

Effect of Mind Sound Resonance Technique on Selected Psycho-emotional Well-being Parameters in Secondary School Students: A Randomised Controlled Trial

ANINDITA SAHA¹, SATYA PRAKASH PUROHIT²

ABSTRACT

Introduction: Mind Sound Resonance Technique (MSRT) is a yogic relaxation technique, which creates a resonance of the “A,” “U,” “M,” “AUM,” and *Mahāmātyuijaya mantra* chanting to provide a delicate massage sensation throughout the body. Adolescence is a developmental stage marked by changes in social, emotional and cognitive functioning. Studies have demonstrated the benefits of yoga, pranayama and meditation regarding health and mental issues in both adolescents and adults.

Aim: To see the effect of the MSRT on selected psycho-emotional parameters in secondary school students.

Materials and Methods: In this randomised controlled trial, data of total 63 adolescents, intervention group (n=32) and control group (n=31) were analysed, who were selected from two English medium schools in Udaipur, Tripura (northeast India). The intervention group was provided the MSRT for 30 minutes each day for 21 sessions, whereas the control group

went through only the daily routine, in the month of April 2022. The data were collected using questionnaires, prior to and after the intervention. Independent sample test and paired sample t-test were done for ‘between groups’ and ‘within group’ comparison respectively for the variables i.e., emotion regulation, impulsivity, creative thinking, critical thinking and interpersonal relationship. Mann-whitney test and Wilcoxon-signed rank test were done for ‘between groups’ and ‘within group’ comparison, respectively for the variables i.e., aggression and mindfulness.

Results: The intervention group showed significant improvement in mindfulness (p<0.001), creative thinking (p<0.001), critical thinking (p<0.001), interpersonal relationship (p<0.001), emotion regulation (p=0.005) and a significant reduction in aggression (p<0.001) and impulsivity (p=0.001) compared to control group.

Conclusion: Based on the result of the present study, it is suggested that MSRT can help to improve the psycho-emotional well-being of adolescents.

Keywords: Adolescents, Aggression, Creativity, Criticality, Emotion regulation, Impulsivity, Interpersonal relationship, Meditation, Mindfulness

INTRODUCTION

The prefrontal cortex and other association cortices undergo important phase mechanisms of neurobiological development during the adolescent period, which are concurrently reflected in the characteristics of cellular and circuit-level cortical growth [1]. Experience has a significant impact on the adolescent period, where the environment can both increase sensitivity to illnesses and offer opportunities to change developmental trajectories [1]. It is found that globally, 1 (14%) in 7 of 10-19-year-old experience mental health conditions [2]. Emotional disorders and anxiety disorders including panic or excessive worry are more common among adolescents [2]. Younger adolescents suffer from behavioural disorders more than older adolescents [2]. As per records, Attention Deficit Hyperactivity Disorder (ADHD) occurs among 3.1% of 10-14-year-old and 2.4% of 15-19-year-old and conduct disorder occurs among 3.6% of 10-14-year-old and 2.4% of 15-19-year-old [3].

Adolescents’ education can be negatively impacted by behavioural disorders and conduct disorders may end up in criminal behaviour [2]. Aggression level is high among adolescents, as overall 66.5% and 56.8% of children were found physically and verbally aggressive respectively in India [4]. Mental well-being or emotional health is also positively related to mindfulness [5]. Adolescence is a time, when psychopathological development is more likely to occur which involves critical risk factors including processes like difficulty regulating emotions [6]. Exposure to negative peer experiences may, therefore, impair the development of emotion regulation [7]. Adolescents who

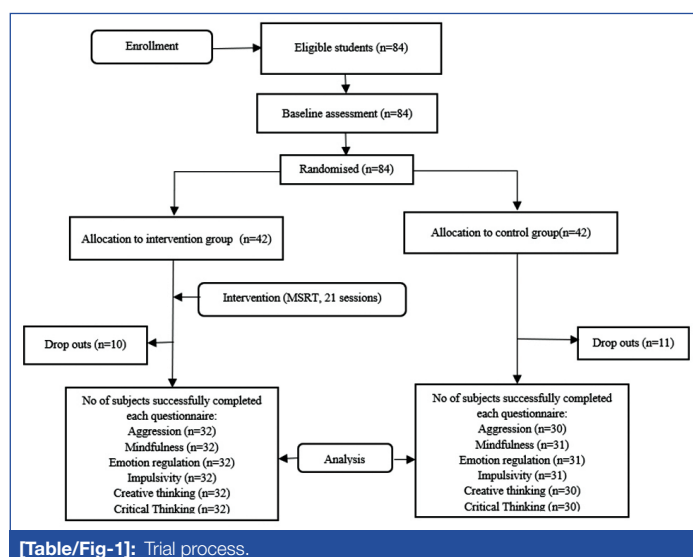
exhibit impulsive behaviour at greater rates of growth are likely to go on to develop antisocial or severe psychological issues in their early adulthood [8]. Creative thinking has an impact on mental health and anxiety and some adolescents experience significant levels of worry and stress [9]. Previous research highlighted the significance of critical consciousness in the positive development of adolescents [10]. Supportive and encouraging interactions of adolescents with their parents and classmates serve as a developmental boost for negotiating school transitions [11]. It has been seen that mental health issues, that occur in childhood can extend to hurt in their adult period [12,13].

