

Evaluation of Mental Health among School-going Children during COVID-19 Pandemic in Bankura Town, West Bengal, India: A Cross-sectional Study

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ABSTRACT

Introduction: The Coronavirus Disease-2019 (COVID-19) pandemic has wreaked havoc around the world, causing serious mental health implications, especially among school-going children who are most vulnerable. The pandemic has had a devastating effect on the mental health and well-being of children, with long-lasting consequences. The present study aims to understand the mental health problems, psychological well-being, and demands of school-going children. Additionally, it seeks to identify any factors associated with poor mental health status and psychological well-being during the COVID-19 pandemic and the post pandemic situation. The findings will contribute to early identification and appropriate management or referrals for mental health issues.

Aim: To assess the mental health status of school-going children aged 11 to 17 years during the COVID-19 pandemic and identify factors associated with poor mental health status in this group.

Materials and Methods: A school-based cross-sectional study was conducted in Secondary and Higher Secondary schools of Bankura Town, West Bengal, India, from June 2021 to September 2021. Four schools were included in the study using simple random sampling technique, with a total of 54 school-going children per school of class VI to XI (nine students per class) included via simple random sampling. Data were collected using an interview guide in the form of a structured questionnaire on Google Forms. The data of 217 children

(one additional student responded) was collected using the Paediatric Symptoms Checklist-17 (PSC Y-17) and the Centre for Epidemiological Studies Depression Scale for Children (CES-DC). Categorical variables were expressed as percentages, and continuous variables were expressed as mean (\pm SD). The association between dependent and independent variables was examined using the Chi-square (χ^2) test, with a significance level of $p < 0.05$.

Results: The mean age of the study participants was 13.67 ± 1.76 years, with 169 (77.88%) male students and 48 (22.12%) female students. The prevalence of depressive symptoms according to CES-DC was 121 (55.76%), while the prevalence of psychological impairment according to PSC Y-17 was 39 (17.97%). Significant associations were found between death due to COVID-19 {5 (2.3%), $p < 0.0001$ }, hospital admission due to COVID-19 was {25 (11.52%), $p < 0.0001$ }, job loss due to COVID-19 was {31 (14.28%), $p = 0.025$ } and having a health worker in the family with poor mental health status {18 (8.29%), $p < 0.0001$ }. These factors were found to be associated with the participants' poor mental health status.

Conclusion: The present study revealed a substantial proportion of participants experiencing psychological impairment and depressive symptoms. It emphasises the need for proactive efforts to support the mental health and well-being of school-going children through educational campaigns and psychological support programmes.

Keywords: Adolescents, Anxiety, Coronavirus disease-2019, Depression, Psychological impairment

INTRODUCTION

Globally, it is estimated that 14% of 10-19 years old experience mental health conditions yet these remain largely unrecognised and untreated [1]. It is estimated that 3.6% of 10-14 years old and 4.6% of 15-19 years old experience an anxiety disorder. Depression is estimated to occur among 1.1% of adolescents aged 10-14 years and 2.8% of 15-19 years old. Attention Deficit Hyperactivity Disorder (ADHD), characterised by difficulty in paying attention, excessive activity, and acting without regard to consequences, occurs among 3.1% of 10-14 years old and 2.4% of 15-19 years old [1]. Conduct disorder, involving symptoms of destructive or challenging behaviour, occurs among 3.6% of 10-14 years old and 2.4% of 15-19 years old [1]. Behavioural disorders can affect adolescents' education, and conduct disorder may result in criminal behaviour. Worldwide, the prevalence of heavy episodic drinking among adolescents aged 15-19 years was 13.6% in 2016, with males most at risk of suicide, which is the fourth leading cause of death in older adolescents (15-19 years) [2]. Risk factors for suicide are multifaceted and include harmful use of alcohol, childhood abuse, stigma against

