

Meditation Program for First Year Medical Undergraduate Students: A Feasibility Study

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ABSTRACT

Introduction: Prevalence of stress among Indian medical undergraduate students is currently higher than the global stress level. Notably, although India is considered home to yogic practices, attempts at incorporating them in the daily routines of medical students have been lacking. In Raj Yoga Meditation (RYM), the steps for meditation are clear and explicit, so it is easy to practice. The study aimed to assess the feasibility of daily practice of RYM by medical undergraduates and find out if there is an improvement in the mental health and stress levels of the participants.

Methods: We chose 80 students randomly from two first-year MBBS batches. All students completed the General Health Questionnaire-12 (GHQ-12) and the Medical Students Stressor Questionnaire (MSSQ) before and after one month of meditation practice. The participants then gave written feedback for program evaluation.

Results: Statistical analysis of the mean GHQ, MSSQ I, and MSSQ IV scores showed a highly significant decline after the intervention compared to preintervention levels. There was also a statistically significant decrease in the number of students with a GHQ score ≥ 3 . Qualitative analysis showed that with daily practice of RYM, students developed the ability to handle stress and liked the technique of RYM.

Conclusion: It is feasible to conduct a supervised meditation program for a month for undergraduate students.

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INTRODUCTION

In the last 15 years, there have been significant insights into the prevalence of stress and stress-related disorders. Notably, several reviews and meta-analyses have shown an increase in stress among undergraduate students in particular. For example, global stress levels among medical students range from 25-90%, and stress is an important determinant of anxiety and depression. In a systematic review of 183 studies from 43 countries the prevalence of depression among medical students was 27.2% [3]. Another systematic review of the mental health issues in medical students in Asia [4] revealed that the rate of depression was 11% and anxiety was 7.04%. Contrary to this the results of another systematic review from India revealed that the prevalence rates of depression, anxiety and stress was 39.20%, 34.50% and 51.3% respectively [5]. Thus, the prevalence of stress and stress-related disorders among Indian medical students is higher than the reported global levels. Despite this, little efforts are visible to maintain the mental health of undergraduate medical students in India.

Several stress management techniques, including progressive muscle relaxation response, biofeedback, guided imagery, transcendental meditation, and mindfulness-based stress reduction (MBSR), are described in the literature [19]. MBSR is a standardized meditation program created in 1979 with efforts to

integrate Buddhist mindfulness meditation with contemporary clinical and psychological practice [11, 12, 13]. Authors have reported that a mindfulness course conducted for health care professionals is feasible and has potential as a wellness and educational initiative [20].

Most traditional yogic practices have originated in India. Most noteworthy among several yogic practices is Ashtangyoga described by sage Patanjali in his book *Yog Sutra* [6]. Ashtang is a word from Sanskrit meaning "having eight limbs or components." The word yoga comes from a Sanskrit word "Yuj," which means "to yolk" or "unite." The eight steps of Ashtang yoga are: yama (universal ethics), niyama (individual ethics), asanas (postures), pranayam (breath control), pratyahara (control of senses), dharana (concentration), dhyana (meditation) and samadhi (bliss). The three major components of yoga include postures, breathing exercises and meditation. While there is much literature published on the benefits of daily practice of Asanas and Pranayam in medical college and school students [7], there is a lack of published scientific literature on how Dharana and Dhyana benefit the psychology and physiological functioning of an individual. One reason for this may be that there is a detailed description of the methods of Asana and Pranayam in texts, while the same is not true for Dhyana and Dharna.

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Raj Yoga Meditation (RYM) is another type of traditional, time-tested mindfulness-based intervention developed by sages of ancient India. RYM leads to the highest state of consciousness in which the mind is fully relaxed, and the body is engaged in daily work [9]. It is also one of the training courses of the Raj Yoga Education & Research Foundation of Brahma Kumaris World Spiritual University (BKWSU), a nonprofit organization having consultative status with UNO, UNICEF and WHO [10]. RYM is a method of autogenic relaxation with a spiritual link providing training in realization of the true self through contemplation on and dialogue with the divine “supreme being.”