The MSRT creates resonance with the help of a mantra to promote deep body and mind relaxation [14]. The practice of MSRT showed an improvement in the cognitive function of the clinical population and also facilitated a reduction in the levels of stress, anxiety, fatigue and psychological distress including an improvement in self-esteem and quality of sleep [15,16]. Yogic postures, pranayama and meditation have positive outcomes in adolescents and adults regarding aggression, mindfulness, emotion regulation and impulsivity [17,18]. However, no study found to improve the quality of psycho-emotional parameters like aggression, impulsivity, emotion regulation, creative thinking, critical thinking and interpersonal relationship in adolescents, using MSRT as on date. MSRT on mindfulness of adolescents showed a positive result for a short time of intervention in a previous study [19]. Hence, the present study is to observe the impact of MSRT on mindfulness with a comparatively

long time of intervention, with a null hypothesis that MSRT has no impact in improvement of psycho-emotional variables. Hence, the present study was planned with the rationale of looking at these outcome parameters.

MATERIALS AND METHODS

This randomised controlled study was conducted on subjects, who were selected from two English medium schools in Udaipur, Tripura (northeast India). The present study being a yoga intervention study, the participants were aware of the research and intervention protocol. Thus, blinding of the study was not possible. The present study (21 sessions) was conducted in the month of April 2022. Informed consent forms from the school principals and the guardian, and informed assent forms from each participant were obtained. The Institutional Ethics Committee approved the study (RES/IEC-SVYASA/114/2019). No incentives were given to participants for participating in the study [Table/Fig-1].



[Table/Fig-1]: Trial process.

Sample size calculation: A sample size of 54 (each group 27) was obtained by using the 'G power' software, ($\alpha=0.05$, power=0.95, and effect size=1.019) from a previous study [19]. A total of 84 students were selected for this study looking for the probability of future dropouts. All 84 participants were stratified randomised into either the intervention group or control group based on their gender and standard. Finally 63 students complete the final assessment (32 in intervention group and 31 in control group).

Inclusion criteria: Healthy children from 7th and 8th standard, who were willing to take part in the present study and they did not have any yogic experience for the last six months were included.

Exclusion criteria: Children with any disability and not regular in class were excluded. Incomplete questionnaires were also excluded from analysis.

Study Procedure

The intervention group was provided MSRT for 30 minutes each day for 21 sessions including daily routine activities and the control group went through only normal daily routine activities.

The steps of MSRT are as follows [14]:

- Opening prayer: *Mahāmātyuījaya mantra*
- Loud chanting (Aaht *Āhata*) of A, U, M, and AUM (five rounds). Feel complete body resonance.
 - Alternate loud (Aaht *Āhata*) and mental (Anaht *Anāhata*) chanting of A,U,M, and AUM (three rounds). Feel the resonance even with anāhata.
- Loud chanting (Aaht *Āhata*) of *mahāmātyuījaya mantra* (3 rounds). Feel the pattern of resonant waves throughout the body.

- Alternate loud (Aaht *Āhata*) and mental (Anaht *Anāhata*) chanting of *Mahāmātyuījaya mantra* (3 rounds). Feel the pattern of resonance waves even with the *Anāhata* phase.

- Anāhata* AUM (9 rounds). Repeat AUM in the mind, feeling the resonant waves throughout the body.
- Ajapājapa* AUM (9 rounds). Feel the resonant waves of OM coming up and spreading throughout the body and diffusing into silence.
- Stay in silence.
- Resolve.
- Closing prayer: *Om sarbe bhavantu sukhinaū*

The data were collected using the below questionnaires prior and after to the intervention period. During data collection, required instructions were given to the participants, and help was taken from the school counsellor to describe all the questions. Unbiased guidance during the assessment was provided. After a thorough explanation, the below mentioned questionnaires were distributed to the participants. All the questionnaires were self-rated and in case of any doubt, they were clarified by the investigators.