help-seeking, barriers to accessing care, and access to means of suicide [1]. A study showed that the prevalence of depression in India varies from 14.5% to 18% [3]. School-going children are the future of the nation. Restricted social interaction may affect children's developing brain. During the COVID-19 pandemic, there was an unanticipated change in the learning environment. This can have short-term as well as long-term impacts on the mental health of children and adolescents [4]. India has the largest (253 million) number of adolescents, comprising around one-fourth of the country's population [5]. Adolescence is the most vulnerable phase in the path of the human life cycle, characterised by rapid growth and development with a transition from childhood to adulthood [1,6]. In this transition, their mental health and well-being may have a further impact due to the current pandemic crisis. Due to the closure of schools during the pandemic, there was a deviation from the normal daily routine of the children. Schools play a very important role in developing social, mental, and physical milestones. During school closures, children had to spend more time at home without face-to-face interaction with their peer groups or friends. Normal outdoor

playtime was hampered due to the imposed lockdown. All these interruptions in routine life might have an influence on the mental health of the school-going children [7,8]. It is essential to assess the status of mental health and well-being of children and adolescents during the COVID-19 pandemic. No study was done in the past to assess the impact of the COVID-19 pandemic on the mental health of school-going children in Bankura town. With this background in mind, the present study was conducted to assess the mental health status of school-going children aged 11 to 17 years in Bankura town and to identify any factors (identified by literature review) associated with poor mental health status in those children.

MATERIALS AND METHODS

The present study was a school-based cross-sectional study conducted in Secondary and Higher Secondary Schools of Bankura town, West Bengal, India for a duration of four months (from June 2021 to September 2021). The study population consisted of school-going children aged 11 to 17 years, belonging to class VI to XI. The study was conducted after obtaining approval from the Institutional Ethics Committee of Bankura Sammilani Medical College and Hospital. The ethics clearance number was BSMC/Aca: 2160. Confidentiality and anonymity were maintained, and telephonic informed verbal assent and consent were obtained from the children and their parents, respectively.

Sample size calculation: The sample size was calculated using the formula $n=(Z^2 \times pq)/L^2$. Here, n represents the sample size, p represents the prevalence of health problems among school-age children (0.16) [3], q represents 1-p (0.84), Z represents the value for the desired confidence interval (1.96 for a 95% confidence interval, two-tailed), and L represents the absolute error (0.0726). By substituting the values, the sample size was calculated as follows:

$$n=1.96^2 \times 0.16 \times 0.84 / (0.0726)^2 = 97.96 \approx 98$$

Since the study followed multistage sampling, a design effect of 2 was considered, resulting in a revised sample size of 196. Assuming a 10% non response rate, the final sample size was adjusted to $196 + 19.6 = 215.6 \approx 216$.

There were 22 secondary/higher secondary schools functioning in Bankura Town. Four secondary/higher secondary schools were included in the present study using a simple random sampling technique. A total of 54 ($6 \times 9 = 54$) school-going children from class VI to XI per school were included in the study using a simple random sampling technique (9 students per class). The final sample size included in the study was $54 \times 4 = 216 + 1 = 217$ (1 additional student responded), which were selected using the enlisted school-going children's names in the register of those schools as a sampling frame.

Inclusion and Exclusion criteria: The inclusion criteria were based on obtaining consent to participate in the study. Informed consent was obtained from the parents of the children by describing the aim of the study through a Google form (due to the lockdown). The exclusion criteria were a history of serious psychiatric illness (such as manic attack, major depression, etc.).

Study Procedure

WhatsApp groups were created for the dissemination of Google Forms to the selected school children. The structured questionnaire was sent via WhatsApp to collect the responses of the children within four hours of dissemination. The study tools used were self-administered structured Google Form questionnaires. Section-I of the questionnaire contained socio-demographic and individual characteristics of the children. Section-II contained the Paediatric Symptom Checklist-17 (PSC Y-17) [9,10].

It consists of a total of 17 questions, with each response scored as follows: 0="A Little", 1="Some", 2="A Lot". Scores range from 0 to 34, and a score of ≥ 15 is considered psychologically impaired.

The subscales include the internalising problems subscale, where a score ≥ 5 signifies impairments with anxiety or depression [9,10]; the externalising problems subscale, where a score ≥ 7 signifies problems with conduct [9,10]; and the attention problems subscale, where a score ≥ 7 signifies impairments in attention [9,10].