Meditation and mindfulness are widely studied topics, particularly for their capacity to improve mental health. There are reports from other countries about the efficacy of mindfulness-based programs for medical students but attempts to implement such interventions in India have been lacking even though it is home to traditional yogic practices [11, 12, 13]. Our study is the first to focus on incorporating a daily meditation program for first-year undergraduate medical students in India. Medical students must learn self-care if they are going to care for others.

The study aimed to assess the feasibility of daily practice of RYM by undergraduate medical students. For this, the RE-AIM framework was used [14]. It is a widely used method for testing the feasibility of health-related interventions. The RE-AIM framework focuses on essential program elements to improve intervention reporting and comprises five key dimensions: Reach, Adoption, Effectiveness, Implementation and Maintenance. Below is a brief description of each component applicable to our RYM intervention.

- a. *Reach*: Establishes the proportion of first year undergraduate students who expressed an interest in taking part in the study.
- b. *Adoption*: Identifies the number of participants successfully recruited to participate in the feasibility study.
- c. *Effectiveness*: (potential effectiveness at this feasibility stage) Establishes whether there was a difference in parameters such as GHQ and MSSQ scores of the participating trainee doctors before and after the intervention.
- d. *Implementation*: The number of trainee doctors who participated in the daily meditation sessions determines the successful implementation of RYM.
- e. *Maintenance*: not covered in this study as it was a short feasibility study.

The primary objective of this study was to obtain preliminary data whether it is feasible to practice daily meditation by undergraduate students. The secondary objective was to assess changes in mental health and stress levels of the students who practiced meditation.

Design

This was a prospective pilot cohort study with purposive sampling. Previous research has proven that 80 participants are an adequate sample size for testing the feasibility of a new intervention [15].

METHODS

Participants

The Research and Ethics Committee of the institute approved the project. Three orientation lectures were given to students regarding the purpose of the study, the beneficial effects of yoga on various physiological systems of the body and the effects of RYM on various physiological variables in the body. Participants gave their written informed consent after these lectures. Students with a history of substance dependence, except for caffeine, or significant medical illness such as asthma, diabetes mellitus and hypertension were excluded from the study. It was made clear to the students from the beginning that the program was not a therapy to be used in place of professional care for psychological health issues. Screening for substance dependence was done using a self-reported questionnaire. To exclude for major medical illnesses such as diabetes, hypertension and asthma, a detailed history was provided, and a medical clinical examination was completed. Screening for mental health was done using General Health Questionnaire-12 (GHQ-12).

Intervention

All the participants underwent seven days of a Raj Yoga Meditation (RYM) introductory course in the Department of Physiology at Government Medical College and Hospital, Chandigarh. For this an expert RYM trainer conducted a one-hour session every day for one week in the departmental demonstration room, which had a comfortable seating arrangement and an audio-visual system. The RYM trainer conducted similar courses for management trainees and banking staff. During the first three days the RYM expert discussed what stress is, the different types of stress, and the ways in which people handle it. Each session consisted of a brief discussion with the participants on these topics and then training them in the basic method of RYM using guided meditation and positive imagery techniques. On the fourth and fifth days, along with their daily meditation, the participants were shown videos entitled “Discover the Spirit Within: essentials of Raja Yoga” and “Who Am I”, thus the participants got accustomed to the technique of RYM. On the sixth and seventh day the RYM expert asked the participants to identify with one good quality such as peace, happiness, love, or calmness, and to then focus on their chosen quality while practicing meditation. Students concentrated on the point of light on the screen while keeping their eyes open. After the RYM introductory course, the students continued their meditation practice for the entire month. We also maintained a daily record of their attendance in these sessions. The students unanimously agreed to take time for daily meditation from their routine working schedules and meet daily in the Department of Physiology between 8:00 - 9:00 AM before their routine classes. The participants did not receive any monetary incentive for their participation; however, they were offered packed breakfast every day after the meditation.

