

Sanskrit Sound Vibration and Stress Regulation: Measuring the Cortisol Response to Mahamrityunjaya Mantra Chanting among College Students

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ABSTRACT

Purpose of the study: The study aimed to examine the effect of the Mahamrityunjaya Mantra on cortisol among college students.

Materials and Methods: The study included 40 female participants from Shri Bhawani Niketan Mahila Mahavidyalaya, Jaipur, with an age range of 18 to 25 years were divided into two groups: an experimental group and a control group. The experimental group underwent the training for 12 weeks with 5 sessions per week. The significance level was set at 0.05.

Methodology and Results: The experimental group practiced the Mahamrityunjaya Mantra chanting regularly for 90 days. In this study, to measure cortisol level, blood cortisol was taken, and data the received was analyzed by t-test and ANOVA. According to statistical analysis, the obtained results are significant at the 0.05 level, which makes it clear that Mahamrityunjaya mantra chanting leads to a significant decrease in the cortisol level of college-going students of Jaipur.

Conclusion: The research presented shows how the Mahamrityunjaya Mantra helps reduce cortisol in students. Therefore, the extreme importance of Mahamrityunjaya chanting practice in the balance of the body, mental health, and spiritual as well as physical health can be established.

Keywords: Cortisol, Mantra, Meditation, Mahamrityunjaya mantra

Introduction

Yoga, an ancient discipline originating in India, has evolved into a widely practiced system of physical, mental, and spiritual development. Recognized by both traditional and contemporary sciences for its therapeutic benefits, yoga is now frequently integrated into modern wellness programs. Traditionally, yoga is a holistic practice encompassing asanas (postures), pranayama (breathing techniques), dhyana (meditation), and mantra chanting—all aimed at promoting self-awareness, physiological balance, and inner peace (Streeter et al., 2012). In modern research, yoga has been shown to positively affect neuroendocrine and autonomic regulation, contributing to stress reduction and improved mental health outcomes. Among these various limbs of yoga, mantra meditation is a potent and relatively underexplored technique involving the rhythmic repetition of specific sounds, words, or phrases, traditionally in Sanskrit. Mantras are considered not only spiritual tools but vibrational formulas with the potential to regulate consciousness and bodily systems. In Indian philosophical systems, mantra chanting is believed to generate subtle energy frequencies that align the individual with deeper aspects of self and the cosmos (Balaram, 2014). From a scientific standpoint, these vibrations can affect the nervous system, modulate breathing patterns, and promote relaxation, factors that may directly influence endocrine functioning, including the regulation of stress hormones (Telles et al., 2010).

The vibratory effects of Sanskrit mantras go beyond symbolic meanings. Phonetically precise syllables are constructed to stimulate specific parts of the body and brain through resonance. Studies suggest that mantra recitation can stimulate the vagus nerve, activate the parasympathetic nervous system, and induce a relaxation response. This includes reductions in heart rate, blood pressure, and brain wave activity shifting toward alpha and theta states—markers of calm, focused awareness (Streeter et al., 2012; Bernardi et al., 2001). Furthermore, mantra repetition has been associated with reductions in anxiety, improvements in emotional regulation, and enhanced psychological resilience. Central to understanding the physiological effects of stress, and thereby the potential impact of mantra meditation, is the hormone cortisol. Produced by the adrenal cortex in response to activation of the hypothalamic-pituitary-adrenal (HPA) axis, cortisol helps the body manage acute stress by increasing glucose availability, suppressing inflammation, and modulating immune responses. While essential for survival during short-term stress, chronically elevated cortisol levels are associated with adverse effects on nearly all bodily systems, including cognitive impairment, mood disorders, metabolic dysfunction, and cardiovascular disease (Hellhammer et al., 2009).