Aggression Scale (AS): The scale consists of 11 items. Each item can range from 0 times through 6+. Responses are additive and total aggression ranges between 0 to 66. The scale has Cronbach's $\alpha=0.87$ and was evaluated in two independent samples of young adolescents ($n=253$ and $n=8,695$) [20].

Children's Assessment of Mindfulness (CAMM): The scale consists of 10 items. Each item can range from 0 times through 4. Items are scored by reverse scoring (0=4, 1=3, 2=2, 3=1, 4=0). The CAMM demonstrates good internal consistency with Cronbach's $\alpha=0.81$ [21].

Emotion Regulation Questionnaire (ERQ): The scale consists of 10 items. Each item is scored on a 7 point Likert scale where '1' is strongly disagree and '7' is strongly agree. The emotion regulation questionnaire is designed to assess individual differences in the habitual use of two emotion regulation strategies: cognitive reappraisal (items: 1, 3, 5, 7, 8, 10) to assess positive emotion and expressive suppression (items: 2, 4, 6, 9) to assess negative emotion [22]. There were total of six questions, out of 10, with a maximum possible score of 42, in case of positive emotion and a total of four questions with a maximum possible score of 28, in case of negative emotion. The Cronbach's α is 0.79 for reappraisal and 0.73 for suppression [23].

Barratt's Impulsivity Scale-Brief (BIS-Brief): The scale consists of eight items. The items are scored on a 4 point scale (1=rarely/never, 2=occasionally, 3=often, 4=almost always/always). The (BIS-Brief) is a modified version of BIS-11 and it is the sum of the scores of eight items from BIS-11 (items 1, 2, 5, 8, 9, 12, 14 and 19), which was developed by Steinberg, Sharp, Stanford and Tharp. It demonstrates good internal consistency with Cronbach's $\alpha=0.78$ [24].

Life skills scale for creative thinking, critical thinking and interpersonal relationship: This demonstrates good internal consistency with Cronbach's $\alpha=0.77$ for creative thinking skills, Cronbach's $\alpha=0.65$ for critical thinking skills and Cronbach's $\alpha=0.69$ for interpersonal relationships skills [25].

Creative thinking: The scale consists of 14 items, out of 115 items, in the life skills scale questionnaire. Each item is scored on a 5 point scale (1=never, 2=rarely, 3=sometimes, 4=usually, 5=always).

Critical thinking: The scale consists of 10 items, out of 115 items, in the life skills scale questionnaire. Each item is scored on a 5 point scale (1=never, 2=rarely, 3=sometimes, 4=usually, 5=always). Out of 10 items, item no. 23 is reversed scored.

Interpersonal relationship: The scale consists of 18 items, out of 115 items, in the life skills scale questionnaire. Each item is scored

on a 5 point scale (1=never, 2=rarely, 3=sometimes, 4=usually, 5=always). Out of 18 items, five items are reversed scored.

STATISTICAL ANALYSIS

Data were analysed using the Statistical Package for Social Science (SPSS) version 20.0. Mann-Whitney test and Wilcoxon-signed rank test were used to check 'between groups' and 'within group' comparisons respectively for non parametric variables i.e., aggression and CAMM. Independent sample test and paired sample t-test were done for 'between groups' and 'within group' comparison respectively for the variables i.e., emotion regulation, impulsivity, creative thinking, critical thinking and interpersonal relationship.

RESULTS

A total of 63 students completed the final assessment, including 32 students from the intervention group (13.59±0.756 years; girls 19 and boys 13) and 31 students from the control group (13.94±0.727 years; girls 19 and boys 12) from both the schools. There was no significant difference in age ($p=0.073$) or gender ($p=0.877$) between the groups. When compared with the baseline data, the intervention group showed a significant improvement in mindfulness ($p<0.001$), positive emotion regulation ($p=0.002$), creative thinking ($p=0.001$), critical thinking ($p=0.005$), and a significant reduction for aggression ($p=0.004$) and impulsivity ($p=0.002$) but no change for negative emotion regulation (0.449), interpersonal relationship ($p=0.113$). The control group did not show any change for aggression ($p=0.919$), mindfulness ($p=0.440$), positive emotion regulation ($p=0.783$), negative emotion regulation ($p=0.782$), impulsivity ($p=0.311$), creative thinking ($p=0.012$), critical thinking ($p=0.013$) but a significant deterioration for interpersonal relationship ($p=0.018$) [Table/Fig-2].

