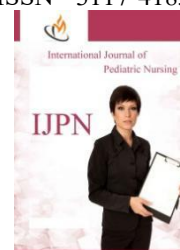




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A PILOT STUDY ON EFFECTIVENESS OF MIND-BODY SKILLS TECHNIQUE ON STRESS, SELF-CARE SKILLS, AND SALIVA CORTISOL LEVELS AMONG ADOLESCENTS IN SELECTED SCHOOLS

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ABSTRACT

Adolescents face significant stress due to academic, social, and emotional challenges, affecting their mental and physical well-being. Developing self-care skills enhances resilience and coping. This study evaluated the effectiveness of the Mind-Body Skills Technique (MBST) in reducing stress and improving self-care skills and regulating saliva cortisol levels among adolescents. A quasi-experimental study was conducted among 20 adolescents each in the control and experimental groups from a selected school in Thiruvallur District. Participants were selected based on eligibility criteria and screened using the Adolescent Stress Questionnaire (ASQ-14). Data were collected using the Adolescent Daily Stress Scale (ADOSS), a self-care skills assessment questionnaire, and bio-physiological measurement of saliva cortisol before and after the MBST intervention. Data were analyzed using descriptive and inferential statistics. Of 576 adolescents screened, most had moderate stress (28.12%), followed by mild (27.25%) and normal (18%). In the study group, the mean stress score reduced from 34.3 to 25.35, while the control group showed no improvement (36.85 to 37.65). Self-care skills improved significantly in the study group (115.2 to 149.3) compared to the control group (116.8 to 118.4). Mean saliva cortisol levels declined from 0.65 µg/dL to 0.38 µg/dL in the study group, with minimal change in controls (0.67 µg/dL to 0.64 µg/dL). Overall, MBST effectively reduced stress and cortisol levels and enhanced self-care skills among adolescents.

INTRODUCTION

Adolescence, defined as the age group of 10–19 years, is a critical developmental period bridging childhood and adulthood. It is marked by significant biological, cognitive, emotional, and social changes that shape identity, autonomy, and lifelong health. Globally,

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there are about 1.3 billion adolescents, accounting for one-sixth of the population, with nearly 90% residing in low- and middle-income countries [1]. Mental health is a major concern during this stage. In 2021, approximately 1 in 7 adolescents (15%) experienced a mental disorder, contributing to 13% of the disease burden in this age group [2]. Depression, anxiety, and behavioral disorders are leading causes of illness and disability. Adolescents with mental health issues often face stigma, social exclusion, academic difficulties, and increased risk-taking



behaviors.

Stress during adolescence is influenced by multiple factors, including peer pressure, academic demands, family environment, media exposure, and socioeconomic conditions [3]. Globally, 8% of children and 15% of adolescents are affected by mental health disorders, yet many remain untreated. Suicide is the third leading cause of death among individuals aged 15–29 years [4], and nearly half of adult mental disorders begin before the age of 18[5].

Studies indicate that most adolescents experience moderate stress, with academics and financial concerns being primary stressors. Common coping strategies include sleep and recreational activities, highlighting the need for healthier stress management approaches [6].

Background of the Study

Non-communicable diseases (NCDs) account for 74% of global deaths and 66% of deaths in India. Psychological stress is a significant contributing factor to these conditions. India is projected to incur economic losses of approximately 1.03 trillion USD due to mental health conditions between 2012 and 2030[7].

Adolescent mental health has become a growing concern, with increasing levels of academic stress, social isolation, and pressure from digital environments. A 2024 report by the Indian Psychiatric Society indicates that around 40% of Indian adolescents experience stress and anxiety [8]. Despite this, many schools lack trained counselors, and mental health education is limited, leading to unmet needs and delayed identification of problems [9]. International data also reveal high stress levels among adolescents, with many reporting emotional distress and adopting unhealthy coping mechanisms such as substance use and poor lifestyle habits [10].

Significance and Need of the Study

Mental health is increasingly recognized as a global health priority, with growing awareness of its importance alongside physical health [11]. Adolescents are particularly vulnerable due to academic pressure, social challenges, and developmental transitions. High stress levels negatively impact academic performance, sleep, concentration, and emotional well-being, and may lead to long-term consequences if unaddressed [12]. Chronic stress also weakens immunity and affects overall quality of life.

Mind-body skills techniques, including mindful breathing, autogenic training, and guided imagery, have shown effectiveness in reducing stress by promoting self-awareness and emotional regulation. Schools provide an ideal environment for implementing such interventions, as adolescents spend a significant portion of their time there. Therefore, there is a critical need to introduce structured,

evidence-based stress management interventions to improve adolescent mental health and equip them with coping skills for future challenges.

Statement of the Problem

A quasi-experimental study to assess the effectiveness of Mind-Body Skills Technique (MBST) on Stress, Self-care skills, and salivary cortisol levels among adolescents in Selected Schools.

Objectives

1. To screen the adolescents for the level of stress
2. To assess and compare the pre- and post-test levels of stress, self-care skills, and saliva cortisol among adolescents in the experimental and control groups
3. To evaluate the effectiveness of Mind-Body Skills Technique (MBST) on the level of stress, self-care skills, and salivary cortisol among adolescents.
4. To identify the relationship between the level of stress, self-care skills, and saliva cortisol among adolescents in the experimental and control groups
5. To associate the selected background variables with the mean differed scores of stresses, self-care skills, and saliva cortisol score among adolescents in the experimental and control group.

