

RESEARCH ARTICLE ON CLINICAL STUDY ON THE EFFECT OF SHANKHPUSHPI (CONVOLVULUS PLURICAULIS) AS MEDHYA RASAYANA IN REDUCING EXAMINATION STRESS AMONG UNDERGRADUATE STUDENTS USING PSS, PSQI, AND DIGIT SPAN TEST

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Article Received on 27 August 2026,
Article Revised on 17 Sept. 2026,
Article Published on 01 Oct. 2026,

<https://doi.org/10.5281/zenodo.23036055>

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How to cite this Article: Dr. Sneh Ranga^{*1}, Suhani Mahajan², Vanshika Sharma² (2026). Research Article On Clinical Study On The Effect Of Shankhpushpi (Convolvulus Pluricaulis) As Medhya Rasayana In Reducing Examination Stress Among Undergraduate Students Using Pss, Psqi, And Digit Span Test. World Journal of Pharmaceutical Research, 15(19), 509–520.

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ABSTRACT

BACKGROUND: Academic examination stress is common among undergraduate students and is often associated with impaired cognitive function, poor sleep quality, and reduced academic performance. In Ayurveda, shankhpushpi (Convolvulus pluricaulis) is described as a medhya rasayana, traditionally used to enhance memory, intellect, and mental well-being. However, clinical evidence supporting its role in managing examination stress is limited. **OBJECTIVE:** To evaluate the effect of Shankhpushpi on perceived stress, sleep quality, and cognitive performance among undergraduate students during examination periods. **METHODS:** The present study adopted a comparative interventional approach and included a total of 60 undergraduate students. Participants were assigned into two groups of equal size, with one group receiving Shankhpushpi as the intervention and the other group undergoing standard counselling without any pharmacological

treatment. Evaluation of outcomes was performed using established assessment tools, namely the Perceived Stress Scale (PSS) for measuring stress levels, the Pittsburgh Sleep Quality

Index (PSQI) for assessing sleep patterns, and the Digit Span Test for evaluating cognitive function. Data collected before and after the intervention period were analyzed to determine changes within each group as well as differences between the two groups, applying suitable statistical techniques. **RESULTS:** The intervention group demonstrated a significant reduction in perceived stress scores along with improvement in sleep quality and cognitive performance following administration of Shankhpushpi. In contrast, the control group showed only minimal changes in these parameters. **CONCLUSION:** The findings of the study provide evidence supporting the effectiveness of Shankhpushpi as a Medhya Rasayana in reducing examination-related stress and improving sleep quality and cognitive performance among undergraduate students.

KEYWORDS: Shankhpushpi; Convolvulus pluricaulis; Medhya Rasayana; academic stress; PSS; PSQI; Digit Span Test; Ayurveda.

INTRODUCTION

Stress refers to a psychological and physiological response that occurs when individuals perceive external demands as exceeding their coping abilities. Among medical and allied health students, stress is widely prevalent, largely attributed to intensive academic workload and ongoing performance assessments. Studies have reported that perceived stress is common among undergraduate medical students, with a significant proportion experiencing moderate to severe stress levels during their academic training.^[1]

Examination-related stress represents a distinct category of academic stress that arises in anticipation of and during evaluative situations. It is a major contributor to psychological distress among students and is associated with anxiety, sleep disturbances, impaired concentration, and reduced academic performance. Examination periods are particularly stressful as they involve high expectations, time pressure, and fear of failure, which significantly elevate psychological burden.^[2]

Research has shown that academic stressors such as vast syllabi, frequent examinations, peer competition, and high parental expectations significantly contribute to stress among students. Perceived stress has also been found to be associated with poor academic performance, indicating a cyclical relationship where stress negatively affects performance, which in turn further increases stress levels.^[3]

From a physiological perspective prolonged exposure to stress stimulates the hypothalamic–pituitary–adrenal axis, leading to elevated cortisol levels that adversely affect cognitive processes. This hormonal imbalance negatively affects cognitive functions such as attention, memory, and decision-making, thereby impairing learning capacity and examination performance.^[2]