There was no difference found from the baseline between group comparison, in respect of all the variables apart from aggression ($p=0.032$) and interpersonal relationship ($p=0.034$). After the intervention period, the intervention group showed a significant reduction in aggression ($p<0.001$) and impulsivity ($p=0.001$) and a significant improvement in mindfulness ($p<0.001$), creative thinking ($p<0.001$), critical thinking ($p<0.001$), interpersonal relationship ($p<0.001$) and positive emotion regulation ($p<0.001$) compared to the control group [Table/Fig-2].

DISCUSSION

The purpose of the present study was to examine the effect of MSRT in promoting psycho-emotional aspects of adolescence. A positive change was found in all the variables, compared to the control group in the present study after 21 sessions of MSRT

intervention. The present study is aligned with the previous studies where a significant reduction (27.83%) in aggression was shown by yogic exercise and pranayama for school students by Shastri VV et al., and an 8.78% reduction by yogic training in overall aggression for offenders by Kanchibhotla D et al., [17,26]; whereas the present study reflected more improvement with a 52.78% of reduction in aggression in adolescents.

A previous study by Anusuya US et al., showed the effect of MSRT on mindfulness in school students with a 23.76% improvement [19], whereas the present study showed more improvement (39.47%). The cause might be the longer intervention period of MSRT as the intervention was provided by Anusuya US et al., for two weeks [19], whereas in the present study, it was for 21 sessions. A 17.11% improvement by yogic training and 6.53% by vedic mathematics for mindfulness was also shown by Shastri VV et al., [17].

The present study showed an improvement in positive emotion regulation by 10.69% and negative emotion by 4.03%, whereas a 6.71% improvement was found by yogic exercise and pranayama for negative emotion regulation by Shastri VV et al., [17]. Yogic training showed a significant effect on impulsivity in convicted adults (mean age=36.4±9.4 years) by Kerekes N et al., and female participants (mean age=37.7±11.33 years) having addictions by Petker T et al., [18,27]. This study reflected a 15.86% of reduction in impulsivity in adolescents.

The present study showed a 12.78% of improvement in creative thinking in adolescents, which corroborates with the result of Shetkar RM et al., which showed that Cyclic Meditation (CM) training increases performance on tests of creative cognition by an overall 17.83% in adults (mean age:27.92±6.95 years) [28]. An improvement was also found using OM meditation by Bashmakova I and Shcherbakova O; and another form of meditation technique by Ding X et al., in creative cognition [29,30]. A 34.5% and 35.34% of improvement were found through yogic practices and brain fitness exercises, respectively on critical thinking by Balasubramanian K and Anandhi A [31]. This study also showed a significant improvement of 10.77% in critical thinking in adolescents.

There were no changes found in the intervention group for interpersonal relationships whereas a significant deterioration was found in the control group. Participants had their final exam during the last one and a half weeks of the intervention period. Students might have more competitive minds and they might have the pressure of exams. So, where the control group had a significant deterioration of 6.18% and could not cope with the situation of their interpersonal relationship, the intervention group had a less

Variables	Within group								Between group		
	Intervention group				Control group				Pre vs pre	Post vs post	
	Pre Mean/Median±SD	Post Mean/Median±SD	p-value prepost	% Change	Pre Mean/Median±SD	Post Mean/Median±SD	p-value pre-post	% Change	p-value	p-value	Cohen's d
AS	18±13.532	8.5±7.791	0.004**	52.78	28±13.332	28.5±12.389	0.919	1.79	0.032*	<0.001***	-1.93
CAMM	19±7.154	26.5±5.858	<0.001***	39.47	18±5.530	17±5.616	0.440	5.56	0.567	<0.001***	1.66
P-ERQ	28.91±7.629	32±6.594	0.002*	10.69	26.29±5.172	25.9±5.88	0.783	1.48	0.118	<0.001**	0.98
N-ERQ	17.44±5.086	18.19±5.474	0.449	4.03	16.9±3.85	16.65±4.929	0.782	1.48	0.449	0.245	0.29
BIS-Brief	17.53±4.174	14.75±3.417	0.002**	15.86	18.26±3.651	17.55±3.129	0.311	3.89	0.465	0.001**	-0.85
CrtV	49.38±9.192	55.69±9.050	0.001**	12.78	49.43±8.951	45.03±6.926	0.012*	8.9	0.980	<0.001***	1.32
CrtC	35.66±6.573	39.50±5.634	0.005**	10.77	35.50±6.415	32.60±5.544	0.013*	8.16	0.925	<0.001***	1.24
IntP	68.53±9.158	71.03±7.685	0.113	3.65	63.55±8.732	59.62±8.178	0.018*	6.18	0.034*	<0.001***	1.44

[Table/Fig-2]: Within group and between group comparisons of the results.