Section-III of the questionnaire contained the Children's Depression Rating Scale (CES-DC) [11,12]. It consists of a total of 20 questions, with scores ranging from 0 to 60. A score >15 signifies levels of depressive symptoms.

The questionnaire was pretested by administering the questions to a small number of representative samples. Necessary modifications were made based on their responses. The questionnaire was then translated into Bengali by a subject expert, Ms. Mitu Majumder (Bengali MA). It was translated back into English, and the retranslated English version was compared with the originally developed English questionnaire for necessary modifications. The English questionnaire was then translated back into Bengali. The final Bengali version of the questionnaire was constructed to ensure semantic equivalence with the original English questionnaire. Additionally, utmost care was taken to make the language as simple as possible so that the respondents could easily understand the questions.

The Bengali validated version of the Paediatric Symptom Checklist-17 (Cronbach's Alpha 0.692) and the Bengali validated version of the Children's Depression Rating Scale (Cronbach's Alpha 0.906) showed good internal consistency, as calculated during the pretesting phase of the study.

Factors considered for poor mental health, based on the literature review, included having family members who are health workers, any family member experiencing job loss due to COVID-19, any hospital admission due to COVID-19, or death due to COVID-19. The socio-demographic variables taken into account were age, sex, type of family, whether residing with parents, and socio-economic status [13].

STATISTICAL ANALYSIS

The data were entered into a Microsoft excel spreadsheet and checked for consistency. Data were analysed using principles of descriptive and inferential statistics by Microsoft excel and Statistical Package for Social Sciences (SPSS) version 20.0. Categorical variables were expressed as percentages, and continuous variables were expressed as mean (\pm SD). A normality test was conducted using both the Kolmogorov-Smirnov and Shapiro-Wilk tests. The results indicated that the dependent variables were non normally distributed. Bivariate associations between the dependent and independent variables were examined using the Chi-square (χ^2) test and Fisher's-exact test. A significance level of $p < 0.05$ was considered statistically significant.

RESULTS

The mean age of the study participants was 13.67 ± 1.76 years, ranging from 11 to 17 years. Among the study participants, 114 (52.53%) were middle adolescents, 169 (77.88%) were males, 120 (55.30%) belonged to nuclear families, 188 (86.64%) resided with their parents, and 89 (41.01%) belonged to class III socio-economic status, according to the Modified B.G. Prasad Scale updated for 2021 [Table/Fig-1] [13].

According to the PSC Y-17, scale, 39 (17.97%) of the study participants were psychologically impaired. In terms of the internalising problems subscale, 48 (22.12%) of the study participants had impairments related to anxiety or depression. Regarding the externalising problems subscale, 15 (6.91%) of the study participants had conduct problems. In terms of the attention problems subscale, 24 (11.06%) of the study participants had attention problems [Table/Fig-2].

According to the CES-DC scale, the majority of the study participants, 121 (55.76%) had depressive symptoms [Table/Fig-3].

Distribution of study participants according to age (N=217)			
Variables		Number of students	Percentage
Age	Early adolescent (11 to 13 years)	103	47.47
	Middle adolescent (14 years to 17 years)	114	52.53
	Total	217	100.00
Distribution of study participants according to gender (N=217)			
Gender		Number of students	Percentage
Gender	Male	169	77.88
	Female	48	22.12
	Total	217	100.00
Distribution of study participants according to type of family (N=217)			
Type of family		Number of students	Percentage
Type of family	Nuclear	120	55.30
	Joint	97	44.70
	Total	217	100.00
Distribution of study participants according to living status (N=217)			
Living status		Number of students	Percentage
Living status	With parents	188	86.64
	Hostel/ite (Mess/Hostel)	28	12.90
	With husband (Married)	*1	0.46
	Total	217	100.00
Distribution of study participants according to socio-economic status (N=217)			
Socio-economic class		Number of students	Percentage
Socio-economic class	I	32	14.75
	II	64	29.49
	III	89	41.02
	IV	30	13.82
	V	2	0.92
	Total	217	100.00