Blood cortisol levels, as measured through venipuncture and plasma analysis, offer a reliable biomarker for understanding how stress affects the human body. Blood-based cortisol assays are considered the gold standard for capturing acute changes in systemic cortisol and provide more precise information on endocrine status than saliva alone, particularly when assessing the physiological impact of interventions (Kirschbaum & Hellhammer, 2000). Monitoring blood cortisol allows researchers to evaluate how therapeutic techniques such as yoga and meditation influence stress responses at a hormonal level. Among populations vulnerable to chronic stress, college students represent a significant risk group. The pressures of academic performance, social transition, and career planning contribute to high levels of psychological distress among students globally. Numerous studies have reported elevated cortisol levels in students during high-stress periods such as examinations, which can interfere with sleep, memory, and emotional well-being (Beiter et al., 2015). As such, identifying low-cost, non-pharmacological strategies to manage stress and regulate cortisol is essential for enhancing student mental health and academic performance.

One such strategy is the use of Sanskrit mantra chanting, particularly the Mahamrityunjaya Mantra, a sacred verse from the Rig Veda (RV 7.59.12). Often referred to as the “Death Conquering Mantra,” it is traditionally recited for healing, protection, and rejuvenation. The mantra reads:

*“Om Tryambakam Yajamahe Sugandhim Pushtivardhanam
Urvarukamiva Bandhanan Mrityor Mukshiya Maamritat.”*

Translated, this mantra seeks liberation from death, suffering, and bondage—both literal and symbolic. It is used widely in Hindu rituals and meditative practices and is believed to create a powerful energetic resonance that promotes healing and spiritual upliftment. The unique combination of long vowels, consonant clusters, and rhythmic repetition in the Mahamrityunjaya Mantra may influence the central nervous system and internal hormonal balance, though scientific investigation is still in its early stages. Although the health benefits of mantra meditation are widely acknowledged in yogic literature, empirical research specifically examining the Mahamrityunjaya Mantra's effects on cortisol—especially through blood-based measurement—is scarce. Related studies have examined the impact of other mantra-based or sound-based interventions on physiological stress markers. Bernardi et al. (2001) compared the effects of yogic mantras and Christian rosary prayers and found that both induced reductions in respiratory rate and blood pressure, suggesting common autonomic benefits. Telles et al. (1995) reported that OM chanting was associated with decreased skin resistance and autonomic arousal, suggesting parasympathetic activation that could influence cortisol indirectly. However, there is a lack of studies directly measuring pre- and post-intervention blood cortisol levels after specific Sanskrit mantra chanting. This research attempts to bridge that gap by conducting an experimental study evaluating the effect of Mahamrityunjaya Mantra chanting on blood cortisol levels among college students. Participants were randomly assigned to two groups: an experimental group, which practiced guided chanting of the Mahamrityunjaya Mantra for 90 days, and a control group, which engaged in silent rest. Blood samples were drawn before and after 90 days of the session to evaluate the physiological impact of the intervention on systemic cortisol levels. By comparing the pre-post cortisol change between groups, the study aims to test whether Sanskrit mantra chanting can serve as a reliable method for acute stress reduction at the hormonal level. This research is grounded in the biopsychosocial model of health, which asserts that biological systems (like the HPA axis), psychological states (like perceived stress), and sociocultural factors (like spiritual practices) interact to shape health outcomes. If chanting the Mahamrityunjaya Mantra is shown to significantly reduce blood cortisol levels compared to passive rest, the findings would offer meaningful evidence for the integration of traditional sound-based therapies into modern mental health and wellness programs. The broader implication of this research is the possibility of introducing vibrational sound therapy into clinical and educational settings as a non-invasive, culturally rooted, and scalable intervention for stress management. Unlike pharmaceutical treatments, mantra meditation is cost-effective, does not require specialized equipment, and can be practiced individually or in groups, making it a feasible option for both personal and institutional application.

In conclusion, the aim of this study is to explore whether Mahamrityunjaya Mantra chanting can reduce physiological stress, as measured by blood cortisol levels, in college students. By leveraging both traditional yogic knowledge and modern biomedical measurement, this study contributes to the emerging field of

integrative medicine and offers insights into how ancient sound-based practices can influence modern stress physiology.