After one week of the introductory course, the participants continued their daily meditation practice under the supervision of the investigator (AB) who was also trained in Raj Yoga meditation. During this time she also conducted sessions of approximately half an hour each day to enable the participants to better understand the physiological principles of the

causation of stress in the modern world and the pathways by which meditation may help relieve it.

Students also filled in the General Health Questionnaire-12 (GHQ-12) for mental health screening and the Medical Students Stressor Questionnaire (MSSQ) to assess participants' stress levels.

GHQ-12 and MSSQ were re-administered to the participants after one month. For program evaluation and improvisation, written feedback comprising structured and open-ended questions was provided by the students after the intervention. Students were also asked to write narratives of their experiences in the program.

Anthropometric Profile

GHQ-12 is a short form of the general health questionnaire, a valid and reliable tool for screening the mental health of both young and old Indian populations [16].

MSSQ is a valid and reliable instrument for identifying stressors among medical students [17]. Each domain has mild, moderate, high, and severe stress categories. These domains are MSSQ I: Academic Related Stress, MSSQ II: Inter and Intrapersonal Related Stress, MSSQ III: Teaching and Learning Related stress, MSSQ IV: Social Related Stress, MSSQ V: Drive and Desire Related Stress and MSSQ VI: Group Activities Related Stress.

Feedback Questionnaire

This had five questions in all. Questions 1 to 3 were

closed-ended, whereas 4 and 5 were open-ended.

Statistical Analysis

Quantitative data were analyzed using SPSS software (SPSS Inc. 2013, version 22.0 for Windows, Armonk, NY, USA). We used the McNemar Test to compare the GHQ-12 scores and the McNemar-Bowker Test to compare MSSQ scores before and after the intervention.

We used a grounded theory approach using constant comparative analysis described in a previous publication [18] for qualitative data analysis. Briefly, we first organized participant comments in a tabular format from which some themes were identified beforehand and coded using 2–3 alphabets. Finally, we had a list of themes and comments supporting those themes.

RESULTS

Reach

Of the 100 MBBS first -year students enrolled for the session in 2016, 95% expressed their interest in participating in the RYM course. However, since the space in which we had decided to conduct the RYM sessions could accommodate only 40 students at a time, we randomly selected 40 students from this batch using a list of computer-generated random numbers. In the same manner we randomly selected another 40 students from the subsequent MBBS batch enrolled for the 2017 session from the 80 students expressing interest in participation (Figure 1).