[Table/Fig-1]: Distribution of study participants according to socio-demographic characteristics (N=217). (*The study subject was married)

Score	Number of students	Percentage
<15 (Normal)	178	82.03
≥15 (psychologically Impairment)	39	17.97
Internalising problems subscale		
Score	Number of students	Percentage
<5	169	77.88
≥5	48	22.12
Externalising problems subscale		
Score	Number of students	Percentage
<7	202	93.09
≥7	15	6.91
Attention problems subscale		
Score	Number of students	Percentage
<7	193	88.94
≥7	24	11.06

[Table/Fig-2]: Distribution of study participants according to the Paediatric Symptom Checklist-17 (PSC Y-17) score and PSC Y-17 score subscale (N=217).

There were no significant associations between socio-demographic characteristics and PSC Y-17 scale score categories ($p>0.05$). However, there were significant associations between the study participants' age group (early adolescent vs. middle adolescent) ($p=0.002$) and socio-economic status (I, II, III vs. IV, V) with CES-DC scale score categories ($p<0.0001$) [Table/Fig-4]. Middle adolescents and those from lower socio-economic classes had significantly more depressive symptoms.

Score	Number of students	Percentage
>15 (Significant levels of depressive symptoms)	121	55.76
≤15 (Normal)	96	44.24
Total	217	100.00

[Table/Fig-3]: Distribution of study participants according to Centre for Epidemiological Studies Depression Scale for Children (CES-DC) score (n=217).

Among the family members of the study participants, there were deaths due to COVID-19 in 5 (2.3%) families, hospital admissions due to COVID-19 in 25 (11.52%) families, and job losses in 31 (14.28%) families. Additionally, 8.29% of families had atleast one family member working as a health worker [Table/Fig-5].

There were significant associations between deaths due to COVID-19, hospital admissions due to COVID-19, job losses due to COVID-19, and having a health worker in the family with PSC Y-17 score categories.

There were significant associations between hospital admissions due to COVID-19 ($p<0.001$), job losses due to COVID-19 ($p<0.001$), and having a health worker in the family with CES-DC score categories ($p<0.0001$) [Table/Fig-6].

DISCUSSION

The present study has shown that school-going children in Bankura town felt significantly burdened by the closure of schools and reduced contact with friends during the COVID-19 pandemic. They also experienced more psychological and mental health problems. The mean age of the study participants in the present study was 13.67 ± 1.76 years, ranging from 12 to 17 years.

A study conducted by Barbieri V et al., gathered self-reports from children aged 11 to 19 years in an online study, which showed that the mean age of children and adolescents was 12.0 ± 3.58 years, and the percentage of male participants was 49.6% [7]. Another study conducted by Jeelani A et al., reported that 56.8% of the participants were males, with a mean age of 17.5 ± 1.26 years, and 60.4% had cleared the 10th class [3].

In a study conducted by Shachar-Lavie I et al., the mental health of children with learning disabilities was compared to healthy controls, with recruitment taking place from November 2020 to August 2021. The mean age of children in the total sample was 11.7 years ($SD=3.8$) [14]. In the present study, among the study participants, 114 (52.53%) were middle adolescents, 169 (77.88%) were male, 120 (55.30%) belonged to nuclear families, 188 (86.64%) resided with their parents, and 89 (41.02%) belonged to Class-III (middle class) socio-economic status.

In a study conducted by Barbieri V et al., the percentage of male scholars was 49.6%, and single parenthood was found in 8.6% of the respondents [7]. Another study conducted by Jeelani A et al., showed that, as per the latest Kuppuswamy scale, 265 (62.2%) of the participants belonged to the upper-lower and lower-middle strata [3]. A study conducted by Singh S et al., showed that social inequality is associated with the risk of developing mental health challenges [4]. The global economic downturn during the pandemic and lockdown has exacerbated pre-existing social inequality. Many poor families had no source of daily wages during the lockdown, leading to frustration and feelings of helplessness. Displacement and family conflicts can manifest as violence towards children, making them more vulnerable to depression, anxiety, and suicide [15].

