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Original article

Mental health parameters of adolescents during COVID-19 Pandemic, an era of compulsory online education in India

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ABSTRACT

Background: COVID-19-Pandemic Lockdowns initiated online teaching-learning in India. We aimed to assess mental health (MH) of adolescents studying online for academic milestone of matriculation during these circumstances.

Material & Methods: It was a cross sectional study carried out in Western Maharashtra, during 2021. MH of study subjects was assessed by presence and severity of symptoms of depression, anxiety, stress (DAS) and emotional intelligence (EI). They were measured by DAS Scale-42 (DASS-42) and Schutte's self-report EI test (SET) respectively with collection of socio-demographic information maintaining confidentiality. Data were analysed by SPSS-20 software. MH parameters were compared with pre-pandemic pilot and other studies to study effect of online education and overall COVID-19 Pandemic scenario on MH of study subjects.

Results: Total 1162 adolescents participated, out of which 59 were omitted from the analysis due to incomplete data. Out of remaining 1103 participants, 43% boys & 57 % girls with the mean age of 14.69 ($\pm$0.78) years. Majority of them belonged to middle socio-economic-status. Mean DAS and EI scores denoted mild anxiety with no evidence of depression and stress. Mean EI score was in normal range. Mean DAS scores were significantly lower and mean EI score was significantly higher than reported in -pandemic pilot and other studies.

Conclusion: MH derangement of matriculating adolescents during COVID-19- Pandemic with online education seemed to be less severe than that was in pre-pandemic times with in-class education.

Recommendations: MH support at schools needs to be strengthened. During the post-COVID-19 period, online school education may be continued in LMIC like India on the basis of willingness of students and parents but with caution and understanding of socio-cultural background and support.

Key words: DAS (Depression, Anxiety, Stress), Emotional Intelligence, Adolescents, Mental health, Mental health derangements

INTRODUCTION

COVID-19-Pandemic affected lives all over the globe in an unexpected manner.[1] Fear and anxiety about COVID-19 along with drastic changes in lifestyles, led to deranged mental health (MH) in all the segments of population.[2] It was more in low-&-middle-income-countries (LMIC).[3]

In India, one in twenty individuals suffered consequences of depression with roots being in adolescence that is in 11 to 19 years of age.[4] Adolescents make 19.6% of Indian population[5] with highest rate of suicide in 16 to 18 years age group. Hence, it is important to address and restrict MH derangements in adolescents.

COVID-19 Lockdowns closed schools and play grounds. School education was being continued by adopting online teaching-learning modes which were never utilized by majority of students in LMIC. In India, secondary school (SS) education is completed in mid-to-late adolescence by matriculation[2] which is considered as crucial academic milestone. During this period natural stresses of adolescence are superadded with considerable academic stress, societal pressure and with COVID-related stressors during the Pandemic time which can affect their MH.[5,6] It is needed to be studied for decision making related to continuation of online education. With this background, present study was planned to study MH parameters of

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adolescents studying online for matriculation during COVID-19-Pandemic and to compare them with pre-pandemic status quo.

METHODOLOGY

It was a cross sectional study carried out during COVID-19-Pandemic from March to NOV 2021 in one of the Municipal Corporations located in Western part of Maharashtra state of India.

Adolescents studying to appear for Secondary School Certificate examination (SSC) for matriculation served as study population. Fifty secondary schools in study area following State Board Syllabus pattern were randomly selected. Assuming 54% expected proportion of symptoms of depression, at 95% confidence level, 5% allowable error, calculated sample size was 1363.[7] Study was preceded by IEC approval, all due permissions, consents, assents and pilot study in Feb 2020 on 45 participants in the same age group, just before declaration of COVID-19-as Global Pandemic. Necessary socio-demographic information was collected maintaining the confidentiality. Students not attending online teaching were excluded from the study.

Asseement of MH parameters of study subjects

MH parameters of study subjects were assessed by using DASS-42 (Depression, Anxiety, Stress Scale of 42 items) and Schutte's self-report Emotional Intelligence Test (SET) to be self-reported on Likert scales. DASS-42 assessed presence and severity of symptoms of depression, anxiety, stress (DAS) and SET [8] assessed EI. Their summative scores were interpreted as given in Table 1 as per instructions of their inventors.[9,10] Conventionally, as DASS scores increase, severity of the symptoms of DAS increases. And, as EI score increases, EI increases which is taken as well and good.