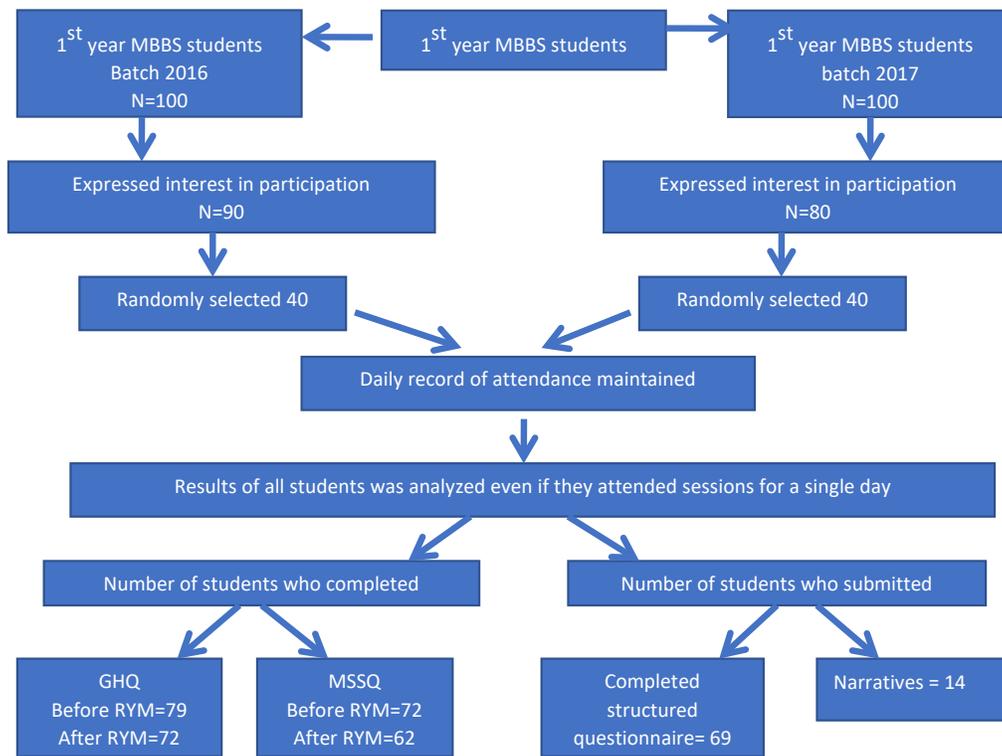


Figure 1: Participant Flow Throughout the Study

Adoption

All 80 students chosen as per the sample size participated in the RYM program. The mean age of the students was 18.40±0.50 years; the mean weight was 61.30±11.40 kg; and BMI was 22.36±3.72 kg/m². We included students attending RYM sessions even for a day to analyze our results.

Table 1 shows the mean and percentile values of GHQ and MSSQ I-VI before and after the intervention. Mean GHQ scores before and after the intervention showed a highly significant change ($p < 0.01$). Mean values of MSSQ II and MSSQ IV showed a highly significant change after the intervention compared to pre-intervention scores.

Table 1: Mean and Percentile Values of GHQ and MSSQ I-VI Before and After the Intervention

	Mean ±SD	Minimum	Maximum	Percentiles		
				25th	50th	75th
GHQ Pre	3.5±3.1	0.0	12	1.0	3.0	6.0
GHQ Post	0.7±1.12	0.0	5.0	0.0	0.0	1.0
MSSQ I Pre	1.8±0.7	0.4	3.1	1.3	1.7	2.2
MSSQ I Post	1.4±0.6	0.2	2.8	1.0	1.4	1.8
MSSQ II Pre	1.6±0.9	0.0	3.6	0.9	1.7	2.3
MSSQ II post	1.1±0.8	0.0	2.7	0.6	1.0	1.7
MSSQ III pre	1.2±0.7	0.0	2.7	0.7	1.3	1.7
MSSQ III post	1.1±0.7	0.0	2.9	0.4	1.0	1.4
MSSQ IV pre	1.3 ±0.6	0.2	2.5	0.8	1.3	1.7
MSSQ IV post	1.0±0.6	0.0	2.3	0.7	1.0	1.3
MSSQV pre	0.9±0.8	0.0	3.3	0.3	0.7	1.3
MSSQ V post	0.8±1.4	0.0	10.7	0.0	0.7	1.0
MSSQ VI pre	1.4±0.8	0.0	3.3	0.8	1.3	2.0
MSSQ VI Post	1.1±0.7	0.0	3.0	0.8	1.0	1.5

Effectiveness

Figure 1 shows that of the 170 students willing to participate, 80 participants enrolled in the RYM program. GHQ administered before RYM was completed by 98% and after RYM by 90% of students. 90% and 77.5% of participants completed the MSSQ before and after RYM intervention. 86.25% of participants also completed a structured questionnaire and narratives.

Table 2 shows the number of students with a GHQ score of $>3/ \leq 3$ before and after the intervention. For the GHQ questionnaire, we took the cut-off <3 as being normal and more than or equal to 3 as abnormal as per published literature [16]. The results showed a statistically significant decrease in students with a cutoff ≥ 3 .

Table 3 shows the results of the student responses to the MSSQ questionnaire. There was no significant change in the number of students in various grades of stress in different domains as assessed by the MSSQ.

Table 2: Number of Students with GHQ Score of $>3/ \leq 3$ Before and After the Intervention

Number of participants (%)		
Pre GHQ	<3	37 (46.8)
	≥ 3	42 (53.2)
Post GHQ	<3	64 (88.9)
	≥ 3	8 (11.1)

Various aspects of the RYM program were evident from the qualitative analysis of the feedback obtained in a structured format and as narratives.

