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Quasi-experimental study to assess the effectiveness of mental health programme on promoting mental health characteristics among adolescents in Coimbatore, India

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ABSTRACT

Introduction: The future and progress of a country is dependent on the children today. The advent of social media has been a double-edged sword by the way it has brought us closer and also resulted in anonymous ways of mental distress to children, which is already being tested by violent school environments and pressure to succeed resulting in the prevalence of different mental illness. Parents and school authorities should ensure that their children grow and thrive in the best and safest environment possible.

Aim: To evaluate the effectiveness of a Mental Health Programme on promoting mental health characteristics among adolescents in a school located in Coimbatore.

Method: A quasi experimental one group pre-test and post-test design was adapted for the study. A sample of 195 students were selected using stratified random proportionate sampling technique and made to answer the pre-test questionnaire followed by the mental health programme intervention. They were then made to answer the post-test questionnaire and the data was analysed. The data collection was initiated on June 2015 and ended on October 2016, the entire process took approximately 48 weeks excluding holidays and examinations.

Result: The pre-test mean score was 8.35 ± 3.02 and the post-test mean score was 26.77 ± 2.94 with a mean gain score of 18.42. The calculated paired 't' produced at value 62.278 which was found to be statistically highly significant ($p < 0.001$).

Conclusion: The results of the present study concluded that the mental health promotion programme was effective in improving the mental health characteristics among adolescent children.

1. Introduction

Mental health problems are a major social issue with consequences ranging from personal distress, disability, reduced labour force participation to wider social and economic impacts.[1] Most mental illnesses manifest during adolescence and have been linked to severe dysfunction and pre-mature death.[2]

Failure of deal with mental health difficulties is a public health issue with numerous lifelong consequences.[3] Literature shows that mental health problems among children and youth is a growing concern with the number of individuals experiencing some form of mental distress increasing exponentially.[4]

Mental health promotion was defined by the WHO as actions to create living conditions and environments that support mental health and allow people to adopt and maintain healthy lifestyles. The prevalence of mental illnesses among children and adolescents is almost 15% globally.[5]

Nearly 50 million children suffer from some form of mental illness at a given point of time in India.[6] Mental health is an immediate concern with the exponential rise in the number of suicides with about 28 suicides reported every day (NCRB 2018 and 2019) and 10,335 students having committing suicide in the year 2019.[7]

Studies conducted throughout India assessing the prevalence of CAMH disorders have shown variations between rural and urban areas. Prevalence of mental disorders among urban area children was found to be nearly double the prevalence among children residing in rural areas.

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The prevalence of mental disorders among children aged 13–17 years was 7.3% according to the National Mental Health Survey 2016. The WHO reported that nearly 2,58,075 Indians committed suicide in 2012 of which a major proportion included students aged between 0 and 19 years.[6] In 2014, the issue of mental health was recognized as one of the six strategic priorities of national adolescent health strategy named Rashtriya Kishor Swasthya Karyakram (RKSK). Although this program is a milestone to improve the overall health of young people nationwide, it has some limitations in addressing mental health issues.[6]

The magnitude of diseases, socioeconomic significance, and gaps in the health system for CAMH are least discussed in the existing national policies and programs in India.[6] To that very end, the present study was implemented with the aim to evaluate the effectiveness of mental health programme on promoting mental health characteristics among adolescents attending a secondary high school in Coimbatore. The study hypotheses states that there will be a significant difference in the pre and post-test level of mental health characteristics among adolescents. There will be a significant association of the post-test level of mental health characteristics with selected demographic variables among adolescents.

2. Methods

The present study was conducted to assess the effectiveness of a mental health programme on promoting mental health characteristics among adolescents in a higher secondary school situated in Coimbatore.