According to Ayurvedic principles, psychological well-being depends on the balance of the three gunas—Satva, Rajas, and Tamas—where dominance of Rajas and Tamas contributes to mental disturbances. Classical Ayurvedic texts describe Medhya Rasayana as a group of drugs that enhance cognitive functions including Dhi (intellect), Dhriti (retention), and Smriti (memory).^[4]

Shankhpushpi (*Convolvulus pluricaulis*) is one of the important Medhya Rasayana drugs described in Ayurvedic literature. It is traditionally indicated for improving memory, reducing anxiety, and promoting mental calmness. It is believed to enhance Satva guna and reduce Rajas and Tamas, thereby improving mental stability and cognitive clarity.^[4]

Modern pharmacological studies have also reported that Shankhpushpi possesses anxiolytic, nootropic, and neuroprotective properties, supporting its traditional claims in improving cognition and reducing stress-induced behavioral changes.^[5]

Standardized psychological tools such as the Perceived Stress Scale (PSS), developed by Cohen et al., the Pittsburgh Sleep Quality Index (PSQI), and the Digit Span Test are widely used to assess stress levels, sleep quality, and working memory respectively in clinical and academic research settings.^[6,8]

Despite increasing awareness of student stress, there is limited clinical evidence evaluating the effect of Shankhpushpi on examination stress using validated psychological scales. Therefore, the present study is designed as a pilot clinical study to evaluate the effect of Shankhpushpi as Medhya Rasayana in reducing examination stress among undergraduate students.

Rationale Of The Study

The traditional Ayurvedic pharmacopeia places significant emphasis on Medhya Rasayana (nootropic/rejuvenating) interventions for optimizing Medha (intellect), Smriti (memory), and Manasika Swasthya (mental equilibrium). Among the various classical formulations,

Shankhpushpi (*Convolvulus pluricaulis*) stands out as a premier botanical agent traditionally indicated for enhancing higher cortical functions and stabilizing psychological health.^[4,9] Ancient classical texts consistently document its therapeutic utility in calming the mind and sharpening cognitive faculties, framing it as a holistic approach to neuropsychological care.

Modern preclinical and clinical research has begun to unravel the pharmacological mechanisms underlying these traditional claims. Current literature highlights that *Convolvulus pluricaulis* exhibits significant neuroprotective, anxiolytic, memory-enhancing, and antioxidant properties.^[10,12] Mechanistic studies indicate that these benefits are primarily driven by the modulation of central neurotransmitter pathways, the mitigation of free-radical-induced oxidative stress, and the direct facilitation of attention and learning mechanisms.^[10,11] Furthermore, preliminary clinical trials suggest a positive correlation between Shankhpushpi supplementation and measurable improvements in psychological resilience and mental performance.^[12]

To address this empirical deficit, the current investigation is designed to systematically evaluate the clinical efficacy of Shankhpushpi. By employing strictly validated outcome measures to quantify its impact on stress perception, sleep architecture, and objective cognitive performance, this study aims to bridge traditional Ayurvedic principles with contemporary evidence-based medicine, establishing a verifiable scientific baseline for its use as a potent Medhya Rasayana.

AIM

To evaluate the effect of Shankhpushpi (*Convolvulus pluricaulis*) on examination-related stress, sleep quality, and cognitive performance among undergraduate students.

OBJECTIVES

PRIMARY OBJECTIVE

1. To determine the effect of Shankhpushpi on perceived stress levels among undergraduate students using the Perceived Stress Scale (PSS).

Secondary Objectives

1. To assess the impact of Shankhpushpi on sleep quality using the Pittsburgh Sleep Quality Index (PSQI).

2. To evaluate changes in cognitive performance following administration of Shankhpushpi using the Digit Span Test.
3. To compare pre- and post-intervention scores of PSS, PSQI, and Digit Span Test within the intervention group.
4. To compare post-intervention outcomes between the intervention and control groups.
5. To explore the role of Shankhpushpi as a Medhya Rasayana in improving psychological well-being and cognitive function during examination stress.