69 participants completed their responses to the structured questionnaire. In response to the first question asked in the feedback form, “which of the following best describes the material covered in this session in relation to your previous knowledge level,” the majority of participants (45) commented that the material covered in the sessions of the RYM course was just right. Some participants (11) responded that the material covered in the sessions was too primary, and only three responded that it was too advanced.

Table 3: Levels of Stress in Various Domains as Measured by MSSQ Scores Before and After the Intervention

		Mild stress	Moderate stress	High stress	Severe stress
		N (%)	N (%)	N(%)	N(%)
MSSQ I	Pre	9 (12.5)	35 (48.6)	27 (37.5)	1 (1.4)
	Post	16 (25.8)	37 (59.7)	9 (14.5)	0
MSSQ II	Pre	22 (30.6)	24 (33.3)	24 (33.3)	2 (2.8)
	post	32 (51.6)	21 (33.9)	9 (14.5)	0
MSSQ III	Pre	25 (34.7)	38 (52.8)	9 (12.5)	0
	Post	32 (51.6)	26 (41.9)	1 (1.6)	0
MSSQ IV	Pre	23 (31.9)	41 (56.9)	8 (11.1)	0
	post	35 (56.5)	26 (41.9)	1 (1.6)	0
MSSQ V	Pre	48 (66.7)	18 (25.0)	5 (6.9)	1 (1.4)
	post	50 (80.6)	10 (16.1)	1 (1.6)	1 (1.6)
MSSQ VI	Pre	30 (41.7)	28 (38.9)	12 (16.7)	2 (2.8)
	post	35 (56.5)	22 (35.5)	5 (8.1)	0

The following two questions were regarding participant engagement during the sessions and increased knowledge resulting from participating in RYM. **Figure 2** (next page) shows the results for these two questions.

Questions 4 and 5 were open-ended. The results of the 4th question, “What was the best moment in this session for you,” and of the 5th question, “What would make this session even better,” are shown in **Figures 3 and 4** (next page), respectively.

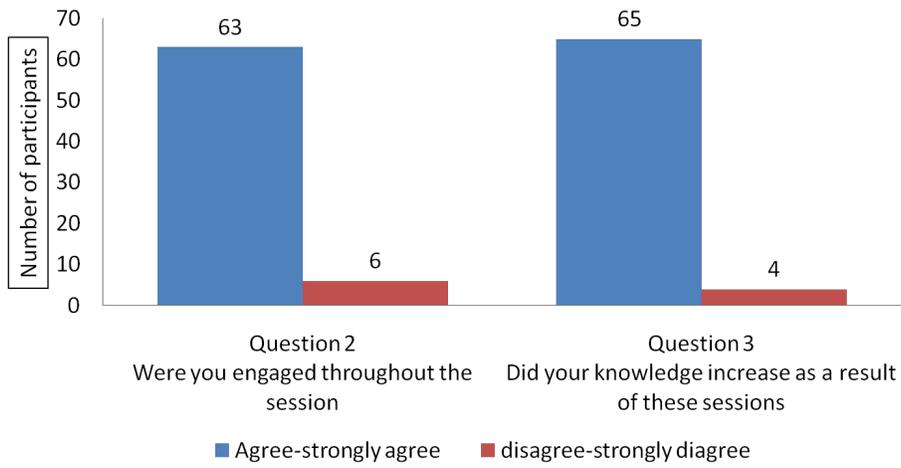


Figure 2: Student responses to questions on engagement throughout sessions and enhancement of knowledge as a result of participating in Raj Yoga Mediation Program