Standard Deviation (SD); Aggression scale (AS); Children's Assessment of Mindfulness (CAMM); Positive Emotion (P-ERQ); Negative Emotion (N-ERQ); Barratt's Impulsivity Scale-Brief (BIS-Brief); Creative Thinking (CrtV); Criticality Thinking (CrtC); Interpersonal Relationship (IntP)

*** $p<0.001$, ** $p<0.01$, * $p<0.05$

Wilcoxon-signed rank test was done for 'within group' comparison of AS and CAMM

Mann-Whitney test was done for 'between groups' comparison of AS and CAMM

Paired sample t-test was done for 'within group' comparison of P-ERQ, N-ERQ, BIS-Brief, CrtV, CrtC, IntP

Independent sample test was done for 'between groups' comparison of P-ERQ, N-ERQ, BIS-Brief, CrtV, CrtC, IntP

significant improvement of 3.65% and could stable up with the situation. Hence, the intervention group showed highly significant improvement in the interpersonal relationship ($p < 0.001$) compared to the control group. The result of Kang Y, is in agreement with the present study and showed positive changes in interpersonal relationships [32].

The MSRT was developed using the concept of *Nādānusandhāna* including A-U-M and AUM chanting and also *Mahāmātyuijaya mantra* chanting [14]. *Nādānusandhāna* is the process to concentrate on inner sound through which the mind forgets all the outer world distractions [33]. By chanting 'A'-kara consciousness is turned outward to the external world. By chanting 'U'-kara consciousness is turned towards the inner world and by chanting 'M'-kara, one is filled with the experience of bliss [34]. The neuro-haemodynamic correlations of 'OM' chanting indicate limbic deactivation [35]. *Mahāmātyuijaya mantra* to cure the healing energy that is constantly at work within us, and it bestows health, peace, satisfaction and immortality [36]. Practicing MSRT might help the participants to turn their concentration inward and they could be free from out-world distractions. Through this, the expression of aggressiveness and impulsivity was reduced gradually and mindfulness was increased as their mind was less destructed and could function in a better way. As *Mahāmātyuijaya mantra* chanting helps to heal the energy, participant's mind and body might become sound and they would be able to think better in a creative and critical way. 'OM' mantra, which consists of the three letters A, U, and M and covers the entire articulation process, increases parasympathetic nervous system activity (high HF: High-Frequency power), promoting serenity and relaxation [37]. As they became more stable in their mind and body and their consciousness turned to a better purpose in life and they might have the experience of bliss, they could be stable in their relationship with others, whereas the participants of the control group experienced the deterioration of interpersonal relationships over the same time.

Limitation(s)

The present study has also limitations as the sources of participants were limited to two schools and there were dropouts for around 25% of each group for no reason, though it could not affect the sample size of the present study. Based on the present study, MSRT can be recommended for the well-being of adolescents, which may help to improve psycho-emotional health to gain academic excellence and can improve social life. The present study design can be strengthened, by including other alternative interventions to compare the result.

CONCLUSION(S)

Rejecting the null hypothesis, MSRT intervention showed a significant improvement in psycho-emotional variables like mindfulness, emotion regulation, creative thinking, critical thinking and interpersonal relationship and a significant reduction in aggression and impulsivity compare to the control group. Considering the scientific evidence discussed, it is fair to conclude that, MSRT can be used as a beneficial tool for all developments of adolescents.

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PARTICULARS OF CONTRIBUTORS:

1. Postgraduate, Department of CODE Master of Science in Yoga, Swami Vivekananda Yoga Anusandhana Samsthana, Bangalore, Karnataka, India.
2. Assistant Professor, Department of Yoga and Humanity, Swami Vivekananda Yoga Anusandhana Samsthana, Bangalore, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Satya Prakash Purohit,
#19, Ekanath Bhavan, Gavipuram Circle, K.G. Nagar, Bangalore, Karnataka, India.
E-mail: drsatyaprakashpurohit@gmail.com

PLAGIARISM CHECKING METHODS: [\[Jain H et al.\]](#)

- Plagiarism X-checker: Nov 02, 2022
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- iThenticate Software: Jan 30, 2023 (13%)

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- For any images presented appropriate consent has been obtained from the subjects. NA

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