Objective of the Study

- To characterize the level of the physiological variable (Cortisol level) among the Mahamrityunjaya Mantra group and the control group of college students.
- To compare the adjusted mean score of the physiological variable (Cortisol level) among the Mahamrityunjaya Mantra group and the control group of college students by considering their pre-cortisol level as a covariate.
- To compare pretest and posttest mean scores of the physiological variable (Cortisol level) of the Mahamrityunjaya Mantra chanting group

METHODS AND MATERIALS

Study participants

Selection of Subjects: A total of 40 female participants from the Shri Bhawani Niketan Mahila PG Mahavidyalaya, Jaipur, Rajasthan, were selected for the study. Participants were drawn using a stratified random sampling method. The chronological age range of participants was 18-25years.

Study organization

Variable and Test Selection: The variable chosen for the study was Cortisol. To measure its parameters, the One-way ANOVA method was used, taking Blood cortisol scores. The Mahamritunjaya Mantra was considered an independent variable, whereas the different cortisol scores were considered the dependent variable.

Table 1 Training Program: -

S.No	Practice	Month 1	Month 2	Month 3
1	Opening Prayer	2 min	2min	2min
2	Breathing Practice	5min	5min	5min
3	Mahamritunjay Chanting	10min	15min	20min
4	Closing Prayer	2min	2min	2min

STATISTICAL ANALYSIS

The statistical analysis of data was done according to the objectives of the present study. To evaluate the effect of six weeks of training designed for Pragma Yoga and Control Group on the Anxiety of female students of LNIPE Gwalior, ANCOVA was employed, and for a significant F-value, the post-hoc test was calculated.

RESULT

Table-2 Descriptive Statistics of the Cortisol Level of College Students

Groups	Pre-Test		Post-Test		Adjusted
	Mean	SD	Mean	SD	Mean
Control Group	16.800	1.105	17.00	.85840	17.00
Mahamritunjay Group	16.800	1.542	13.05	1.356	13.05

Table 2 revealed the pre-test mean, pre-test standard deviation (SD), post-test mean, post-test SD, and adjusted mean of the two different groups Control Group and Mahamrityunjaya Group. The pre-test mean and SD of the Control Group were 16.80 ± 1.105 , and the pre-test mean and SD of the Mahamrityunjaya Group were 16.80 ± 1.542 , indicating that both groups were equivalent before the intervention in terms of cortisol levels. The post-test mean and SD of the Control Group were 17.00 ± 0.858 , while the post-test mean and SD of the Mahamrityunjaya Group were 13.05 ± 1.356 . This clearly shows a decrease in cortisol levels among participants who practiced the Mahamrityunjaya Mantra. The adjusted mean of the Control Group was 17.00, while the adjusted mean of the Mahamrityunjaya Group was 13.05, after statistically controlling for pre-test differences. This difference was found to be statistically significant, as confirmed by ANCOVA results, and is graphically represented in **Figure 1**.

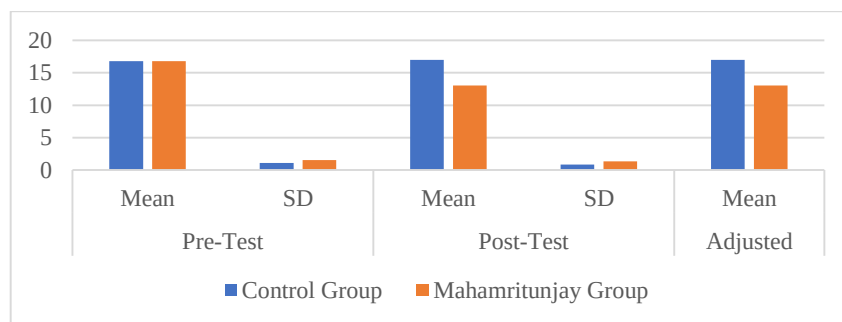


Table 3 Analysis of mean scores of cortisol at Pre-test and Post-test scores

	Paired Difference			t	df	Sig. (2-tailed)
	Mean	Standard Deviation	Standard error			
Pair 1 Pre-test cortisol Post-test cortisol	3.75000	.71635	.16018	23.411	19	.000

