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Original Research Article

Effect of Shiva Samkalpa Sooktha chanting on stress among ayurveda college students: an open label randomized trial design

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ABSTRACT

Backgrounds: Stress is physical or mental tension in response to life demands. In medical sectors, the surplus stress may decrease the students' abilities to establish good relationships with patients resulting in feeling of clinical dissatisfaction.
Methods: In this open label interventional study, 160 students from an Ayurveda college, India who were suffering from moderate stress, after screening with perceived stress scale (PSS 10) were selected. They were instructed to complete the inventory of college student's recent life experiences (ICSRLE) scale and satva sara assessment. The participants were randomly allocated into two groups of 80 each. Test group was administered shiva samkalpa sooktha chanting continuously for 30 minutes for 48 days at 6 AM in yoga hall of the institution. Control group did not follow any of the practices followed by mantra group. After 48 days; both groups were evaluated for stress and satva sara.
Results: Post hoc analysis with Wilcoxon signed rank test showed statistically significant reduction of stress in test group soon after mantra chanting. Mann-Whitney U test showed a difference in perceived stress between groups after mantra chanting; but the result is statistically not significant (U=2446.5, p=0.167). Statistically significant reduction in ICSRLE stress score is observed in test group compared to control group after chanting (U=2268, p=0.040).
Conclusions: Short term mantra chanting can reduce the stress among undergraduate students. Reduction is more appreciated in stressors like relationship related problems, time factor and in social isolation factors.

Keywords: Perceived stress, Mantra chanting, Undergraduate professional college students, Ayurveda college students, ICSRLE scale

INTRODUCTION

Stress is the sum of the physical, mental, and emotional tensions on a person due to various life demands. A stressor is any stimulus that arouses stress in a person e.g., natural calamities like flood etc., life events like separation of loved ones, daily hassles include meeting dead-lines at work or ambient stressors like pollution, noise etc.[1]

Research conducted by American college health association found out that stress is the common inhibitor on academic performance of students followed by depression, anxiety and sleep difficulties.[2] The estimated prevalence of stress in modern medical college students is 71.9% in Saudi Arabian medical school, 31.2% in the British universities, 41.9% in Malaysian medical school and 61.4% in a Thai medical school.[3] Main stressors in academic sector includes high job ambitions, vast syllabus, financial difficulties, peer pressure, problems in

romantic relations, expectations of parents, home sickness etc.[4] Students who are admitted in Ayurveda colleges also expose to so much of stress because they have to learn a lot of portions from modern medicine as well as from ayurveda. Many of the subjects including Sanskrit language are new to BAMS (Bachelor of ayurveda medicine and surgery) students after the present intermediate level curriculums.[5]

Stress management techniques include meditation, pranayama, exercises, as well as mantra chanting along with therapeutics.[6] " Mantra meditation involves continually repeating a chosen word or set of syllables (silently or aloud) while passively ignoring any internal or external distractions". The number of studies exploring the impact of mantra meditation proves that it can result in reductions in burnout, stress, depression, anxiety etc.[7] Hence the present study aimed to find out the effect of Shivasamkalpa Sooktha (mantra) chanting in the reduction of stress among undergraduate ayurveda college students.

Objectives

Objectives were to check the effect of Shiva Samkalpa Sooktha chanting on stress level of college going students and to find out the consistency of Satva sara against changes in external factors like stress, food, climate etc.

Hypothesis

Null hypothesis

There is no difference in stress scores by chanting Shivasamkalpa Sooktha.

Alternate hypothesis

There is difference in stress scores by chanting Shivasamkalpa Sooktha.

METHODS

Study design

The study design was of open label randomized interventional study

Materials used for the study

Prakriti assessment with Topiwala national medical college (TNMC) Prakriti 2004 questionnaire[8]

Prakriti was assessed using a TNMC Prakriti 2004 questionnaire which comprises 37 objective questions related to the person's physical characteristics, psychological make-up and physiological habits. The score obtained by a person for answers in these domains were summed up and the person was identified as having a specific prakriti depending on scores obtained. The questionnaire was validated and more than 90% concordance was observed in the prakriti assessment by the two clinicians.