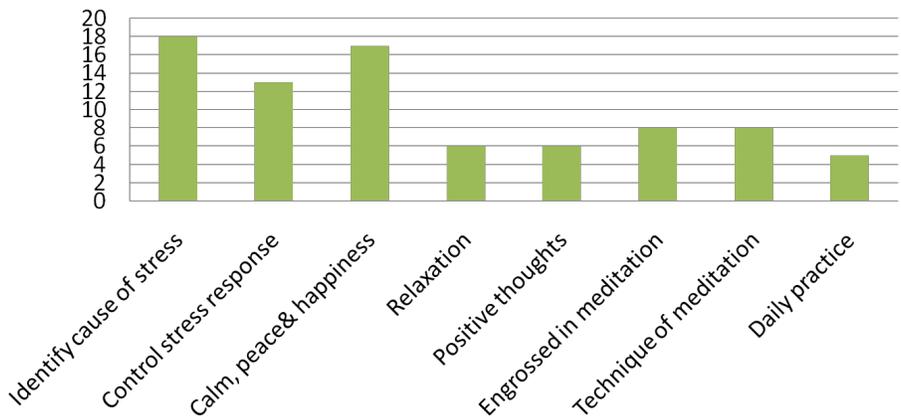


Figure 3: Responses of the students regarding the best part in the Raj Yoga Mediation sessions

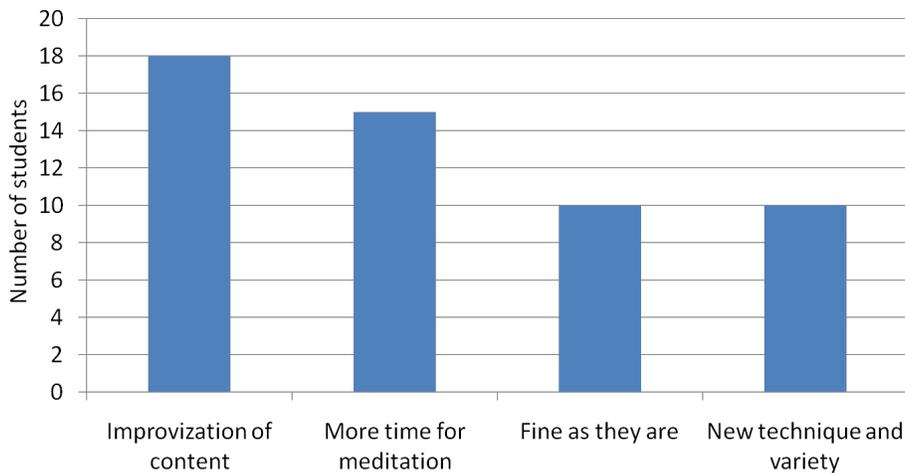


Figure 4: Responses of students regarding what would make these sessions even better

Table 4: Key Participant Responses Derived from the Qualitative Analysis of the Narratives

Key participant responses derived from narratives	Number of students
Peaceful mind	5
Calm mind	6
Calm body	2
Happy and cheerful beginning of day	1
Good/great /enjoyable experience	11
Relaxation from stressful thoughts	8
Mind free of thoughts for a few moments	7
Positive energy through the day/energetic/refreshed	8
Able to maintain focus on point of light/detached	7
Experience that mind is full of thoughts/train of thoughts	9
A lot of imagination audio and visual guidance was helpful	7

Table 5: Themes and Subthemes Derived from Analysis of Open Ended Questions and Narratives

Themes derived from analysis of narratives and structured questionnaire	Sub themes derived from narratives	Sub themes derived from structured questionnaire
Positive effect of meditation	Peaceful mind (5)	Feeling of calmness, peace and happiness (17)
On the mind and body	Calm mind (6)	Feeling of relaxation (6)
	Calm body (2)	Positive thoughts (6)
	Happy and cheerful beginning of day (10)	
	Giving time to oneself (1)	
	Control of breathing (1)	
	Fatigue tiredness headache vanished (3)	
Able to practice meditation	Mind free of thoughts for a few moments (7)	Engrossed in firsthand experience of meditation (8)
	Positive energy through the day/energetic/refreshed (8)	Momentary thoughtlessness (1)
	Able to maintain focus on point of light/detached (7)	
Developing ability to handle stress	Happy and cheerful beginning of day (1)	Ability to introspect and identify causes of stress (18)
	Good/great /enjoyable experience (11)	Ability to control response to stress (13)
	Relaxation from stressful thoughts (8)	
Acknowledgment of one's own fickleness of the mind	Experience that mind is full of thoughts/train of thoughts (9)	
	Aware of surrounding disturbance (1)	
	Continuous practice required (3)	

Table 4 shows the critical participant responses derived from the qualitative analysis of the narratives, and **Table 5** shows the sub-themes and the themes derived from analysis of open-ended questions and narratives.