In the present study, there were significant associations between deaths due to COVID-19, hospital admissions due to COVID-19, job losses due to COVID-19, and having a health worker in the family with PSC Y-17 score categories.

A study conducted by Jeelani A et al., showed that a history of admission due to COVID-19 in the family and a history of being put under home quarantine were significantly associated with depression in univariate analysis [3]. Another study conducted by

Variables	Socio-demographic characteristics	CES-DC score categories		χ^2 , df	p-value
		≤15	>15		
Age (years)	Early adolescent	57 (55.3%)	46 (44.7%)	9.793	0.002
	Middle adolescent	39 (34.2%)	75 (65.8%)	1	
Gender	Male	72 (42.6%)	97 (57.4%)	0.829	0.363
	Female	24 (50%)	24 (50%)	1	
Type of family	Nuclear	48 (40%)	72 (60%)	1.956	0.162
	Joint	48 (49.5%)	49 (50.5%)	1	
Socio-economic status (SES)	I+II+III	91 (49.2%)	94 (50.8%)	12.459	<0.0001
	IV+V	5 (15.6%)	27 (84.4%)	1	

Variables	Socio-demographic characteristics	PSC Y-17 score categories		χ^2 , df	p-value
		<15	≥15		
Age (years)	Early adolescent	89 (86.4%)	14 (13.6%)	2.552	0.110
	Middle adolescent	89 (78.1%)	25 (21.9%)	1	
Gender	Male	142 (84%)	27 (16%)	2.065	0.151
	Female	36 (75%)	12 (25%)	1	
Type of family	Nuclear	94 (78.3%)	26 (21.7%)	2.485	0.115
	Joint	84 (86.6%)	13 (13.4%)	1	
Socio-economic status (SES)	I+II+III	155 (83.8%)	30 (16.2%)	2.624	0.105
	IV+V	23 (71.9%)	9 (28.1%)	1	

[Table/Fig-4]: Association of socio-demographic characteristics with PSC Y-17 and CES-DC scales (N=217).

Chi-square (χ^2) test* p<0.05

Variables	Categories	Paediatric symptoms checklist (PSC Y-17) score categories		χ^2 df	p-value
		<15 (Normal)	≥15 (Impaired)		
Having family members as health worker	Yes	7 (38.9%)	11 (61.1%)	5.007	Chi-square (χ^2) test, <0.0001
	No	171 (85.9%)	28 (14.1%)		
Job lost due to COVID-19 of any family member	Yes	21 (67.7%)	10 (32.3%)	1	0.025
	No	157 (84.4%)	29 (15.6%)		
Hospital admission of any family member due to COVID-19	Yes	9 (36.0%)	16 (64.0%)	1	<0.0001
	No	169 (88.0%)	23 (12.0%)		
Death of any family member due to COVID-19	Yes	0	5 (100%)	1	Fisher's-exact test, <0.0001
	No	178 (82.0%)	34 (16.0%)		

[Table/Fig-5]: Association between PSC Y-17 scale score categories with the effect of COVID-19 on family {Chi-square (χ^2) test and Fisher's-exact Test} (N=217).

Variables	Categories	CES-DC score categories		χ^2 df	p-value
		<15 (Normal)	≥15 (Impaired)		
Having family members as health worker	Yes	1 (5.6%)	17 (94.4%)	12.701	<0.0001
	No	95 (49.2%)	104 (50.8%)	1	
Job lost of any family member due to COVID-19	Yes	1 (3.2%)	30 (96.8%)	24.905	<0.0001
	No	95 (51.6%)	91 (48.7%)	1	
Hospital admission of any family member due to COVID-19	Yes	1 (4.0%)	24 (96.0%)	18.547	<0.0001
	No	95 (49.5%)	97 (50.5%)	1	
Death of any family member due to COVID-19	Yes	0	5 (100%)	1	Fisher's-exact Test, 0.068
	No	96 (45.3%)	116 (54.7%)		

[Table/Fig-6]: Association between CES-DC scale score categories with the effect of COVID-19 on family. {Chi-square (χ^2) test and Fisher's-exact Test} (N=217).

