DASS-21 depression, anxiety, and stress subscales—showed statistically significant reductions following the intervention.

The reduction in PSS-10 scores is in agreement with earlier work showing that sound-based meditation techniques such as Nadanusandhana enhance relaxation and reduce perceived stress by promoting inward attention and withdrawing awareness from external distractions [2,27]. Immediate improvements in energy and relaxation parameters reported after a single session of Nada Yoga [18] may, over repeated daily practice, translate into the sustained reduction in perceived stress observed in the present sample.

The parallel reduction in DASS-21 depression and anxiety scores is consistent with the broader literature on music therapy, which has repeatedly demonstrated reductions in anxiety and improvement in mood following structured listening interventions [3,4]. The specific use of ragas such as Yaman and Bhairavi is supported by evidence that exposure to Raga Bhairavi is associated with significant reductions in stress-related psychophysiological markers [28].

These findings are also consistent with reports on related yogic sound- and breath-based practices—including Om chanting, prāṇāyāma, and Yoga Nidrā—which have been shown to improve autonomic balance, promote parasympathetic dominance, and reduce depression, anxiety, and stress scores [25,26]. Taken together, the present findings support the proposed mechanism that Nadanusandhana acts primarily through inward attentional withdrawal and activation of the parasympathetic nervous system, while flute-based Nada Yoga acts through psychoacoustic and dopaminergic pathways associated with music listening, and that the two mechanisms may act synergistically when combined within a single daily protocol.

The present study has certain limitations. The sample size was small ($n = 12$), and the design did not include a control or comparison group, which limits the ability to attribute the observed improvements solely to the intervention rather than to non-specific factors such as regular attention, expectation, or the

natural course of stress over two weeks. Self-reported psychometric instruments, while validated, are subject to recall and response bias. Future studies with larger sample sizes, a control group, objective physiological markers (e.g., heart-rate variability, salivary cortisol), and longer follow-up are recommended to confirm and extend these findings.

7. Conclusion

Within the limitations of this single-group pre–post study, the combined practice of Nadanusandhana and flute-based Nada Yoga, administered daily for two weeks, was associated with a statistically significant reduction in perceived stress (PSS-10) and in the depression, anxiety, and stress domains of the DASS-21 among healthy adult subjects. The intervention was simple, non-invasive, low-cost, and well tolerated, with no adverse events reported. These findings suggest that this integrative sound-based yogic protocol may be considered a useful complementary approach for stress attenuation and merits further evaluation in larger, controlled studies.

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Conflict of Interest

The authors declare no conflict of interest.

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