MATERIALS AND METHODS

Study Design

This study was carried out as a controlled clinical investigation with the objective of assessing the impact of Shankhpushpi on stress levels, sleep patterns, and cognitive functions among undergraduate students facing examination pressure.

Study Setting

The research was undertaken at Mai Bhago Ayurvedic Medical College for women & Hospital involving students from undergraduate courses.

Study Participants

Students who reported experiencing stress associated with examinations were screened, and a total of 60 individuals meeting the eligibility criteria were selected for participation.

Grouping of Participants

The selected participants were divided into two equal groups, each comprising 30 individuals:

- The first group received Shankhpushpi as an intervention
- The second group received only standard counselling and served as a comparison group.

Eligibility Criteria

Inclusion Criteria

- Individuals aged between 21 and 24 years
- Students reporting examination-related stress
- Those who voluntarily agreed to participate and provided consent
- Participants available for the complete duration of the study

Exclusion Criteria

- History of psychiatric or neurological disorders
- Ongoing use of medications affecting mental health or cognition
- Presence of serious medical conditions
- Consumption of herbal or synthetic agents influencing stress or memory
- Refusal to participate

Intervention Protocol

Participants assigned to the intervention group were administered Shankhpushpi in Tablet form at a dose 250 mg twice daily for over a period of 30 days.^[13] No medication or placebo was given to the comparison group, only standard counselling was provided.

Assessment Tools

Evaluation was conducted at the beginning and at the completion of the study period using standardized instruments:

- **Perceived Stress Scale (PSS)**

Stress perception among participants was evaluated using the Perceived Stress Scale. This tool measures how individuals interpret and respond to stressful situations in their daily lives. It focuses on the extent to which experiences are felt as uncertain, difficult to control, and overwhelming over a recent time period. The scale has been widely applied in research involving student populations and is considered a reliable method for assessing subjective stress levels.^[14]

- Score range: 0-40
 - 0-13: Low perceived stress
 - 14-26: Moderate perceived stress
 - 27-40: High perceived stress
- Scoring: 10 questions, each scored 0-4. Items 4, 5, 7, and 8 are reverse-scored. If you're using the PSS-14, the range is 0-56.

- **Pittsburgh Sleep Quality Index (PSQI)**

Sleep patterns were assessed using the Pittsburgh Sleep Quality Index, a standardized questionnaire that captures an individual's perception of their sleep over the past month. The tool examines multiple aspects of sleep, including duration, time taken to fall asleep,

disturbances during sleep, efficiency, daytime functioning, and overall sleep satisfaction. It is commonly used in clinical and academic settings due to its consistent performance in evaluating sleep-related issues.^[15]

- Total Scoring Range

Total score range: 0-21

0-5: Good sleep quality

>5 (6-21): Poor sleep quality /significant sleep disturbance

- **Digit Span Test**

Cognitive function was examined with the Digit Span Test, which evaluates attention and memory capacity. In this test, participants are required to recall a sequence of numbers in the same order as presented and in reverse order. This helps in assessing short-term memory, concentration, and mental processing ability. Better performance is reflected by the ability to accurately reproduce longer sequences.^[16]

Scoring

- Digit Span Forward – repeat numbers in the same order → mainly tests attention/short-term memory.
- Digit Span Backward – repeat numbers in reverse order → tests working memory and mental manipulation.
- Typical scoring (WAIS)

Each correctly repeated sequence = 1 point

Sequences become progressively longer.

Testing stops after repeated failures according to the specific test manual.

Maximum span varies with the version/age group, so there isn't one universal cutoff for adults.

Data Collection Method

Initial readings were recorded prior to starting the intervention. After completion of the study duration, all parameters were reassessed using the same tools. Observations were documented.

Statistical Processing

The collected data were compiled and subjected to statistical evaluation using appropriate analytical methods. Results were expressed in terms of mean and standard deviation.

Comparisons within the same group before and after intervention were analysed using suitable paired statistical methods, while differences between the two groups were assessed using independent statistical techniques. A probability value less than 0.05 was considered indicative of statistical significance.