Stress evaluation with PSS 10 and the inventory of college students' recent life experiences (ICSRLE)[9 10]

The PSS was developed by Cohen to measure the degree to which respondents found their lives as "unpredictable, uncontrollable, and overloading". Different PSS scales are available like PSS 14, PSS 10, and PSS 4. Scores on the PSS 10 can range from 0 to 40, with higher scores indicating higher perceived stress. The ICSRLE was designed by Kohn, Lafreniere and Gurevich in 1990. It is an instrument that measures degree of exposure to recent hassles and is specifically targeted to the college population. It consists of 49 items. A score of 49 or less indicates that a person is unlikely develop negative feelings. A score of 50 to 147 indicates that a moderate chance of experiencing negative feelings in life. A score of over 147 indicates that the person might likely suffer from negative feelings that could lead to a stress-related illness. There are seven factors identified for ICSRLE scale like relationship problem, lack of time, social isolation, future decision, academic dissatisfaction, financial difficulties and items not corresponds to factor structure.

Assessment of Satva sara with a standardized and validated questionnaire[11]

Satva sara questionnaires were published in international journal of applied ayurveda research on 2018. This tool was structured as a closed ended questionnaire and contains36 items in a five point Likert scale format with the scores ranging from one to five. There are 29 positive and 7 negative questions. Higher scores indicate higher levels of Satva Saarata. Cronbach's alpha was found to be 0.85 for the refined tool. The content and face validity of the tool also good.

Stress relieving intervention "Shiva Samkalpa Sooktha" from Shukla Yajurveda[12]

Shivasamkalpa Sooktha is selected from Shuklayajurveda's 34th Adyaya of Vajasaneyi Samhita. It is a six-verse mantra. Chanting of the particular Sooktha, is helpful to steady the mind and helps in controlling the thought process.

Study setting

This study conducted at an ayurveda college, India from December 2019 to December 2021.

The following criteria were considered for inclusion: First, second- and third-year BAMS students who were willing to participate in the study, subjects who are in the age group of 18-21 years, subjects who are staying in

college campus, students who are mentally and physically healthy

The following criteria were considered for exclusion- Subjects who are on medication, subjects who are having acute or chronic illness.

Sample size calculation

From the pilot study conducted, the SD of stress score was 6 with a two sided 5% significance level and a power of 80%, a sample size of 80 subjects per group was necessary, with an anticipated dropout rate of 10%.

Study design

A total of 200 volunteers were initially screened with PSS 10 and 160 students who were in moderate stress group were selected (Figure 1). Subjects were asked to fill the questionnaire of ICSRLE. Satva sara analysis was also done with the mentioned questionnaire. The moderately stressed subjects were allocated into two groups (test group/mantra group and control group) by a random number table method. Each group consists of 80 subjects. Attrition of total 9 subjects noted throughout the study period. After the initial assessment of stress and Satva sara, the students in study group were advised to chant "Shivasamkalpa Sooktha" on regular days (21 times, 30 minutes) for 48 days (1 mandala kala) (March-April 2020). A trained Sanskrit teacher monitored the sessions. Regular mantra chanting was done at 6 AM in Yoga-hall of the institution. The control group followed their normal daily routine and did not practice any of the techniques practiced by study group. The second evaluation of stress and Satva sara in both groups were done with already mentioned scales and questionnaires after 48 days. To find out the long-term effect of the therapy, final evaluation of stress was done on with PSS after six months.

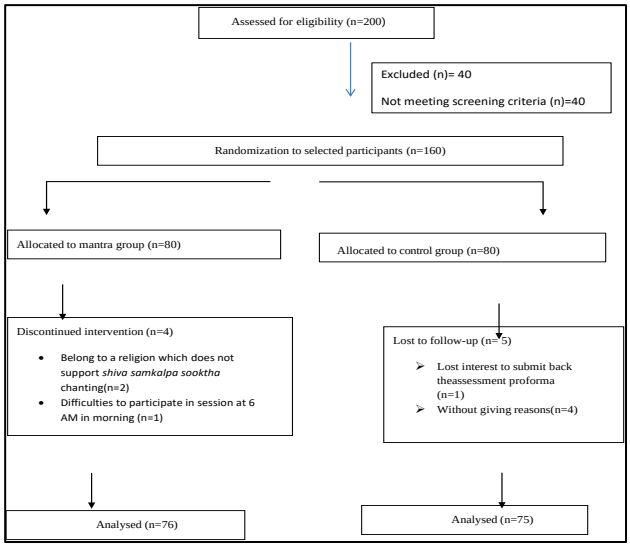

Figure 1: Participant's flow diagram.