This study utilized a quasi-experimental pre-test: post-test design. Ethical committee approval was received from the Institutional Human Ethics Committee with reference Project No. 12/119. The sample size was estimated using power analysis Comparison of proportion formula.

$$n = \frac{P_1(100 - P_1) + P_2(100 - P_2)}{(P_1 + P_2)^2}(Z_\alpha + Z_\beta)^2$$

The pilot study knowledge score (50%) and expected to increase 15% after training with α-error 5% and power of the study 80%. Estimated sample size was 166 and with 20% dropout rate, final required sample size could be 195.

$P_1 = 50\%$, $P_2 = 65\%$, $Z_\alpha = 1.96$, $Z_\beta = 0.84$, P_1–$P_2 = 15$

$$n = \frac{50(100 - 50) + 65(100 - 65)}{(50 - 65)}(1.96 + 0.85)$$

$$n = \frac{2500 + 2275}{225}(7.84)^2 = 166$$

$$n = \frac{166}{100} \times 20 = 33$$

The sample size was calculated after conducting a pilot study, power analysis revealed need for 166 samples.[8] Expecting a 20% attrition, the investigator selected 199 samples and the final sample size comprised of 195 adolescents who were selected by means of stratified random proportionate sampling technique. This technique involved dividing the participants into homogeneous subgroups (based on year of study) and then taking a proportionate sample from each subgroup, this has been depicted in Fig. 1.

The inclusion criteria required selecting students between the age group of 12–19 years and willing to participate in the study. Students with any emotional or behavioural disorders were excluded from the study.

Data Collection Tool: The tool used for the present study had two parts with part A including demographic data consisting age, sex, class, religion, type of family, living status of parents, caretaker (or) guardian, close friends in school, mass media at home, father's education, mother's education, father's occupation, mother's occupation and income.

Part B included the modified Abraham and Prasanna Mental health

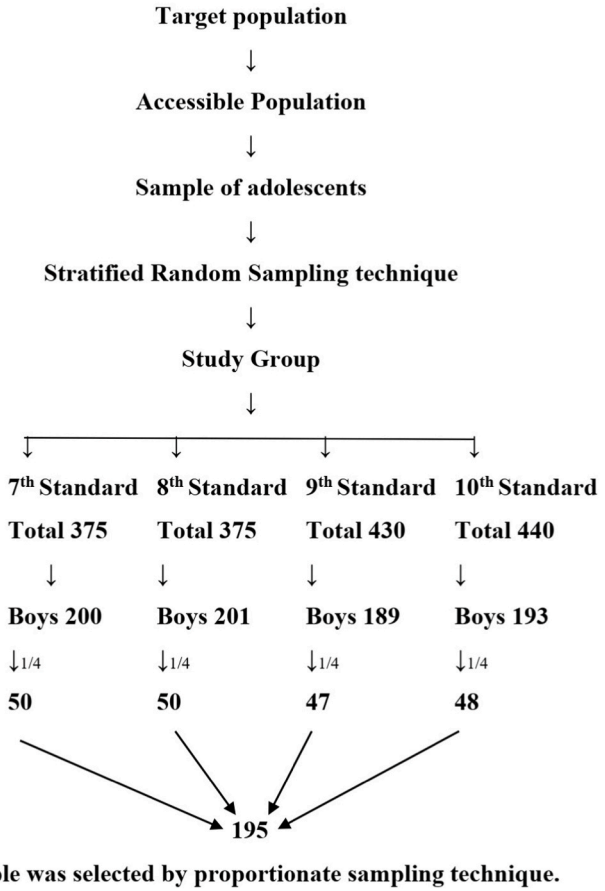

Fig. 1. Schematic representation of Sampling Technique.

status scale[8,9,10] questionnaire which includes Physical, Intellectual, Psychological, Familial and Social dimensions (6 questions each) with responses "YES" or "NO". Score less than 50% was considered inadequate, 51–75% was considered moderately adequate and above 75% was considered adequate.