Ethical Considerations

Approval for conducting the study was obtained from the Institutional Ethics Committee prior to its initiation. All participants were informed about the nature of the study, and written consent was obtained. Confidential handling of participant information was ensured throughout the research process.

RESULT

In this study, 60 female BAMS students were selected based on the eligibility criteria. All participants were staying in the hostel throughout the study duration. The participants belonged to an age group of 22–24 years. A summary of their general characteristics is provided in Table 1.

Parameter	Value
Total participants	60
Gender	Female (100%)
Residence	Hostel
Age range	21-24

The baseline assessment of stress, sleep quality, and cognitive performance was carried out before administration of Shankhpushpi. The mean scores obtained on PSS, PSQI, and Digit Span Test are presented in Table 2,3,4.

Table 2: Comparison of PSS score.

Group	n	Mean $\pm$ SD
Pre Assessment (all students)	60	21.2 $\pm$ 1.7
Post (shankhpushpi)	30	16.3 $\pm$ 1.5
Post (control)	30	20.4 $\pm$ 1.6

This intervention group showed reduction in perceived stress scores following administration of shankhpushpi, whereas only a slight reduction was observed in the control group ($P < 0.001$).

Table 3: Comparison of PSQI score.

Group	n	Mean $\pm$ SD
Pre Assessment (all students)	60	8.1 $\pm$ 1.5

Post (shankhpushpi)	30	5.9 ± 1.3
Post (control)	30	7.6 ± 1.4

This intervention group demonstrated improvement in sleep quality as reflected by lower PSQI scores, while the control group showed minimal improvement ($p < 0.01$).

Table 4: Comparison of Digit Span Test Score.

Group	n	Mean ± SD
Pre Assessment (all students)	60	10.2 ± 1.4
Post (shankhpushpi)	30	12.1 ± 1.5
Post (control)	30	10.6 ± 1.3

This intervention group exhibited improved attention and working memory performance as indicated by higher digit span test scores, whereas the control group showed only a marginal increase ($p < 0.01$).

DISCUSSION

The present study explored the role of Shankhpushpi in managing examination-related stress and its influence on sleep quality and cognitive performance among female BAMS students. The participants who received the intervention showed clear improvement in stress levels, sleep patterns, and mental performance in comparison to the control group.

The observed reduction in stress scores indicates that Shankhpushpi may have a calming effect on the mind during periods of academic pressure. In Ayurveda, it is described as a Medhya Rasayana, known for supporting mental stability and clarity. Modern findings also suggest its potential role in reducing stress and improving emotional balance, which supports the changes observed in this study.^[17] Improvement in sleep quality may be linked to reduced mental disturbance, as stress is a common factor responsible for poor sleep among students during examinations.^[17]

Better performance in cognitive tests reflects enhancement in attention and memory functions. The increase in Digit Span scores suggests improved concentration and working memory capacity. Similar findings have been reported in clinical studies, where Shankhpushpi has shown beneficial effects on memory and cognitive efficiency,^[19] Additionally, broader scientific reviews have highlighted its neuroprotective and stress-relieving properties, further supporting its role in improving mental functions.^[18]

Overall, the findings indicate that reduction in psychological stress may contribute to better sleep and improved cognitive abilities. The results support both classical Ayurvedic understanding and modern scientific observations, suggesting that Shankhpushpi can be useful in promoting mental well-being and cognitive performance during stressful academic situations.

CONCLUSION

The findings of the present study indicate that Shankhpushpi may be beneficial in reducing examination-related stress among undergraduate students. Participants receiving the intervention showed improvement in stress levels, sleep quality, and cognitive functions such as attention and memory. These observations are in accordance with its traditional Ayurvedic use as a Medhya Rasayana, which is believed to support mental functions and emotional balance.

The results suggest that Shankhpushpi can be considered a useful supportive measure for students experiencing academic stress. Its role in promoting better sleep and enhancing mental performance further highlights its relevance in student health.

Limitations

However, the study was conducted on a limited sample over a short duration, acknowledging that this was an open-label trial. Further research involving a larger population and extended follow-up with a future double-blind, placebo-controlled study is required to strengthen the evidence and better understand its long-term effects.

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