Statistical analysis

Statistical analyses were performed using SPSS-16 software (SPSS 16:233 South Wacker drive, 11th floor, Chicago, trademarks of Apple Computer, Inc., registered in the U.S). Descriptive analyses (such as percentages, means and standard deviations) were done for different variables. Fried man's test, Wilcoxon signed rank test, Mann Whitney U test etc. were used to compare test and control group. The significance limit was set at $p<0.05$.

RESULTS

General characteristics of the sample

Final sample consisted of 151 students who under moderate stressed group, of whom majority was female participants (77.48%). Majority of participants belong to Hindu religion (94%). Most of students were from upper middle-class families (79.47%). This sample included subjects who belongs to mainly pitta or a combination of pitta with other Doshaja Prakruty (92.05%) (Table 1).

Table 1: Baseline demographic details of the participants.

Participants' characteristics		Groups (n=151) (%)	
		Test, (n=76)	Control, (n=75)
Gender	Male	18 (23.6)	16 (21.33)
	Female	58 (76.3)	59 (78.67)
Age group (Years)	17-18	27 (35.5)	5 (6.67)
	19-20	47 (61.8)	63 (84)
	21-22	2 (2.63)	7 (9.33)
Religion	Hindu	74 (97.3)	67 (89.33)
	Muslim	0 (0)	5 (6.67)
	Christian	0 (0)	2 (2.67)
	Others	2 (2.63)	1 (1.33)
Socio-economic status	Upper middle	59 (77.6)	61 (81.33)
	Lower middle	17 (22.3)	14 (18.66)
Diet	Vegetarian	34 (44.7)	32 (42.67)
	Mixed	42 (55.2)	43 (57.33)
Exercise	Yes	28 (36.8)	62 (82.67)
	No	48 (63.1)	13 (17.33)
Prakruty	Pitta Kapha	51 (67.1)	44 (58.67)
	Pitta Vata	11 (14.4)	18 (24)
	Pitta	07 (9.21)	08 (10.67)
	Kapha	02 (2.63)	02 (2.67)
	Kapha Vata	05 (6.58)	03 (4)
Sara	Twak	4 (5.26)	27 (36)
	Rakta	0 (0)	2 (2.67)
	Mamsa	26 (34.21)	11 (14.67)
	Medas	1 (1.31)	3 (4)
	Asthi	26 (34.2)	18 (24)
	Majja	5 (6.57)	11 (14.67)
	Shukra	14 (18.4)	3 (4)

Comparison of effect of mantra chanting in stress score of test group subjects

There was statistically significant difference in perceived stress scores at three different time points (chi square=12.783, p=0.002). An overall reduction of stress is found after mantra chanting in the test group. However, the results are statistically significant soon after chanting (Z=-4.008, p=0.000). Statistically significant result in stress reduction was observed in ICSRLE scores soon after 48 days of chanting and the same difference continued after 6 months as well (Table 2 and 3).

Table 2: Mean and standard deviation in stress score of test group subjects.

Administered scale in study group	Time of assessments	Mean stress score	Std. dev
PSS score	Before chanting	19.96	3.72
	After 48 days of mantra chanting	17.25	4.81
	After 6 months of chanting	18.47	5.36
ICSRLE score	Before chanting	93.21	18.8
	After 48 days of mantra chanting	80.67	14.6
	After 6 months of chanting	83.03	17.3

Comparison of effect of mantra chanting on stress score of test group and control group subjects (After 48 days)

Study shows that with mantra therapy the perceived stress in the test group had decreased more than that in control group. But results are not statistically significant (U=2446.5, p=0.167). It is also clear that there is a statistically significant reduction in ICSRLE stress score for test group subjects compared to control group after chanting (U=2268, p=0.040) (Table 4).

Effect of mantra chanting on various stressors analyzed from ICSRLE scale

There is statistically significant reduction of stress in the stressors like relationship (z=-3.678, p=0.000), Time stressor (z=-5.051, p=0.000), and social isolation stressors (z=-3.311, p=0.001) as shown below (Table 5).