NULL HYPOTHESES

NH₁: There is no significant difference in the levels of stress, self-care skills, and salivary cortisol before and after the implementation of the mind-body skills technique between the study and control groups.

NH₂: There is no significant correlation between the mean differed level of scores of stresses, self-care skills and saliva cortisol among adolescents in the experimental and control group.

NH₃: There are no significant association of selected background variables and the mean differed level of stress, self-care skills and saliva cortisol levels among adolescents in the experimental and control group.

METHODOLOGY

The independent variable of the study was Mind-Body Skills Technique (MBST). The dependent variables were stress, self-care skills, and salivary cortisol levels. The target population comprised adolescents aged 13–18 years, while the accessible population included students from selected Matriculation Higher Secondary Schools. Adolescents with acute illness, chronic comorbid conditions, hormonal or psychiatric disorders, medication affecting cortisol levels, recent structured interventions, or conditions influencing salivary flow were excluded to ensure data accuracy.

Content validity of the tools was established through expert evaluation by 15 professionals from



nursing, medicine, psychiatry, and allied disciplines. Reliability was assessed using Cronbach's alpha, yielding values of 0.83 for stress, 0.85 for self-care skills, and 0.80 for salivary cortisol, indicating good internal consistency.

Ethical clearance was obtained from the Institutional Ethics Committee. Permission was secured from educational authorities, and informed consent was obtained from parents and adolescents. Confidentiality, voluntary participation, and the right to withdraw were ensured throughout the study.

A pilot study was conducted after obtaining administrative approval. Eligible participants were screened, and baseline (pretest) data on stress, self-care skills, and salivary cortisol were collected. The MBST intervention—comprising deep breathing, autogenic training, and guided imagery—was administered to the experimental group, and post-test assessment was conducted after four weeks.

For the main study, 570 adolescents were screened, of whom 474 with stress were selected using purposive sampling. Participants were allocated into experimental and control groups. Pretest assessment included self-administered questionnaires, anthropometric measurements, and salivary cortisol collection under standardized conditions. The experimental group received MBST through demonstration and supervised practice, while the control group did not receive intervention during the study period. Post-test data were collected after four weeks. Subsequently, the intervention was provided to the control group to ensure ethical equity.

RESULTS

Section I: Distribution of adolescents based on their screening for stress

Table 1.1 shows the distribution of adolescents according to stress levels. Among 576 adolescents, the highest proportion experienced moderate stress (28.12%), followed by mild stress (27.25%). Only 18% were within the normal range, while 11.11% and 10.59% reported severe and extreme stress, respectively. The mean stress scores increased progressively from normal (11.92 ± 2.26) to extreme stress (51.30 ± 4.10). The overall mean stress score (29.84 ± 12.67) indicates that adolescents in the study predominantly experienced a moderate level of stress. These findings highlight that a considerable proportion of adolescents experience moderate to high stress, emphasizing the need for targeted interventions.

Section II: Distribution of adolescents based on their background variables

Table 2.1 shows the demographic distribution of adolescents in the study and control groups. The majority of participants in the study group were aged 14 years (45%), while in the control group most were 15 years

(35%). Females predominated in the study group (70%), whereas the control group had a relatively higher proportion of males (45%). With regard to religion, the majority in both groups were Hindus (study: 60%; control: 65%), followed by Christians and a small proportion of Muslims.

Table 2.2 depicts that most adolescents belonged to the upper lower middle class, which was higher in the control group 10 (50%) compared to the study group 8 (40%), while lower middle class was equal in the study 8 (40%) but lower in control group 6 (30%). Nuclear families were predominant in both groups, whereas joint families were notably higher in the control group 9 (45%) than the study group 5 (25%). Majority had parents living together, slightly higher in control group 16 (80%) than study group 15 (75%). Most adolescents had one sibling, equally distributed in both groups 15 (75%); two siblings were slightly higher in control group 4 (20%) than study group 3 (15%). Parenting by both parents was most common, higher in control group 15 (75%) compared to study group 12 (60%), while mother-only parenting was higher in study group 6 (30%) than control group 2 (10%). Laissez-faire parenting style was more common in the study group 10 (50%), whereas democratic style was higher in the control group 9 (45%) compared to study group 6 (30%). Most adolescents were from rural/semi-urban areas, slightly higher in study 13 (65%) than control group 12 (60%), while city residence was slightly higher in control 2 (10%) than study group 1 (5%).

Section III: Assessment of level of stress among adolescents

Above table 3.1 shows the pretest level of stress score between study and control group. In study group, none of them are having normal level of score, 30.00% of them are having mild level of score, 35.00% of them are having mild level of score 10.00% of them are having severe level of score, and 25.00% of them are having extreme level of stress score.

In control group, none of them are having normal level of score, 30.00% of them are having mild level of score, 35.00% of them are having mild level of score 10.00% of them are having severe level of score, and 25.00% of them are having extreme level of stress score.

Above table 3.2 shows the posttest level of stress score between study and control group. In study group, none of them are having normal level of score, 50.00% of them are having mild level of score, 30.00% of them are having mild level of score 20.00% of them are having severe level of score, and none of them are having extreme level of stress score.

In control group, none of them are having normal level of score, 20.00% of them are having mild level of score, 30.00% of them are having mild level of score



20.00% of them are having severe level of score, and 30.00% of them are having extreme level of stress score. Above table 3.3 compare the stress score between experiment and control group.

In pretest, Study group are having 34.30 score and control group are having 36.85 score, so the difference is 2.55 score, this difference is small and it is not statistically significant.