Intervention: The investigator administered an intervention related to life skill education with 3 components: *COMMUNICATION* component consisted of 6 activities such as you and I statement (assertiveness), contribution in group conversations, see, express and act good listening, verbal and non-verbal communication, body language, mime, drawing together and listening well. *COPING WITH EMOTIONS* consisted of 6 activities such as managing anger, expressing emotions, managing emotions, handling anger, emotion flashcards and understanding anger. *COPING WITH STRESS* consisted of 5 activities such as what happens when stressed, stress snap, coping with stress, my stress journal and how to manage stress through 17 activities. Each activity took 1 h. The activities were provided through audio-visual aids, role play and group discussion. The content was checked for validity and reliability score obtained was r = 0.9 showing high correlation of scores both times. Hence all the tools used were considered reliable.

Data Collection Procedure: Stratified random technique was used to select the samples. The male student population was divided into homogenous subgroups from 7th to 10th grade and then proportionate sample (50% males from each grade) was taken resulting in 195 adolescent male students being selected. The study was explained to the selected students, assent from adolescents and signed parental consent was obtained to participate in the study.

In the first week, pre-test assessment was done. After that, a maximum of 25 adolescents were allotted to individual groups and trained on life skill education components. Intervention was provided to each group for six weeks. The post-test was done after the mental health

programme. The data collection took approximately 48 weeks from June 2015 and was completed on October 2016.

Statistical Analysis: Statistical Package for Social Science (SPSS)/PC + Ver.20 was used to conduct statistical analysis. Data analysis plan included descriptive analysis where frequency and percentage distribution were calculated to analyse the demographic variables. Mean and standard deviation was calculated to analyse the pre and post-test level of mental health characteristics. $p < 0.001$ was considered highly significant and $p < 0.01$ was considered significant.

Inferential Statistics included use of a paired 't' test to compare the pre and level of mental health characteristics. ANOVA/unpaired 't' test being used to associate the selected demographic variables with mean differed level of mental health characteristics and a post -hoc scheffe test was used for multiple comparison of post-test domain-wise mental health characteristics scores and $p < 0.01$ was considered statistically significant.

3. Results

The study included 195 students of which 25.64% belonged to age groups 11–12 and 13–14 years respectively. Majority of the participants (25.64%) were studying in VII and VIII respectively. With respect to religion, 90.77% of participants were Hindus.

Table 1 showed that majority of the participants father's (39.49%) had high school education and 48.72% of the mother's had high school education. With respect to occupation, majority (46%) of the participants fathers were skilled workers and 34% of the mothers were skilled workers. Majority of the participants (82%) belonged to nuclear families. 88% of the participants lived together with their parents. Regarding the caretaker (or) guardian, 100% were parents. With respect to family income, 35.90% were in the income group of 1590–4726 Rs per month. 66.15% of the participants had only one sibling. 57.95% of the participants had more than three friends and 82.05% had a television at home.

Table 2 shows that with respect to the physical domain, the pre-test mean score was 2.40 ± 1.24 and post-test mean score was 6.0 ± 0, the difference was not statistically significant. The intellectual domain showed pre-test mean score of 1.86 ± 0.57 and post-test mean score of 5.25 ± 0.83, this difference was found to be statistically highly significant ($p = 0.000$).

Considering the psychological domain, the pre-test mean score was 1.37 ± 1.22 and the post-test mean score was 5.25 ± 0.83 which was found to be statistically highly significant ($p = 0.000$). The familial domain showed pre-test mean score of 3.95 ± 0.37 and post-test mean score of 5.50 ± 0.50 and this difference was found to be statistically highly significant ($p = 0.000$). With respect to the social domain, the pre-test mean score was 1.24 ± 0.51 and the post-test mean score was 4.74 ± 2.17 showing a difference found to be statistically highly significant ($p = 0.000$).

The overall comparison revealed that the pre-test mean score was 10.82 ± 3.04 and post-test mean score was 26.73 ± 2.95 showing a difference which was found to be statistically highly significant ($p = 0.000$). The above findings clearly proved that the mental health programme administered to adolescents resulted in improved post-test level of mental health characteristics.