Data Collection

DASS-42 & SET were translated in local language. After their pre-testing & validation they were sent along with study information, consent and assent forms to the students by respective class teachers using ongoing online teaching- learning mode.

Statistical analysis

Data were entered in MS-Excel and analysed with SPSS 20.00 (IBM) software. Associations were assessed by Chi-squared test, one sample Student's 't' test after enlisting frequencies & proportions Corelations were assessed by Pearson's corelation-coefficient. For all, significance level (p) was assigned at ≤ 0.05.

RESULTS

Characteristics of study participants

Total 1103 students participated; boys & girls were 42.9% (473/1103) & 57.1% (630/1103) respectively. Mean age was 14.7 ($\pm$0.75) years. And, 23.1% (255/1103), 62.2% (686/1103) & 14.7% (162/1103) were from low, middle & upper socio-economic status (SES) respectively.

In pre-pandemic pilot study with in-class school education, 45 adolescents participated with 69.6% boys & 30.4% girls. Mean age was 14.42($\pm$0.64) years.

MH parameters of study participants

Mean DAS & EI scores & their categorization is shown in Table 2. As in Table 3, majority, had no evidence of symptoms of DAS. Proportion of students with symptoms of anxiety was relatively more. It was 46.1% as compared to 26.7% & 30% with depression & stress respectively. Majority, 62.6% (664/1060) had Normal EI, while 9.8% participants had low EI & 17.5% of the participants had high EI.

Comparison with Findings from Pre-pandemic pilot study with in-class school education Mean DAS scores had higher categories in pre-pandemic pilot study (Table 2) with significantly higher proportion of adolescents with severe to extremely severe DAS (Table 3). Proportions of adolescents without any symptoms of DAS were significantly high ($p<0.0001$) in present study than in pre-pandemic pilot study (Table 3).

EI score was significantly lower in pre-pandemic pilot study with significantly higher proportion of adolescents with low EI as compared to present study (Table 2).

Secondary findings

DAS scores had strong positive corelation with each other in present as well as pre-pandemic pilot study with corelation coefficients, $r > 0.7$, at $p<0.0001$. DAS scores were on higher side for girls than boys without significant statistical difference ($p=0.880, 0.696, 0.923$ respectively).

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Table 1: Categorization of Scores of DAS & EI

	No Evidence	Mild	Moderate	Severe	Extremely severe
Depression	**0–9**	**10–13**	**14–20**	**21–27**	**≥ 28**
Anxiety	**0–7**	**8–9**	**10–14**	**15–19**	**≥ 20**
Stress	**0–14**	**15–18**	**19–25**	**26–33**	**≥ 34**
EI	**Low**	**Normal**	**High**		
	<110	**111-137**	**>137**		

Table 2: DAS & EI Scores Present study (PS) during Pandemic & Pre-pandemic pilot (PP) study

Score for	Present study during Pandemic (N=1103)		Pre-pandemic pilot (PP) study (N=45)		t value	P (two tailed)
	Mean	SD	Mean	SD		
Depression	**7.12 (No evidence)**	**6.927**	**15.2 (Moderate)**	**9.360**	**-38.732**	**<0.0001**
Anxiety	**8.09 (Mild)**	**6.784**	**16.04 (Severe)**	**8.623**	**-38.939**	**<0.0001**
Stress	**10.95 (No evidence)**	**7.25**	**16.20 (Mild)**	**8.264**	**-24.063**	**<0.0001**
Emotional Intelligence	**123.14 (Normal)**	**16.42**	**111.98 (Normal)**	**21.708**	**22.132**	**<0.0001**

TABLE 3: Categories of DAS in Present study (PS) during Pandemic & Pre-pandemic pilot (PP) study