In posttest, Study group are having 25.35 score and control group are having 37.65 score, so the difference is 12.30 score, this difference is large and it is statistically significant.

Above table 3.4. compare the stress score between pretest and posttest. In study group, in pretest they are having 34.30 score and in posttest they are having 25.35 score, so the pretest and posttest mean difference is 8.95 score, this difference is large and it is statistically significant. It was tested using Student paired t-test. In control group, in pretest they are having 36.85 score and in posttest they are having 37.65 score, so the pretest and posttest mean difference is 0.80 score, this difference is small and it is not statistically significant. It was tested using Student paired t-test

Above table 3.5 shows the posttest level of self-care skill score between study and control group. In study group, none of them are having poor level of score, none of them are having satisfactory level of score, 55.00% of them are having good level of score and 45.00% of them are having severe level of score.

In control group, none of them are having normal level of score, 25.00% of them are having mild level of score, 75.00% of them are having good level of score and none of them are having very good level of stress score.

Above table 3.6. compare the self-care skill score between experiment and control group. In pretest, Study group are having 89.95 score and control group are having 92.05 score, so the difference is 2.10 score, this difference is small and it is not statistically significant.

In posttest, Study group are having 123.70 score and control group are having 95.70 score, so the difference is 28.00 score, this difference is large and it is statistically significant.

Above table 3.7 compare the self-care skill score between pretest and posttest. In study group, in pretest they are having 89.95 score and in posttest they are having 123.70 score, so the pretest and posttest mean difference is 33.75 score, this difference is large and it is statistically significant. It was tested using Student paired t-test. In control group, in pretest they are having 92.05 score and in posttest they are having 95.05 score, so the pretest and posttest mean difference is 3.65 score, this difference is small and it is not statistically significant. It was tested using Student paired t-test

Above table 3.8 compare the Saliva Cortisol

score between experiment and control group. In pretest, Study group are having 7.43 score and control group are having 6.89 score, so the difference is 0.54 score, this difference is small and it is not statistically significant. In posttest, Study group are having 4.09 score and control group are having 6.61 score, so the difference is 2.52 score, this difference is large and it is statistically significant.

Above table 3.9 compare the Saliva Cortisol score between pretest and posttest. In Study group, in pretest they are having 7.43 score and in posttest they are having 4.09 score, so the pretest and posttest mean difference is 3.34 score, this difference is large and it is statistically significant. It was tested using Student paired t-test.

In control group, in pretest they are having 6.89 score and in posttest they are having 6.61 score, so the pretest and posttest mean difference is 0.28 score, this difference is small and it is not statistically significant. It was tested using Student paired t-test. Weigensberg et al. (2022), who found that group-guided imagery for adolescents yielded a 32% drop in salivary cortisol versus a 5% decrease in controls ($p = .05$), alongside a 27%–46% reduction in self-reported stress. Collectively, these findings demonstrate that integrating mind-body strategies into youth self-care effectively mitigates both physiological and psychological markers of stress.

Section V: Correlation between mean stress reduction score, self-care skills gain score and saliva cortisol reduction score

Table 5.1 denotes the correlation analysis using Karl Pearson's coefficient revealed significant positive relationships among stress reduction, self-care skill gain, and saliva cortisol reduction in the study group. Stress reduction scores (8.95 ± 4.48) showed a moderate positive correlation with self-care skill gain scores (33.75 ± 16.24) ($r = 0.37$, $p = 0.05$), indicating that a decrease in stress was associated with improved self-care practices. Similarly, stress reduction scores correlated positively with saliva cortisol reduction scores (3.34 ± 1.84) ($r = 0.32$, $p = 0.05$), suggesting alignment between psychological and physiological stress reduction. A further positive correlation was observed between self-care skill gain and saliva cortisol reduction ($r = 0.35$, $p = 0.05$), indicating that enhanced coping and self-care skills were associated with improved biological stress regulation.

In the control group, all three correlations—between stress reduction, self-care skill gain, and saliva cortisol reduction were positive but weak ($r = 0.14$ to 0.18) and statistically non-significant ($p > 0.05$). This implies that, in the absence of MBST, the relationships among psychological outcomes (stress and self-care



skills) and physiological stress markers (saliva cortisol) were minimal and inconsistent. The findings suggest that natural variations in stress, self-care, and cortisol do not strongly influence each other in adolescents who did not receive the intervention.

Section VI: To associate the selected background variables with the mean differed level of stress, self-care skills and saliva cortisol score among adolescents in the experimental and control group the association of stress reduction scores with selected background variables of adolescents in the study group was examined using t-test and F-test. The analysis revealed that gender ($t = 2.12$, $p = 0.05$) and parenting style ($F = 3.88$, $p = 0.05$) were significantly associated with stress reduction scores. This finding suggests that the extent of stress reduction following the intervention varied between male and female adolescents, and was also influenced by the nature of parental approach and discipline within the family. On the other hand, variables such as age, religion, father's and mother's educational status, father's and mother's occupation, family monthly income, socioeconomic status, perception of family's economic condition, type of family, family structure, number of family members, number of siblings, birth order, parenting responsibility, and residential setting did not demonstrate any statistically significant association with stress reduction scores ($p > 0.05$).

Association between stress reduction score and adolescents background variables of control group in the control group, stress reduction scores were minimal across all background variables (age, gender, religion, parental education and occupation, family income, socioeconomic status, perception of family's economic condition, type and structure of family, number of family members or siblings, birth order, parenting responsibility, parenting style, and residential setting), with values ranging from approximately -2.33 to 1.00. None of the

demographic, socio-economic, or family-related factors were significantly associated with stress reduction ($p > 0.05$). This indicates that, in the absence of a MBST, adolescents' stress levels remained largely unchanged, and variations in stress were not meaningfully influenced by background characteristics.