Implementation

Figure 5 (next page) shows the number of participants reporting for meditation sessions on each day of the month. During the whole month, there were six days on which the students could not come for meditation because of an official holiday. We had previously instructed the students to do RYM at home in case of a holiday. Consequently, there were 24 days in which the students performed supervised meditation and six days they performed unsupervised meditation. Out of the days they performed supervised meditation, more than 50% of students were present on 19 days.

DISCUSSION

Despite a higher percentage of anxiety, stress and depression reported among first-year undergraduate medical students in India [5, 21], there are no reports on efforts to maintain their mental health. Our study is the first to report that conducting a daily supervised RYM program for medical undergraduates is feasible. Preliminary results demonstrate that students practicing RYM show a positive increase in mood and a reduction in stress levels. The results show that, despite their intense schedules, first-year undergraduate medical students can participate in the month-long Raj Yoga Meditation (RYM) program. It also provides a sense of hope since it is possible to incorporate meditation into students' daily lives, reduce stress, improve wellbeing, and better equip them to care for others.

More than 90% of the students completing the feedback questionnaire described the sessions as engaging and the material covered as appropriate. Moreover, their knowledge increased due to participation in the program.

Qualitative analysis of the narratives revealed that, because of participation in the RYM sessions, the students were in a peaceful and calm state of mind. They felt happy and cheerful at the beginning of each day, and RYM was an enjoyable experience. Participation in these sessions led to the freedom of the mind for a few moments from stressful thoughts and filled them with positive energy throughout the day, making them feel fresh and energetic. The audio and visual guidance during meditation practice helped them maintain focus on the point of light. During meditation, they also experienced that their minds were full of thoughts.

Themes derived from the narratives and open-ended questions in the feedback

Number of students on each day of meditation

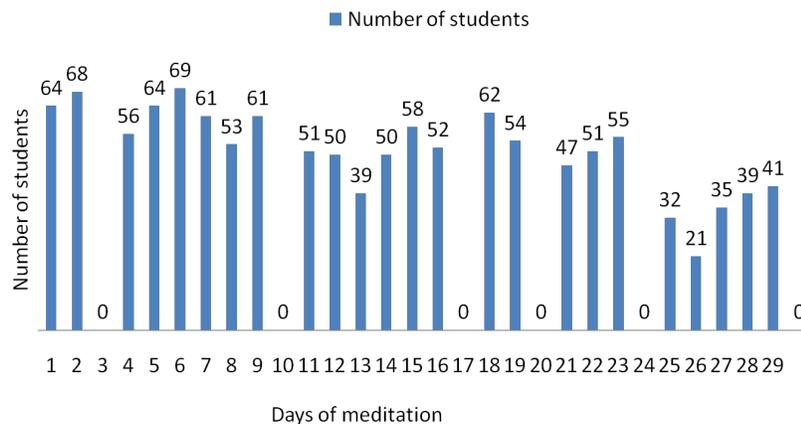


Figure 5: Number of Students on Each Day of Meditation

questionnaire revealed a positive effect of meditation on the mind and body. The students acknowledged their fickleness of mind but were able to practice RYM and developed the ability to handle stress. They also approved of the technique of RYM.

Several studies highlight the short, intermediate, and long term beneficial effects of RYM in various patient populations and healthy adults.