Categories		No Evidence	Mild	Moderate	Severe	Extremely severe	Total
Depression n (%)	**PS**	**808 (73.3)**	**115(10.4)**	**111 (10.1)**	**52 (4.7)**	**17 (1.5)**	**1103 (100)**
	PP	**15 (33.3)**	**4 (8.9)**	**9 (20.0)**	**13(28.9)**	**4 (8.9)**	**45 (100)**
	p < 0.00001						
Anxiety n (%)	**PS**	**595 (53.9)**	**125 (11.3)**	**178 (16.1)**	**127 (11.5)**	**78 (7.1)**	**1103 (100)**
	PP	**7 (15.6)**	**4 (8.9)**	**8 (17.8)**	**10 (22.2)**	**16 (35.6)**	**45 (100)**
	p < 0.00001						
Stress	**PS**	**772 (70.0)**	**151(13.7)**	**147 (13.3)**	**29 (2.6)**	**4 (.4)**	**1103(100)**

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n (%)							
	PP	**19 (42.2)**	**5 (11.1)**	**15 (33.3)**	**5 (11.1)**	**1 (2.2)**	**45 (100)**
	p < 0.00001						

DISCUSSION

Present study investigated MH parameters of adolescents undergoing matriculation utilizing online teaching-learning modes for education. We observed that they had lower DAS & higher EI scores than pre-pandemic pilot and previous studies in the same study area. [3,7,11] Major change from in-class school education to online school education did not affect their MH adversely.

Pilot study carried out during Pre-pandemic period showed much deranged MH when in-class teaching-learning was the routine. Similarly, Shaikh MB et al, in 2018, well before Pandemic in the same study area, reported quiet higher proportion of adolescents with DAS symptoms as 54%, 60% and 44% respectively as compared to what we observed at lower level as 26.7%, 46.1%, 30.0% respectively.[7] Similarly, it was much lower than our pre-pandemic pilot study wherein they were 66.70%, 84.4%, 57.8% respectively.

EI is known to be associated with overall MH and improves adolescents' resilience which protects against school burnout and anxiety.[12] It also predicts adaptation to newer life circumstances like lifestyle changes during COVID-19-Pandemic.[13] Pre-pandemic pilot study showed lower EI with higher DAS while present study with online education showed higher EI with lower DAS scores. Increased time spent with family in COVID-19-Pandemic scenario may also had influenced positively on EI.[14]

Thus, MH parameters of adolescents studying for matriculation during COVID-19 Pandemic Lockdowns, an era of compulsory online education in India, signify positive effect of online teaching on their MH. Though our findings are not coherent with some studies during COVID-19-pandemic [15-16], they are somewhat coherent with reports by Yu-Hsiu Chu who found no significant changes in psychological distress and life stress due to online educational modes among 181 Taiwanese University students.[17] Contradictory to report by Shepherd et al[14], some students in our study reported that they were more comfortable with online teaching activities than attending schools. But online education may prove to be a risk factor for early obesity and need simultaneous health promotional measures to prevent it. Yu-Hsiu Chu et al also observed drastic ($p < 0.05$) reduction in physical activity during online learning period specially among male students.[17]

There was a strong corelation among depression, anxiety and stress scores. Minimizing stress and anxiety may help to decrease incidence of depression & consequent MH disorders. In consistency with previous studies, DAS scores were more among girls than boys.[18,8] Generalizability of the results is restricted to matriculating adolescent population in study area. Comparison group of pre-pandemic pilot study had smaller sample size (n=45). But it provided directly comparable pre-COVID-19 baseline for same parameters of MH as under present study and such comparisons are not reported before. Studies with larger sample size in both groups are recommended. As data is self-reported, response bias may exist. We could not reach adolescents who did not have access to online teaching. It will need different study designs.

From India, there is hardly any study analysing in depth DAS & EI scores as well as their categorization with large sample size as in present study which enhanced the power of the study. It may be the first study on its own in LMIC to investigate the MH of only matriculating adolescents who are in crucial stage of academic development with the comparison of the same in pre-Pandemic times.

We recommend online education for matriculation to be continued partially, especially for theoretical sessions, based on willingness of students and their parents but with caution and taking into consideration socio-economic and socio-cultural aspects in LMIC in post-COVID-19 period also. At the times of in-class learning, school environments should facilitate mental & emotional well-being of the students. School MH program and support needs to be strengthened to limit DAS among adolescents studying for matriculation.

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