From Table 3, it was observed the median (IQR) level of mental health score for the physical dimension is pretest is 3 whereas posttest score is 6.00. Pretest median level for the intellectual dimension is 2^{2-2} while posttest is 5^{4-6} which shows a statistically significant difference ($p = 0.000$). Similarly, the median level for the psychological dimension of pretest is 2.00 (0–2) and posttest level is 5^{4-6} showing a statistically significant difference ($p = 0.000$). The pretest level for the Familial dimension is 4^{4-4} less than when compared to posttest is $5^{5,6}$ the difference between which is statistically significant ($p = 0.000$). The Social dimension shows pretest median level of 1^{1-1} and posttest level of 6^{1-6} showing a statistically significant difference ($p = 0.000$). The median

Table 1
Frequency and percentage distribution of demographic variables of adolescents.

Demographic Variables	N	%
Age		
11–12 years	50	25.64
13–14 years	50	25.64
14–15 years	47	24.10
15–16 years	48	24.62
Class		
VII Std	50	25.64
VIII Std	50	25.64
IX Std	47	24.10
X Std	48	24.62
Religion		
Hindu	177	90.77
Christian	12	6.15
Muslim	6	3.08
Father's education		
Profession or Honors	6	3.08
Graduate or Post graduate	18	9.23
Intermediate or Post High school diploma	6	3.08
High school certificate	77	39.49
Secondary school certificate	42	21.54
Primary school certificate	12	6.15
Illiterate	34	17.44
Mother's education		
Profession or Honors	6	3.08
Intermediate or Post High school diploma	6	3.08
High school certificate	95	48.72
Secondary school certificate	42	21.54
Primary school certificate	18	9.23
Illiterate	28	14.36
Father's occupation		
Profession	12	6.15
Semi-profession	36	18.46
Clerical, Shop-owner, farmer	36	18.46
Skilled worker	87	44.62
Semiskilled worker	24	12.31
Mother's occupation		
Profession	17	8.72
Semi-profession	24	12.31
Skilled worker	65	33.33
Semiskilled worker	42	21.54
Unskilled worker	47	24.10
Type of family		
Nuclear	159	81.54
Joint family	30	15.38
Extended	6	3.08
Living status of the parents		
Staying together	171	87.69
Separated	12	6.15
Widow/Widower	12	6.15
Caretaker (or) Guardian		
Parents	195	100.00
Family income (per month)		
≥31,507	18	9.23
15,754–31,506	17	8.72
11,817–15,753	12	6.15
7878–11,816	18	9.23
4747–7877	18	9.23
1590–4746	70	35.90
≤1589	42	21.54
No. of siblings		
One	129	66.15
Two	54	27.69
Three	12	6.15
Close friends in school		
1–2	18	9.23
3	58	29.74
>3	113	57.95
None	6	3.08
Mass media at home		
Radio	29	14.87
Television	160	82.05
Newspaper	6	3.08

Table 2
Comparison of mean pretest and post-test mental health characteristics score among adolescents.

Factors	Mean (SD) Score Pre-Test	Mean (SD) Score Post Test	p-value[a]
Physical dimension	2.40 (1.24)	6.00 (NA)	NA
Intellectual Dimension	1.86 (0.57)	5.25 (0.83)	0.000
Psychological Dimension	1.37 (1.22)	5.25 (0.83)	0.000
Familial Dimension	3.95 (0.37)	5.50 (0.50)	0.000
Social Dimension	1.24 (0.51)	4.74 (2.17)	0.000
Overall score	**10.82 (3.04)**	**26.73 (2.95)**	**0.000**

[a] Significant value for paired *t*-test for Pre and Post total scores; NA-not applicable.

level of mental health score for the overall dimension of pretest is 12[8–12] which was lower than then the posttest median of 27 (22–28) which infers a statistically significant difference between the median of overall dimension pre-test and posttest scores ($p = 0.000$).