The association between self-care skill gain scores and adolescents' background variables showed that most variables had no significant influence. Age ($F = 0.22$, $p = 0.94$) and gender, where males scored 42.17 ± 33.72 and females 30.14 ± 22.86 ($t = 0.93$, $p = 0.36$), were not significantly associated. Similarly, religion ($F = 2.79$, $p = 0.09$), parental education—father ($F = 0.54$, $p = 0.71$) and mother ($F = 0.73$, $p = 0.54$)—and parental occupation—father ($F = 2.63$, $p = 0.12$) and mother ($F = 0.21$, $p = 0.88$)—showed no significant differences. Family income ($F = 0.67$, $p = 0.62$) and socioeconomic status ($F = 1.06$, $p = 0.39$) were also not significant. However, type of family showed a statistically significant association ($F = 3.86$, $p = 0.05$), with adolescents from nuclear families having higher gain scores (48.90 ± 29.16) compared to joint (22.00 ± 13.55) and broken families (12.67 ± 4.93). Overall, only family type significantly influenced self-care skill gain scores.

The analysis in the table 6.1 showed that most background variables had no significant association with saliva cortisol reduction scores. Gender ($t = 2.12$, $p = 0.05$) and type of family ($F = 3.69$, $p = 0.05$) were the only significant factors, with females (11.45 ± 5.24) and adolescents from nuclear families (12.33 ± 4.68) showing greater cortisol reduction. Variables such as age, religion, parental education and occupation, income, and socioeconomic status were not significant ($p > 0.05$). In the control group, no variables showed significant association, and cortisol reduction remained minimal, indicating that intervention was necessary to achieve measurable change.

Table 1: Frequency and Percentage Distribution of Adolescents According to their Screening for Stress Levels. N=576

Levels of Stress	Frequency	Percentage (%)	Mean	SD	Over all Mean SD
Normal	103	18	11.92	2.257	29.84 12.667
Mild	157	27.25	21.52	4.181	
Moderate	162	28.12	36.09	2.841	
Severe	94	11.11	38.85	3.328	
Extreme	61	10.59	51.30	4.100	

Table 2: Frequency and percentage distribution of demographic variables of the adolescents in the study and control group N= 20

Demographic data		Group			
		Study(n=20)		Control (n=20)	
		Number	Percentage (%)	Number	Percentage (%)
Age in years	13	1	5.00	2	10.00
	14	9	45.00	5	25.00



	15	1	5.00	7	35.00
	16	5	25.00	3	15.00
	17	1	5.00	0	0.00
	18	3	15.00	3	15.00
Gender	Male	6	30.00	9	45.00
	Female	14	70.00	11	55.00
Religion	Hindu	12	60.00	13	65.00
	Christian	7	35.00	6	30.00
	Muslim	1	5.00	1	5.00

Table 3: Frequency and percentage distribution of adolescents based on their family variables N= 20

Family Variables		Group			
		Study(n=20)		Control (n=20)	
		n	%	n	%
Socioeconomic status of the family	Upper class	0	0.00	0	0.00
	Upper middle class	2	10.00	2	10.00
	Lower middle class	8	40.00	6	30.00
	Upper Lower middle class	8	40.00	10	50.00
	Lower socio-economic class	2	10.00	2	10.00
Type of family	Nuclear	12	60.00	11	55.00
	Broken	3	15.00	0	0.00
	Joint	5	25.00	9	45.00
	Extended	0	0.00	0	0.00
Family structure	Parents living together	15	75.00	16	80.00
	Parents are separated	2	10.00	2	10.00
	Divorced	0	0.00	0	0.00
	Single Parent	3	15.00	2	10.00
	Living with relatives	0	0.00	0	0.00
Number of siblings	Nil	2	10.00	1	5.00
	One	15	75.00	15	75.00
	Two	3	15.00	4	20.00
	Three	0	0.00	0	0.00
	More than three	0	0.00	0	0.00
Parenting done by	Father only	0	0.00	0	0.00
	Mother only	6	30.00	2	10.00
	Father and Mother	12	60.00	15	75.00
	Others	2	10.00	3	15.00
Parenting style	Autocratic	4	20.00	6	30.00
	Democratic	6	30.00	9	45.00
	Laissez-faire	10	50.00	5	25.00
Residential setting	Rural /Semi-urban	13	65.00	12	60.00
	Urban	6	30.00	6	30.00
	City	1	5.00	2	10.00
	Metropolitan city	0	0.00	0	0.00

Table 4: Frequency and percentage distribution of adolescents based on their stress-related variables N=20