From Table 3, it can be seen that the correlated t-value is 23.411, which is significant at the .05 level with df = 19. This indicates that the mean cortisol levels at the pre-test and post-test stages differ significantly following the intervention. Thus, the null hypothesis stating that "there is no significant difference in mean cortisol levels at pre-test and post-test stages" is rejected. Further, the mean difference in cortisol levels was 3.7500, with a standard deviation of 0.71635 and a standard error of 0.16018. The p-value (Sig. 2-tailed) was .000, which is highly significant ($p < .001$). It may, therefore, be concluded that the cortisol levels significantly decreased after the intervention, indicating that the treatment (e.g., mantra chanting or relaxation method used) was effective in reducing physiological stress.

Table-4 Summary of One-way ANCOVA of Cortisol Level of College Students by taking their Pre-Cortisol as Covariates

Source	Variance	df	SSy.x	MSSy.x	Fy.x	Sig.
Treatment		1	156.025	156.025	227.965	.000
Error		37	25.324	.684		
Total		40	9235.00			

From Table 4, it can be seen that the adjusted F-value is 227.965, which is statistically significant at the 0.05 level ($p = .000$). This indicates that there is a significant difference in the adjusted mean scores of cortisol levels between the treatment group and the control group, when their pre-test cortisol levels were taken as covariates. Thus, the null hypothesis stating that there is no significant difference in adjusted mean cortisol levels between the treatment and control groups after controlling for pre-test cortisol is rejected. It may, therefore, be concluded that the treatment group (those who participated in the Mahamrityunjaya Mantra chanting) had significantly lower adjusted cortisol levels than the control group, even after statistically controlling for baseline differences in pre-test cortisol. This highlights the effectiveness of the intervention in reducing physiological stress.

DISCUSSION OF FINDINGS

The findings of the present study revealed a significant reduction in cortisol levels following the chanting of the Mahamrityunjaya Mantra, indicating that Sanskrit sound vibration has a measurable impact on stress regulation. The ANCOVA results confirmed this reduction was significant even after adjusting for pre-test cortisol levels. This outcome aligns with Russell et al. (2024), who reported significant decreases in salivary cortisol and anxiety after 12 minutes of "Om" chanting, especially in the vocal chanting group. Similarly, Kulshrestha (2011) found a significant reduction in stress levels among students who practiced Pragy Yoga, supporting the idea that spiritual practices improve mental and physiological well-being. Physiologically, mantra chanting slows breathing and activates the parasympathetic nervous system, leading to relaxation and reduced cortisol secretion (Brown & Gerbarg, 2005). Peng et al. (2004) also noted that chanting at six breaths per minute improves heart rate variability, further supporting its calming effect. Additionally, Kalyani et al. (2011) showed that Sanskrit chanting enhances alpha and theta brainwaves, reflecting states of calm and focused attention.

Therefore, it can be concluded that chanting of the Mahamrityunjaya Mantra significantly decreased the cortisol levels of college students, reflecting a powerful stress-regulating effect of Sanskrit sound vibration. The results of the present study are strongly supported by both recent physiological and neuroscientific research, highlighting the therapeutic potential of mantra-based interventions in managing stress and improving student well-being.

CONCLUSION

The present study concludes that chanting the Mahamrityunjaya Mantra has a significant effect in reducing cortisol levels among college students. The findings support the effectiveness of Sanskrit sound vibration in regulating stress through physiological relaxation. This suggests that regular practice of mantra chanting can serve as a powerful, natural, and non-pharmacological approach to managing stress and promoting emotional well-being in academic settings and beyond.

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