Table 4 was used to evaluate for an association between mean differed knowledge score and demographic variables. ANOVA/unpaired 't' value F = 9.2** was calculated for age and class inferring that there was a significant association ($p < 0.01$) between knowledge and these variables. Variables such as religion, father's education, mother's education, father's occupation, mother's occupation, type of family, living status of parents, presence of caretaker (or) guardian, family income, no. of siblings, close friends in school and mass media at home did not show an association with the mean differed score of mental health characteristics among adolescents.

4. Discussion

Effective and quality school mental promotion has been connected to improved academic accomplishment and competence, decline in occurrence of problem behaviours, increased number of relationships that encompass each child, and meaningful, positive changes in school environments.[8] Toward that end, the present study was aimed at assessing the effectiveness of mental health programme on promoting mental health characteristics among adolescents in a school situated in Coimbatore.

With regard to the demographic data collected, majority participants (39.49%) had fathers with high school certificate and 48.72% had mothers with high school certificates. Literature has shown that low parent education level has been associated with child abuse which can adversely affect the mental health of a child, low education of father increased odds of physical and emotional abuse but odds of physical abuse and neglect were lower if mothers were housewives which is related to their educational levels.[11,12] With regard to parent occupation, 46% participants had fathers who were skilled workers and 34% had mothers who were skilled worker. The odds of suffering physical abuse and neglect were reduced when mothers were homemakers, this was probably due to the continuous attention and deeper bond by added duration of contact.[11] A large majority of participants (82%) belonged to nuclear families and 88% of the participants had parents who were living together. This is important as previous studies have reported that physical abuse was more common in families with disturbed environment which can include families with separated parents.[11] A majority of participants (35.90%) belonged to families with an income between 1590 and 4726 Rs per month. Low income could be associated with increased chances of mental illness due to it being related to low parent education level and type of occupation.[13] Of all study participants, 57.95% had more than three friends in the school, increased number of relationships can help with improved mental health status.

The first objective of the present study was to evaluate the mental health characteristics among adolescents. The analysis of pre-test level of mental health revealed that all the study participants had an inadequate level of mental health characteristics. The results of this study are in agreement with a randomized controlled trial conducted by Yamaguchi S et al. which evaluated the effects of a Short Mental Health Literacy Program (SMHLP) among adolescents among high school students. The pre-test knowledge scores for the intervention and control group were 4.4 and 4.3 which were insufficient and increased exponentially during post-test and 2 month follow up. The intervention in the study conducted by Yamaguchi S et al. was reduced to a single 50-min session due to tight school schedules. The SMHLP also had teacher providing intervention which is very cost effective and easily manageable when compared to that of the present study.[14]

The second objective was to evaluate the effectiveness of mental health programme on mental health characteristics among school going adolescents which represented the second hypothesis mentioned in the study. A comparison of pre-test and post-test mean and median with respect to all the included dimensions was made and showed that the intellectual, physiological, familial and social dimensions had a highly significant difference between the pre and post-test scores ($p = 0.000$) while the physical component did not show any significant difference. However, the overall comparison between the pre-test and post-test revealed that the post-test mean score had significantly increased from the pre-test mean score and this difference was statistically highly significant ($p = 0.000$).

These results are in agreement with a study conducted by Campos L et al., in 2018 which evaluated the effectiveness of a School-Based Mental Health Literacy Promotion Program among 12–14-year-old children. The results showed that the participants in the experimental group had significantly higher gains compared to the control group, both in the global score and in all individual Mental Health Literacy questionnaire dimensions proving that the program was effective through to follow-up after 6 months.[4] The intervention used by the authors was of a combined 180 min (two 90-min sessions) which is significantly lower than the duration of intervention in the present study. The study also had a follow up of 6 months which helped evaluate the long-term effect of the study.