Consistency of Satva sara scores in test group and control group subjects at different time points

Friedman's test results suggest there is no statistically significant difference observed in Satva sara score against time in mantra group. Wilcoxon signed rank test also opines that there is no statistically significant difference in Satva sara score in control group across different time point as shown below (Table 6). So, the Satva sara is almost consistent across the time.

Table 3: Comparison of mantra chanting in stress score of test group subjects in terms of significance.

Variables	PSSM1_ PSSM2	PSSM2_ PSS M3	PSSM1_ PSS M3	ICSRLEM2- ICSRLE M1	ICSRLEM3- ICSRLE M2	ICSRLE M3- ICSRLE M1
Z	-4.008	-2.242	-2.164	-4.224	-1.142	-3.984
P	0.000	0.025	0.030	0.000	0.253	0.000

*PSS M1-Stress scores of test group before mantra chanting, PSS M2- Stress scores of test group after chanting, PSS M3-Stress scores of test group After 6 months, ICSRLE M1-Stress scores of test group before mantra chanting, ICSRLE M2-Stress scores of test group after chanting, ICSRLE M3-Stress scores of test group after 6 months.

Table 4: Comparison of effect of mantra chanting on stress scores (PSS, ICSRLE) of test group and control group subjects (After 48 days).

Variables	N	Mean Rank	U	Z	P value
PSS M2	**76**	70.62	2446.5	-1.381	0.167
PSS C2	**75**	80.38			
ICSRLE M2	**76**	68.24	2268	-2.049	0.040
ICSRLE C2	**75**	82.76			

*PSS M2-Stress scores of test group after chanting, PSS C2-Stress scores of control group after chanting, ICSRLE M2- Stress scores of test group after chanting, ICSRLE C2-Stress scores of control group afterchanting.

Table 5: Factor analysis done from ICSRLE to assess effect of mantra chanting on various stressors in test group.

Stressors scores	Time	Mean stress score	Std. deviation	Z value	P value
Relationship factor	Pre-test	16.4737	4.523	-3.678	0.000
	Post-test	14.2267	4.180		
Time factor	Pre-test	18.3947	4.77	-5.051	0.000
	Post-test	14.2400	2.94		
Social alienation	Pre-test	9.9605	3.185	-3.311	0.001
	Post-test	8.4800	2.2978		

Continued.

Stressors scores	Time	Mean stress score	Std. deviation	Z value	P value
Future decision	Pre-test	6.5526	2.02909	-.641	0.522
	Post-test	6.3733	1.829		
Academics	Pre-test	9.7763	2.96917	-1.940	0.052
	Post-test	8.9600	2.10174		
Finance	Pre-test	8.1711	2.568	-1.474	0.140
	Post-test	7.4933	2.02266		
Items not related to factor structure	Pre-test	24.1447	5.19924	-4.316	0.000
	Post-test	20.05867	4.92948		

Table 6: Satva sara scores in test and control group subjects at different time points.

Group	Time	N	Mean	Std. Dev.	Friedman mean rank	Chi square test	Df	P value
Test group	Beforemantra chanting	76	4.6057E	38.65515	1.82	4.694	2	0.096
	After 48 days of chanting	76	4.6169E2	41.30431	2.00			
	After 6 months	76	4.7142E2	40.44149	2.18			
Control group					**Wilcoxon signed rank test statistic**		**P**	
	Beginning of study	75	4.6487E2	32.19969		-0.415		0.678
	After 48 days of chanting	75	4.6616E2	36.05028				

Stress scores with prakriti of participants

Pittaja prakriti participants are more vulnerable to stress as compared to other Prakriti (Table 7).

Table 7: Descriptive statistics of PSS scores (stress scores) with Prakriti of participants.

Prakriti	N	Mean stress score	Std. Dev.
Pittakapha/Kaphapitta	95	17.4632	4.37062
Kapha	4	16.2500	3.59398
Vatakapha/Kaphavata	8	17.2500	3.57571
Pitta	15	18.8000	4.90189
Pittavata/ Vatapitta	28	18.2500	4.17776

DISCUSSION

Stress is an inevitable part of life. Society always demands perfection which will result in unimaginable kind of stress in people. Eustress is always good to achieve goals in life. Various studies show that the extremely stressful life events are precipitating metabolic syndrome and insulin resistance. Extreme stress in academic sectors, can hinder work effectiveness which lead to poor academic performance and academic success. American college health association found out that the students who engaged in meditation and mantra practices demonstrated significantly greater reductions in perceived stress than students who did not.