Stress-related variables		Group				Chi-square test
		Study(n=20)		Control(n=20)		
		n	%	n	%	
Personality type	Introvert	4	20.00	6	30.00	$\chi^2=0.53$ p=0.46(NS)
	Extrovert	16	80.00	14	70.00	
Adequacy of sleep in	Inadequate	8	40.00	11	55.00	$\chi^2=0.92$



hours/day	Adequate	5	25.00	4	20.00	p=0.63(NS)
	More than adequate	7	35.00	5	25.00	
Exclusive screen time spent per day in hours	Not at all	0	0.00	0	0.00	$\chi^2=0.57$ p=0.75(NS)
	1-2	12	60.00	11	55.00	
	2-3	5	25.00	7	35.00	
	> 3	3	15.00	2	10.00	
Preferred mode of screen time	Television	5	25.00	2	10.00	$\chi^2=5.01$ p=0.08(NS)
	Mobile /Smart Phones	8	40.00	15	75.00	
	Tablets/iPads	7	35.00	3	15.00	
	Laptops/Computers	0	0.00	0	0.00	
	E-Readers	0	0.00	0	0.00	
Most preferred Screen time usage intent	Studying	4	20.00	2	10.00	$\chi^2=2.66$ p=0.44(NS)
	Social media	10	50.00	11	55.00	
	Gaming	2	10.00	5	25.00	
	Watching videos	4	20.00	2	10.00	
	Messaging/calling	0	0.00	0	0.00	
	Relief from stress	0	0.00	0	0.00	
	Feeling bored	0	0.00	0	0.00	
	Lack of friends	0	0.00	0	0.00	
	Diversion	0	0.00	0	0.00	
Parenting style	Authoritative	2	10.00	7	35.00	$\chi^2=3.70$ p=0.15(NS)
	Authoritarian	16	80.00	11	55.00	
	Permissive	2	10.00	2	10.00	
	Neglectful	0	0.00	0	0.00	
Parent-adolescents relationship	Secure	12	60.00	12	60.00	$\chi^2=1.06$ p=0.58(NS)
	Avoidant	4	20.00	6	30.00	
	Ambivalent	4	20.00	2	10.00	
	Disorganized	0	0.00	0	0.00	
Alcohol used by parents	Sometimes	2	10.00	4	20.00	$\chi^2=4.00$ p=0.26(NS)
	Often	6	30.00	2	10.00	
	Most frequently	2	10.00	5	25.00	
	Nil	10	50.00	9	45.00	

Table 5: Comparison of pretest level of stress among adolescents N = 20

Level of score	Study group		Control group		Chi square test
	n	%	n	%	
Normal	0	0.00	12	40.00	$\chi^2=3.75$ P=0.29 (NS) DF=3
Mild stress	6	30.00	4	20.00	
Moderate stress	7	35.00	6	30.00	
Severe stress	2	10.00	7	35.00	
Extreme stress	5	25.00	3	15.00	
Total	20	100	20	100	

p ≤ 0.001 very high significant; S=significant

Table 6: Comparison of posttest level of stress among adolescents N=20

Level of score	Study group		Control group		Chi square test
	n	Percentage (%)	n	Percentage (%)	
Normal	0	0.00	0	0.00	$\chi^2=8.57$ P=0.03* (S) DF=3
Mild stress	10	50.00	4	20.00	
Moderate stress	6	30.00	6	30.00	
Severe stress	4	20.00	4	20.00	
Extremely stress	0	0.00	6	30.00	



Total	20	100	20	100	
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$p \leq 0.001$ very high significant; S=significant

Table 7: Comparison of stress score between study and control group. N=20

Assessments	Group				Mean difference	Student independent t-test
	Study		Control			
	Mean	SD	Mean	SD		
Pretest	34.30	13.51	36.85	13.51	2.55	t=0.60 p=0.55(NS)
Posttest	25.35	11.79	37.65	12.68	12.30	t=3.18 p=0.01**(S)

$P \leq 0.001$ very high significant; S= significant

Table 8: Assessment of mean difference between pretest and post-test score on level of stress between study and control groups.

Group	Assessments				Mean difference	Student paired t-test
	Pretest		Post-test			
	Mean	SD	Mean	SD		
Study	34.30	13.51	25.35	11.79	8.95	t=7.30 p=0.001***(S)
Control	36.85	13.51	37.65	12.68	0.80	t=1.58 p=0.13(NS)

$p \leq 0.001$ very high significant; S= significant

Table 9: Distribution of adolescents based on their posttest level of self-care skills N=20

Level of self-care skill score	Study group		Control group		Chi square test
	n	%	n	%	
Poor	0	0.00	0	0.00	$\chi^2=14.61$ $P=0.001^{***}$ (S) DF=3
Satisfactory	0	0.00	5	25.00	
Good	11	55.00	15	75.00	
Very good	9	45.00	0	0.00	
Total	20	100	20	100	

$p \leq 0.001$ very high significant S=significant

Table 10: Distribution of adolescents based on the comparison of self-care skills score between study and control group N=20

Assessment	Group				Mean difference	Student independent t-test
	Study		Control			
	Mean	SD	Mean	SD		
Pretest	89.95	20.88	92.05	19.82	2.10	t=0.32 p=0.74(NS)
Posttest	123.70	25.39	95.70	11.56	28.00	t=4.48 p=0.001**(S)

$P \leq 0.001$ very high significant S= significant

Table 11: Distribution of adolescents based on the comparison of self-care skills score between pretest and posttest.