The short-term practice of RYM (three months) also improves the intelligence quotient of attention deficit hyperactivity disorder (ADHD) [22]. Further, three-month RYM training in healthy volunteers significantly increased self-satisfaction and happiness in life by enhancing positive thinking [23]. Eight days of RYM was also shown to relieve chronic tension headaches as measured by the headache parameter [24]. It has also been reported that after three short sessions of half an hour each, the RYM training program conducted during the preoperative period helps alleviate the anxiety of open-heart surgery [25]. One month of RYM was shown to effectively treat clinical disorders such as depression and anxiety [26, 27].

Intermediate duration practice (six months to five years) shows the same cardio-respiratory benefits as long-term meditators [28]. Autonomic function tests show a shifting of the autonomic balance to the parasympathetic side in healthy individuals [29]. In young, healthy individuals, a decline in resting pulse rate, systolic blood pressure, diastolic blood pressure, and significantly lower orthostatic tolerance test and isometric hand grip test has been observed [30].

Long-term practice of RYM (more than 5 years) in healthy individuals leads to decreases in total cholesterol, triglycerides, low-density lipoprotein, and fasting blood sugar and to a higher level of HDL [31]. It also causes a decline in heart rate, respiratory rate, systolic and diastolic blood pressure 15 and 30 minutes after RYM. Research also confirms the role of RYM in helping the participants get rid of their addictions and negative attributes with improvement in mental peace and happiness [32]. In diabetics, it also leads to improvement in glycemic control [33]. Long term meditators could robustly shift states from rest to meditation with enhanced theta power (4–8 Hz) during meditation [34].

A study of 1021 adults conducted across 25 states and two union territories of India on the usefulness of Raj Yoga meditation in persons dependent on tobacco in various forms concluded that the Raj Yogi lifestyle is effective in the management and relapse prevention of those addicted to tobacco [35]. A comprehensive review of RYM and its effects describes various outcomes of practicing RYM [36].

Since there are many reports of the beneficial effects of RYM, we chose this student population to extend the benefits of a traditionally accepted practice in our subcontinent. We tried to determine the feasibility of incorporating the RYM program into the daily life of our medical undergraduates. Ours is the first study of undergraduate medical students in India demonstrating that they can participate in a month long RYM program. Moreover by consensus they decided that the morning time before starting their classes was the best and most feasible time for meditation.

LIMITATIONS

This study was not a randomized control trial; therefore, the role of potential confounders such as first-person experience, which makes the practitioner more attentive to the meditation experience leading to improvement, cannot be ruled out. The duration of meditation practice was only one month, which is a short period for assessing any changes in the participants.

Asking leading questions in the feedback questionnaire could be avoided. We cannot comment on the generalizability of the findings of this study since this is the first study on undergraduate medical students to be reported from India.

Strength of the Study

The authors have tried to incorporate a supervised meditation program for maintaining the mental health of medical students right in their first year when they are under considerable stress and trying to find ways to handle it. This study will be crucial in increasing our cross-cultural knowledge and contributing to improving global health and reducing suffering.

CONCLUSION

We conclude feasibility of a supervised meditation program for undergraduate medical students. Future studies in other medical colleges in India and abroad could develop a standardized RYM protocol that can weave its way into the medical curriculum. Moreover, future studies can also look at the difference between online and in-person meditation programs.

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Supplementary Material

Feedback questionnaire for participants

Note: There were five questions in this feedback form. For Question number 1, 2 and 3 please tick mark any one responses amongst the options provided. For question number 4 and 5 please write down your responses in a few sentences.

1. Which of the following best describes the material covered in these session in relation to your previous knowledge level. The material used was:

- a) Too basic
- b) Just right
- c) Too advanced

2. I was engaged through these session

- a) Strongly disagree
- b) Moderately disagree
- c) Disagree
- d) Agree
- e) Moderately agree
- f) Strongly agree

3. My knowledge increased as a result of these sessions

- a) Strongly disagree
- b) Moderately disagree
- c) Disagree
- d) Slightly agree
- e) Moderately agree
- f) Strongly agree

4. What was the best part in these session for you?

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5. What would make these session even better?

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