It is proved that overall reduction of stress is observed after mantra therapy in the test group subjects. But significant effect is observed immediately after 48 days of chanting (Z=-4.008, p=0.000). Even the assessment of stress with ICSRLE scale also proves the same. The chanting sessions had reduced the stress of test group subjects more than that of control group. The smaller sample size might have produced the insignificant difference (U=2446.5, p=0.167). Hence more sample size is needed to prove the effect of this behavioral intervention on participants. Reductionof stress in control group may be attributed to Hawthorne effect.

As per Ayurvedic classics, balance between Satva, rajas and tamas are essential for mental stability. Chanting of Shivasamkalpa mantra every day is helpful to balance mind. Other studies also proved that mantra can reduce insomnia, and depression enhances self-efficacy, and mindfulness.[13] Transcendental meditation which uses silent mantra also showed decrease in stress, anxiety and it also showed increased connectivity between posterior cingulate cortex and right insula results in the changes in interoceptive awareness.[14] Brain imaging studies have shown that meditation shifts the brain activity in the prefrontal cortex from the right hemisphere to the left indicating that the brain is re-oriented from a stressful mode to one of acceptance, that may indicate better contentment.[15] Meditation techniques with chanting reduces the stress hormones like epinephrine, norepinephrine, cortisol and they are useful for increasing the nitric oxide levels, effective in reducing the sympathetic arousal and in gene expression changes.[16]

Various studies have proved that the frequency of practice does affect outcome.[17] Here also the continuous chanting of mantra for 48 days has reduced the stress more as compared to the results after 6 months when the participants stopped chanting. So further studies should be conducted to understand how the practice frequency affects outcome if we want to develop efficient mantra training programs for the general public. Mantra therapy

shows improvement in stress causing factors like relationship problems (z=-3.678, p=0.000), time related stressors (z=-5.051, p=0.000), and also in social isolation stressor (z=-3.311, p=0.001). Few studies have suggested that the main stressors in teenage life is predisposed due to the above three causes. [18]

Satva sara score showed minimal changes at different point of time in test group and control group subjects. Sara is considered as the excellence of dhatu. Expression of sara is influenced by prakriti as dosha dominance regulate all physiological activities of body like digestion of food etc. The sara depends on strength of Agni and it in-turn depends on the prakriti in healthy individual. As per Chandogya Upanishad, the gross part of food after digestion converts to form the mala (waste part), the mid part forms as dhatu and subtle part nourishes manas. Hence the depletion in quality or quantity of food hampers the functioning of mind as the Trigunatmaka Satva requires Pancha Mahabhootatmaja Shareera for functioning.[19] So, the consumption of food, the changes in external environment etc. can vary the Satva sara across different points of time but the flexibility can be again fixed within the prakriti or genotype of an individual.

From the analysis, it is found out that the Pittaja and Pittadhika prakriti subjects are more vulnerable to psychological stress as compared to other prakriti. Klesha Asahishnu (inability to face difficult situation), Kshipra Kopa Prasada (short tempered) etc. characters of Pittaprakriti people may result in this vulnerability.[20] Genopsycho-somatotyping of different types classified Pitta-dominant types as more androgenic with tendencies towards frustration, aggression, irritability, and impatience when out of balance.[21]

Limitations

This research has a number of limitations. It is limited by a small sample size, which reduced statistical power. Participants mainly consist of female subjects and were principally recruited from only one Ayurveda college at Bangalore, which is not representative of all Ayurveda students' population. In addition, our sample had around 9 drop outs too. The assessment was solely based on self-reported questionnaires and their results were not validated by a semi-structured interview. Thus, future research needs to replicate these findings using experimental design with more sample size. More research work should be conducted to standardize the procedure of mantra chanting. Stress scores should be evaluated using objective parameters like serum cortisol measurements as well.

CONCLUSION

Short term (48 days) chanting of shiva Samkalpa Sooktha can reduce the stress scores among ayurveda college students. Regular practice is needed to produce consistent reduction in stress. Reduction is more seen in stressors like relationship related problems, time factor and in social isolation factors. Pitta constitutional type individuals are more vulnerable to stress. Satva sara of all participants shows minimal changes throughout the study period.

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