Group	Assessments				Mean difference	Student paired t-test
	Pretest		Post-test			
	Mean	SD	Mean	SD		
Study	89.95	20.88	123.70	25.39	33.75	t=7.30 p=0.001***(S)
Control	92.05	19.82	95.70	11.56	3.65	t=1.58 p=0.13(NS)

$p \leq 0.001$ very high significant S= significant

Table 12: Distribution of adolescents based on their comparison of saliva cortisol score between study and control group n=20

Group n=20						
Assessment	Group				Mean difference	Student independent t-test
	Study		Control			
	Mean	SD	Mean	SD		



Pretest	7.43	2.75	6.89	2.42	0.54	$t=0.65$ $p=0.52$ (NS)
Posttest	4.09	1.56	6.61	1.88	2.52	$t=4.60$ $p=0.001^{**}$ (S)

$P \leq 0.001$ very high significant S= significant

Table 13: Distribution of adolescents based on the comparison of saliva cortisol score between pre and posttest. N=20

Group	Assessments				Mean difference	Student paired t-test
	Pretest		Post-test			
	Mean	SD	Mean	SD		
Study	7.43	2.75	4.09	1.56	3.34	t=8.11 p=0.001*** (S)
Control	6.89	2.42	6.61	1.88	0.28	t=0.90 p=0.38(NS)

$p \leq 0.001$ very high significant S= significant

Table 14: Correlation between mean stress reduction score, self-care skills gain score and saliva cortisol reduction score(study)

Group	Correlation between	Mean score Mean±SD	Karl pearson Correlation coefficients	Interpretation
Study group	Stress reduction score Vs self-care skill gain score	8.95±4.48 33.75±16.24	$r=0.37$ $P=0.05^{*}$ (S)	There is a significant positive fair correlation between Stress reduction score and self-care skill gain score. It means Stress reduction score increases their skill gain score also increases fairly
	Stress reduction score Vs saliva cortisol reduction score	8.95±4.48 3.34±1.84	$r=0.32$ $P=0.05^{*}$ (S)	There is a significant positive fair correlation between Stress reduction score and saliva cortisol reduction score. It means Stress reduction score increases their saliva cortisol reduction score also increases fairly
	self-care skill gain score Vs saliva cortisol reduction score	33.75±16.24 3.34±1.84	$r=0.35$ $P=0.05^{*}$ (S)	There is a significant positive fair correlation between self-care skill gain score and saliva cortisol reduction score. It means self-care skill gain score increases their saliva cortisol reduction score also increases fairly

Table 15: Correlation between mean stress reduction score, self-care skills gain score and saliva cortisol reduction score among adolescents in the control group.

Group	Correlation between	Mean score Mean±SD	Karl pearson Correlation coefficients	Interpretation
Control group	Stress reduction score Vs self care skill gain score	8.95±4.48 33.75±16.24	$r=0.16$ $P=0.45$ (NS)	There is a positive but very weak correlation between stress reduction score and self-care skill gain score which is not statistically significant.
	Stress reduction score Vs saliva cortisol reduction score	8.95±4.48 3.34±1.84	$r=0.14$ $P=0.52$ (NS)	There is a significant positive poor correlation between Stress reduction score and saliva cortisol reduction score. It means Stress reduction score increases their saliva cortisol reduction score also increases poorly
	self care skill gain score Vs saliva cortisol reduction score	33.75±16.24 3.34±1.84	$r=0.18$ $P=0.10$ (NS)	There is a significant positive poor correlation between self-care skill gain score and saliva cortisol reduction score. It means self-care skill gain score increases their saliva cortisol reduction score also increases fairly



Table 16: Association between stress reduction score and adolescents background variables of study group. N=20

Background variables		Stress reduction score						n	F-test/ t-test
		Posttest		Pretest		Reduction score= posttest-pretest			
		Mean	SD	Mean	SD	Mean	SD		
Gender	Male	34.50	15.06	28.30	14.38	6.20	4.59	6	t=2.12 P=0.05 *(S)
	Female	34.21	13.39	23.30	10.91	11.45	5.44	14	
Parenting style	Autocratic	32.25	14.66	25.50	14.73	7.75	4.71	4	F=3.88 P=0.05 *(S)
	Democratic	33.83	15.90	27.67	13.38	6.17	5.64	6	
	Laissez-faire	35.40	13.02	22.90	10.35	12.50	3.99	10	

Table 17: Association between self-care skill gain score and adolescents background variables of study group N=20

Background variables		Self-care gain score						n	F-test/ t-test
		Posttest		Pretest		Gain score= posttest-pretest			
		Mean	SD	Mean	SD	Mean	SD		
Type of family	Nuclear	125.92	21.84	86.42	17.52	48.90	29.16	12	F=3.86 P=0.05 *(S)
	Broken	95.00	36.37	81.33	38.66	12.67	4.93	3	
	Joint	135.60	16.73	103.60	12.42	22.00	13.55	5	
	Extended	0.00	0.00	0.00	0.00	0.00	0.00	0	
Parenting style	Autocratic	124.25	21.93	99.00	20.15	17.25	24.47	4	F=3.61 P=0.05 *(S)
	Democratic	122.33	22.37	100.00	19.13	22.33	20.94	6	
	Laissez-faire	130.90	30.18	81.50	23.39	49.40	26.10	10	

Table 18: Association between Saliva Cortisol Reduction Score and Background Variables of Adolescents in the Study and Control Group N=20