The results of the present study are comparable to that of a study conducted by Yamaguchi S et al. to assess to effectiveness of a classroom-based mental health literacy educational intervention to promote knowledge and help-seeking/helping behaviour in adolescents. The

Table 3
Comparison of median total score before and after intervention for all level of dimensions.

Factors	Median (IQR) Total Score Pre-Test	Median (IQR) Total Score Post Test	Z	p-value[a]	Correlation[#] (rho)	p-value[##]
Physical dimension	3 (1–3)	6 (6–6)	−12.314	0.000	NA	NA
Intellectual Dimension	2 (2–2)	5 (4–6)	−12.254	0.000	0.057	0.428
Psychological Dimension	2 (0–2)	5 (4–6)	−12.168	0.000	−0.024	0.741
Familial Dimension	4 (4–4)	5 (5,6)	−12.396	0.000	0.043	0.552
Social Dimension	1 (1–1)	6 (1–6)	−11.304	0.000	0.004	0.951
Overall score	**12** (8–12)	**27 (22–28)**	**−12.132**	**0.000**	**0.043**	**0.548**

[a] Significant value for Wilcoxon signed rank test for Pre and Post total scores; #Spearman rho correlation was performed for Pre and Post total scores; ## significant value (p-value) at 5% level for Spearman rho correlation.

Table 4
Association of mean differed score of mental health characteristics among adolescents with their selected demographic variables such as age, class, religion, father's education and mother's education.

Demographic Variables	No.	Mean Imp.		ANOVA/Unpaired 't' Value
		Mean	**S.D**	
Age				F = 9.2** p < 0.01
11–12 years	50	16.98	4.57	S
13–14 years	50	17.06	3.58	
14–15 years	47	19.46	3.63	
15–16 years	48	20.31	3.65	
Class				F = 9.2** p < 0.01
VII Std	50	16.98	4.57	S
VIII Std	50	17.06	3.58	
IX Std	47	19.46	3.63	
X Std	48	20.31	3.65	
Religion				F = 0.863 p = 0.4
Hindu	177	18.29	4.12	N.S
Christian	12	19.41	4.39	
Muslim	6	20.00	3.79	
Father's education				F = 0.439 p = 0.9
Profession or Honors	6	18.16	5.56	N.S
Graduate or Post graduate	18	17.83	4.56	
Inter/Post High school diploma	6	16.50	4.23	
High school certificate	77	18.70	3.97	
Secondary school certificate	42	18.50	4.13	
Primary school certificate	12	17.58	4.27	
Illiterate	34	18.67	4.13	
Mother's education				F = 0.534 p = 0.8
Profession or Honors	6	16.83	3.37	N.S
Inter/Post High school diploma	6	16.50	4.23	
High school certificate	95	18.51	4.19	
Secondary school certificate	42	18.45	4.18	
Primary school certificate	18	18.22	3.82	
Illiterate	28	18.92	4.28	
Father's occupation				F = 0.160 p = 0.9
Profession	12	17.83	3.68	N.S
Semi-profession	36	18.33	4.65	
Clerical, Shop-owner, farmer	36	18.52	3.98	
Skilled worker	87	18.35	4.08	
Semiskilled worker	24	18.91	4.17	
Mother's occupation				F = 0.299 p = 0.8
Profession	17	18.58	4.69	N.S
Semi-profession	24	17.58	4.73	
Skilled worker	65	18.49	4.06	
Semiskilled worker	42	18.69	4.11	
Unskilled worker	47	18.44	3.81	
Type of family				F = 0.380 p = 0.6
Nuclear	159	18.54	4.07	N.S
Joint family	30	17.83	4.23	
Extended	6	18.16	5.56	
Living status of the parents				F = 0.345 p = 0.7
Staying together	171	18.50	4.18	N.S
Separated	12	17.58	4.27	
Divorce	–	–	–	
Widow/Widower	12	18.00	3.35	
Caretaker (or) Guardian				–
Parents	195	18.42	4.13	
Family income (per month)				F = 0.968 p = 0.4
≥31,507	18	9.23	4.49	N.S
15,754–31,506	17	8.72	3.14	
11,817–15,753	12	6.15	4.20	
7878 - 11,816	18	9.23	3.98	
4747–7877	18	9.23	4.13	
1590–4726	70	35.90	4.31	
≤1589	42	21.54	4.03	
No. of siblings				F = 0.318 p = 0.7
One	129	66.15	4.11	N.S
Two	54	27.69	4.17	
Three	12	6.15	4.37	
Close friends in school				F = 0.402 p = 0.7
1–2	18	9.23	3.95	N.S
3	58	29.74	4.53	
>3	113	57.95	3.88	
None	6	3.08	5.56	
Mass media at home				F = 0.194 p = 0.8
Radio	29	14.87	4.11	N.S
Television	160	82.05	4.10	
Newspaper	6	3.08	5.56	