Shachar-Lavie I et al., found that both the PSC and CATS scores correlated with children's connection with friends, economic difficulties, and parents' worries regarding their child [14]. A study conducted by Spencer AE et al., demonstrated that mental health symptoms significantly correlated with the number of social risks before the pandemic, but not during the pandemic [16].

In a study conducted by Shachar-Lavie I et al., the extent of exposure to COVID-19-related stressors was significantly greater in the group with learning disabilities compared to the control group [14]. Another study conducted by Sing S et al., showed that the prolonged period of stress could have a long-term negative impact on overall development [4]. In the present study, 17.97% of participants were screened to be psychologically impaired based on the PSC Y-17 score. Additionally 22.12% of students had impairments related to anxiety or depression, 11.06% had impairments in attention, and 6.91% had problems with conduct. These rates are much higher compared to prepandemic data.

A study conducted by Spencer AE et al., found that children had significantly higher levels of emotional and behavioural symptoms during the mid-pandemic period compared to prepandemic levels in all domains [16]. There were significantly more children with a positive PSC-17 total score (18% vs. 8%, p<0.01) and internalising (depression and anxiety) score (18% vs. 5%, p<0.001) during the pandemic compared to before, indicating clinical concerns in these areas [16]. The prevalence of self-reported depressive symptoms according to CES-DC in the present study was 55.76%. Younger children (44.7%) were less negatively affected by the pandemic compared to older children (65.81%).

A study conducted by Barbieri V et al., showed a prevalence of self-reported depressive symptoms, and children aged 7 to 10 years were significantly less affected than children aged 11-19 years (younger scholars were significantly less affected than older ones) [7].

According to the World Health Organisation (WHO), depression is estimated to occur among 1.1% of adolescents aged 10-14 years and 2.8% of 15-19-year-olds [1].

According to the National Mental Health Survey of India (2015-2016), 7.3% of adolescents aged 13-17 years in India were suffering from mental health disorders. The prevalence was similar between

males (7.5%) and females (7.1%), but higher in urban metro areas, with a prevalence of 3.6% for anxiety disorders and 0.8% for depressive disorders [17]. A study conducted in Srinagar among school-going adolescents in the Indian Kashmir valley during the COVID-19 pandemic showed an overall prevalence of depression of 16% and an overall prevalence of anxiety of 20% [3]. In a study conducted by Günaydın N and Alemdar DK the PSC-17 scores of children of front-line healthcare professionals who provided care to COVID-19 patients were significantly higher [18].

The present study has shown that mental health is significantly associated with the study participants' age group, Socio-economic Status (SES), and the effect of COVID-19 on the family. A study conducted by Barbieri V et al., showed that children and adolescents with low socio-economic status, a migration background, and limited living space were significantly affected, while a positive family climate supported the mental health of children and adolescents during the pandemic [7]. Similarly, the study conducted by Jeelani A et al., showed that anxiety was associated with female gender, a past history of personal COVID-19 infection, a history of COVID-19 diagnosis in the family, and hospital admission due to COVID-19 in the family [3].

Limitation(s)

The study was cross-sectional and conducted only in four schools in Bankura town. There is a pressing need for planning longitudinal and developmental studies and implementing evidence-based, elaborative plans of action to cater to the psychosocial and mental health needs of vulnerable children and adolescents.

CONCLUSION(S)

The study has revealed that the majority of children were suffering psychologically due to various factors such as hospital admission, death of family members, or job loss of family members due to COVID-19, among others. Additional attention should be given to children who are more susceptible to mental health crisis through a collaborative approach involving their parents, educators, school administrators, counsellors, psychologists, and psychiatrists. There is a specific need to implement a mental health screening programme in school-going children, particularly those with a family history of COVID-19 admission and/or death, as well as for all adolescents in general. Health systems should be proactive and scaled up to provide accessible mental health services, particularly for those in low and middle-income groups. Adequate training for teachers should be provided to enhance their ability to access and utilise mental health services. Family and community orientations should be

conducted to sensitise society regarding the importance of school-going children's mental health needs, providing them with social security, and helping them become responsible and productive members of society.

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