Background variables		Cortisol Reduction Score						n	F-test/ t-test
		Posttest		Pretest		Gain score= posttest-pretest			
		Mean	SD	Mean	SD	Mean	SD		
Gender	Male	34.50	15.06	28.30	14.38	6.20	4.59	6	t=2.12 P=0.05 *(S)
	Female	34.21	13.39	23.30	10.91	11.45	5.24	14	
Type of family	Nuclear	34.17	11.96	24.83	10.93	12.33	4.68	12	F=3.69 P=0.05 *(S)
	Broken	18.67	5.86	11.67	.58	5.00	5.29	3	
	Joint	44.00	12.45	34.80	8.87	8.10	4.07	5	
	Extended	0.00	0.00	0.00	0.00	0.00	0.00	0	

p>0.05 not significant, NS=not significant; p≤0.05 significant, S= significant



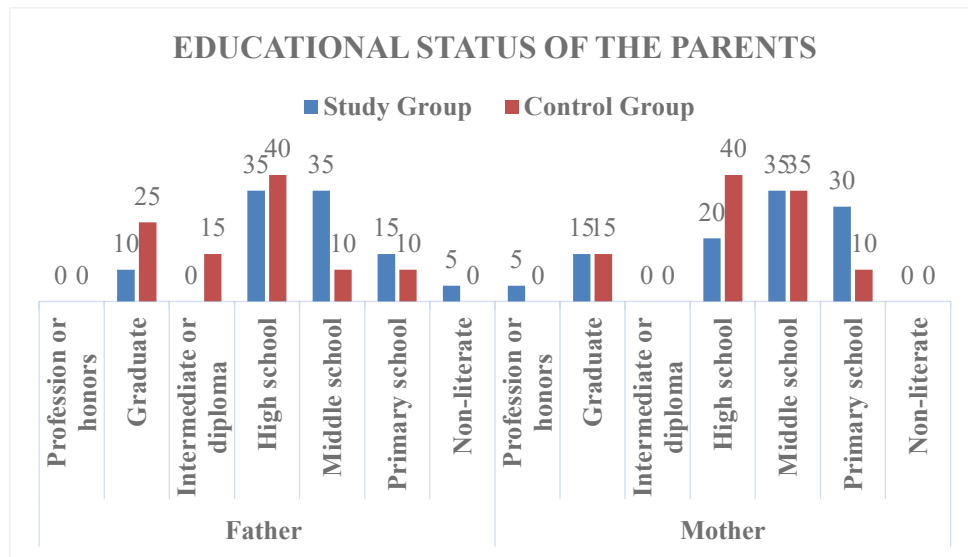


Figure 1: Frequency and percentage distribution of educational status of parents of the adolescents in the study and control group N=20

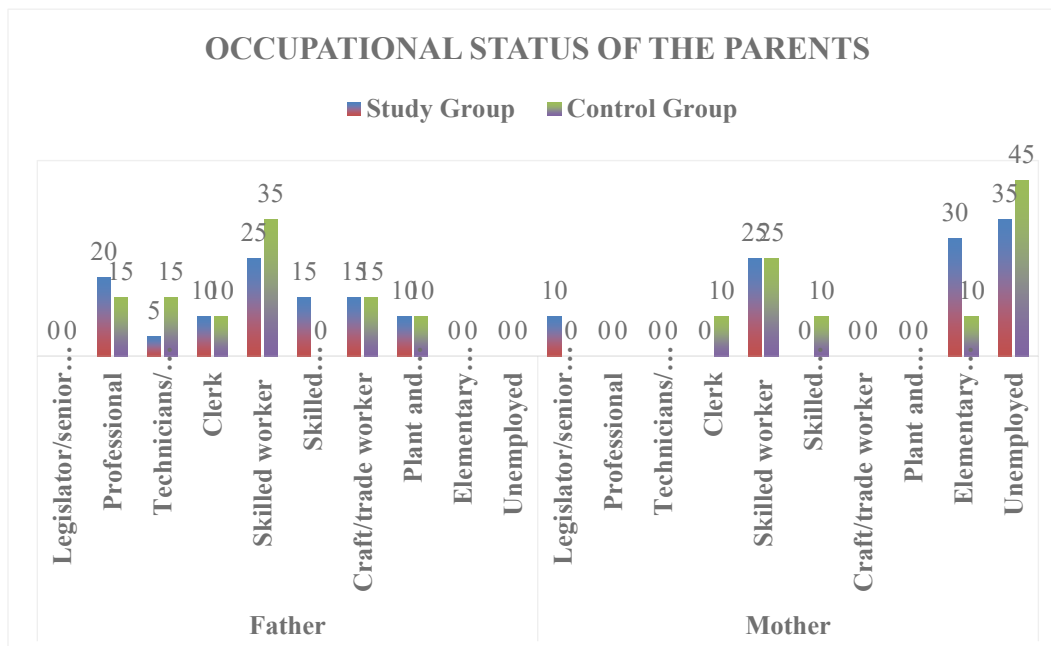


Figure 2: Frequency and percentage distribution of adolescents based on the occupational status of the parents N=20