proportion of participants in the intervention group who answered correctly was significantly increased post-intervention when compared to the pre intervention test, which was significantly more than the control group.[14]

Results of this study are also similar to that of a study conducted by Viskovich S which assessed the effectiveness of web-based Acceptance and Commitment Therapy (ACT) program to promote mental health in university students. It concluded that when compared to a control group, intervention was associated with improved mental health skills such as acceptance, defusion, valued living, and present moment awareness, which show potential in improving well-being, self-compassion, life satisfaction, distress, and academic performance. The study differs from the present study due to participants having a mean age of 28.85 years but it can be inferred that a mental health intervention would be effective even during adulthood.[15]

The results of this study are also in agreement with a systematic review conducted to assess the effectiveness of interaction-based interventions in schools and communities in children's and adolescents' mental health. The study included 11 studies and concluded that interactive mental health interventions have a positive effect on the mental health of children and adolescents, both in decreasing internalizing and externalizing symptoms, and in promoting personal wellbeing.[16]

The third objective was to associate the mental health characteristics among adolescents with selected demographic variables represented by the second hypothesis of the present study. The results showed a statistically significant association between mean differed knowledge score and selected demographic variables such as age and class. Other demographic variables such as religion, father's education, mother's education, father's occupation, mother's occupation, type of family, living status of parents, presence of caretaker (or) guardian, family income (per month), no. of siblings, close friends in school and mass media at home did not show an association with the mean differed score of mental health characteristics.

According to a previous study, it was observed that the students attending the ninth year had, on average, higher gains than students attending the seventh year which is similar to the results of the present study. This indicates that higher age is associated with better assimilation of mental health knowledge due to better understanding. The study also compared variables like participants knowing people with mental health problems to show association with mental health aspects. An individual who knows someone suffering mental illness can be more receptive of improving knowledge on the topic due to observed experience.[4]

The present study was not without any limitations, the study was conducted during student vacation period and session duration was limited to 45 min/session resulting in reduced interaction time with participants therefore increasing study period. The intervention duration was also found to be excessive when compared to other programmes.[4,14,15] The strength of the present study lied in the inclusion of participants from the same school resulting in no dropouts during the course of the study. The implementation of mental health programmes in a more effective and interactive manner as well as permanent inclusion into school curriculum can help improve the mental health of schoolchildren.

Schools are places where children spend most of their time other than human during the educative years of their lives and must play a role in helping them safeguard their mental health. In India, initiatives have

been inadequate at addressing the mental health epidemic in the child and adolescent population. The results of the present study revealed that the overall pre-test mean score was 10.82 ± 3.04 and post-test mean score was 26.73 ± 2.95 and this increase in score was found to be statistically highly significant. This shows that the study intervention was found to be effective in improving mental health characteristics. The study also validated the fact that there exists significant association of mean differed score of mental health characteristics with selected demographic variables among adolescents.

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Research data for this article

The data will be made available by the corresponding author upon reasonable request.

Declaration of competing interest

No conflict of interest to be disclosed.

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