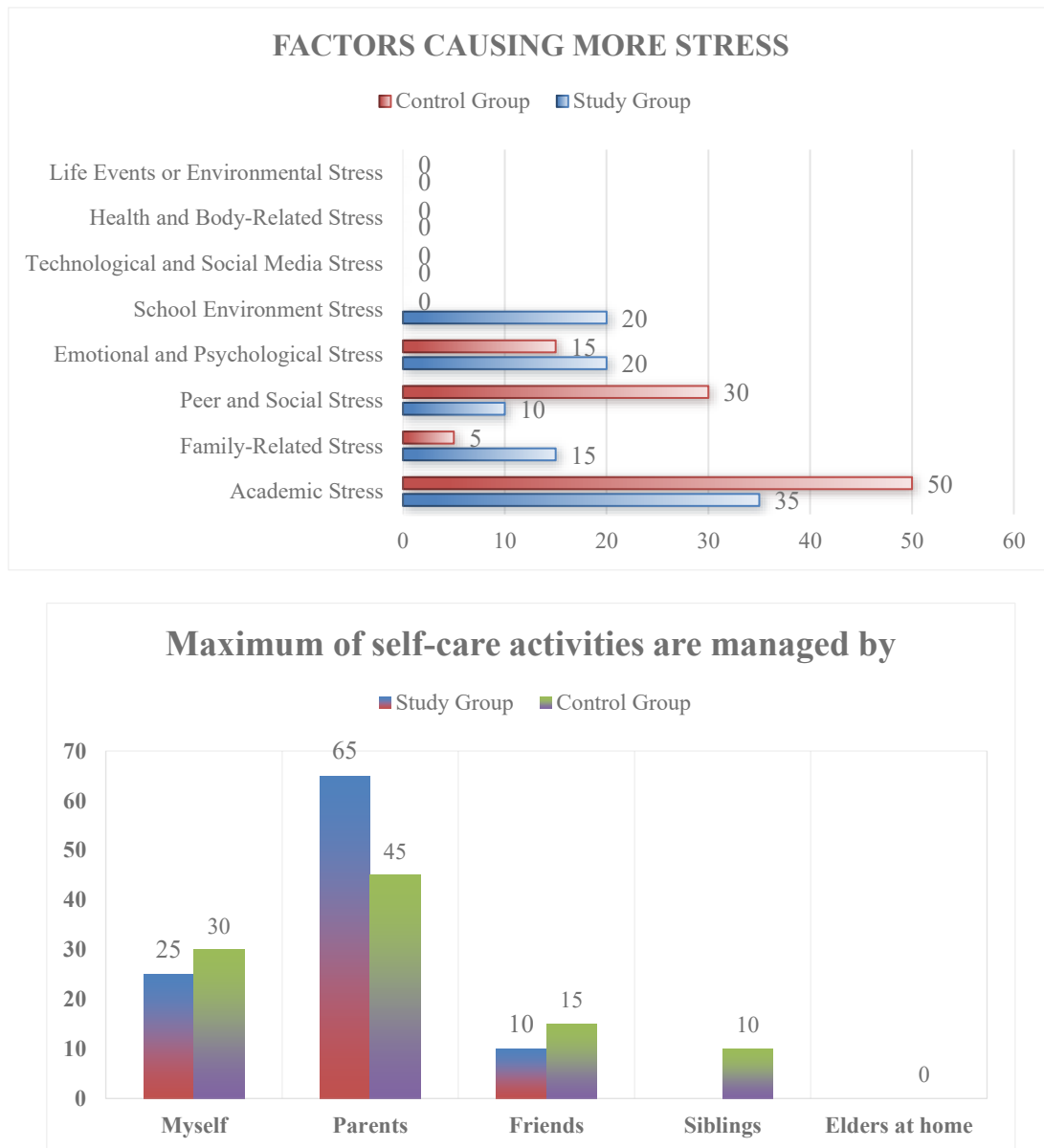


Figure 3: Frequency and percentage distribution of adolescents based on the factors causing more stress N=20

DISCUSSION

Among 576 adolescents, the highest proportion experienced moderate stress (28.12%), followed by mild stress (27.25%). Only 18% were within the normal range, while 11.11% and 10.59% reported severe and extreme stress, respectively. This finding is consistent with recent research by Gajula et al., who investigated perceived stress among adolescent school students in Hubli. They reported that only 11.9% of students experienced low stress, while the vast majority fell into the moderate (63.7%) or high stress (24.4%) categories.[13]

Priyadharshini et al. (2024) reported prevalence of stress was 39.2% among school students of mid and late adolescence. [14] Mahima J Shah et al (2019) reported that out of the 385 students, 29.13% reported for mild stress due to academic stressors and almost 7.21% reported for severe stress. 38.26% and 11.9% reported for mild and severe stress respectively due to interpersonal related stressors.[15]

With regard to self-care assessment, the stress score of the study group significantly decreased from a pretest mean of 34.30 to a post-test mean of 25.35 (mean



difference = 8.95, statistically significant). Conversely, the control group showed no significant change, with a slight increase from 36.85 to 37.65 (mean difference = 0.80, not statistically significant). The significant reduction in the study group's stress scores over time demonstrates the vital role targeted interventions play in enhancing adolescent mental well-being. This aligns directly with recent evaluations of the Childhood to Livelihood (C2L) initiative, which established that life skills programs yield highly positive impacts on the socio-emotional development, self-efficacy, and resilience of youth (Tagat et al., 2025).[16]

With regard to saliva cortisol assessment, in pretest, the study group (7.43) and control group (6.89) exhibited a small, statistically non-significant difference of 0.54 in saliva cortisol scores. In contrast, the posttest evaluation revealed a large, statistically significant difference of 2.52 between the two research cohorts. The significant reductions in psychological stress align closely with adolescent self-care frameworks that prioritize proactive coping mechanisms. This link is biologically corroborated by Weigensberg et al. (2022), who found

that a group-guided imagery intervention for urban adolescents yielded a 32% drop in salivary cortisol compared to just a 5% decrease in the control group ($p = .05$), alongside a 27%–46% reduction in self-reported stress. Collectively, these findings demonstrate that incorporating mind-body strategies into adolescent self-care effectively mitigates both physiological and psychological markers of stress.[17]

CONCLUSION

The main aim of the pilot study was to identify the reliability of the tool and the feasibility of the study. The pilot study revealed the tool was reliable, and the study is practicable and feasible to carry on with the Mind Body Skills Technique on Stress, Self-care skills, and Saliva Cortisol level. The suggestions of the pilot study will be incorporated into the main study. Overall, the findings confirm that MBST is an effective, feasible, and non-invasive intervention for reducing stress and enhancing self-care and biological stress regulation among adolescents.

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