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Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_392_23

Mental health issues and lifestyle changes associated with the COVID-19 pandemic in adolescents: A cross-sectional study in selected schools of Eastern India

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Abstract:

BACKGROUND: Due to coronavirus disease 2019 (COVID-19), adolescents from all over the world have higher rates of anxiety, depression, and stress. This study attempts to assess the effect of the COVID-19 pandemic on adolescent mental health and lifestyle issues. The study also focuses on coping strategies adopted by the participants during the pandemic.

MATERIALS AND METHODS: It was a cross-sectional study performed among school-going adolescents studying from classes VII to X of selected schools in Bhubaneswar. A semi-structured questionnaire was formed and validated by faculty members of the Departments of Pediatrics, Psychiatry and Community Medicine, IMS and SUM Hospital, Bhubaneswar, to obtain a detailed history regarding lifestyle changes, mental health issues, and coping strategies. Randomly, three schools were selected in Bhubaneswar. Permission from the principal, informed written consent from parents, and assent from students were obtained before the study. A total of 711 participants were enrolled in the study. All data were entered in an Excel spreadsheet and analyzed using Statistical package for social sciences (SPSS) version 26.

RESULTS: Middle and high school students also experienced lifestyle changes; however, it was revealed that high school students experienced higher mental health problems, such as mood swings. Additionally, compared to males, girls substantially more frequently experienced academic stress, sleep difficulties, and worry, as well as the development of unhealthy habits. Various coping strategies developed by the students included development of a new hobby (45.4%), spending time with family members (12.8%), learning by playing indoor games (8.4%), computer skills (3.9%), and meditation (2.25%).

CONCLUSIONS: The lockdown, apprehension of pandemic and associated morbidity, fear of losing loved ones, academic and peer pressures, and sudden adjustment to new study methods contributed to the changes experienced by adolescents physically and mentally; hence, all of these issues were addressed in this study. This study pointed toward the need for the propagation of adolescent mental health awareness during pandemics.

Keywords:

Adolescents, COVID-19, mental health

Introduction

The coronavirus disease 2019 (COVID-19) pandemic and lockdown have impacted

the physical and mental health of people. A series of surveys related to mental health during the COVID-19 pandemic have suggested that the number of cases of depression, anxiety, and stress has

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How to cite this article: Gupta M, Sarangi R, Sharma S, Patnaik L. Mental health issues and lifestyle changes associated with the COVID-19 pandemic in adolescents: A cross-sectional study in selected schools of Eastern India. J Edu Health Promot 2024;13:80.

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Received: 18-03-2023
Accepted: 30-08-2023
Published: 26-02-2024

skyrocketed. Closing schools, educational institutions, and activity hubs has been a major form of preventive methods, which magnify stress, anxiety, and a sense of helplessness among the population.^[1] Globally, 10–20% of adolescents suffer from mental health conditions. This statistic is likely to be affected by the vulnerability of adolescents during the COVID-19 pandemic.

However, researchers have paid very little attention to the psychological toll of COVID-19 on the mental health of adolescents, which leads to poor mental and physical health outcomes. The pandemic serves as a greater challenge for adolescents of 10 to 19 years as they belong to a transitional phase of physical and emotional development and lack the capacity of developing coping mechanisms to deal with the stress. Isolation, contact restrictions, and economic shutdown impose a complete challenge to the psychosocial environment.^[2] Adolescents with preexisting mental health conditions face additional difficulties with their mental health during times of crisis, which may be a result of isolation, feelings of uncertainty, lack of daily routines, and lack of access to health services provided through schools.^[3] Anxiety has substantial negative effects on children's social, emotional, and academic success. Specific effects include poor social and coping skills, often leading to avoidance of social interactions, loneliness, low self-esteem, perceptions of social rejection, and difficulty forming friendships. Importantly, school avoidance, decreased problem-solving abilities, and lower academic achievement have also been noted as consequences.^[4] Among senior-class students, established associations have been found between poor mental health outcomes, such as psychological issues and anxiety, and factors related to the COVID-19 pandemic. Studies that discussed gender-related data have established higher rates of COVID-19-related anxiety among females.^[5] A real-time survey conducted to detect the psychosocial effects induced by the spread of COVID-19 concluded that COVID-19 significantly affects the emotions and lifestyle of Italian adolescents.^[5] Along with mental health, the pandemic has simultaneously frazzled the lifestyle of the population, especially that of adolescents, adding to the preexisting pubertal and hormonal changes. Thematic analysis reported that pandemics cause stress, worry, helplessness, and social and risky behavioral problems among children and adolescents. Interventions such as art-based programs, support services, and clinician-led mental health and psychosocial services effectively decrease mental health issues among children and adolescents.^[6] The prevalence of any predictive psychiatric disorder before the lockdown was 20.5% and within lockdown was 39.7%, and the difference was highly significant ($P < 0.001$). The prevalence of emotional and conduct disorder and hyperactivity also increased significantly during the

lockdown period compared with before.^[7] Studies were conducted in Argentina to assess parents' perception of the emotional and behavioral impact of lockdown where a total of 96.3% of parents noticed emotional changes in their children.^[8] Although various studies have individually assessed the impact of COVID-19 pandemic on the mental health and lifestyle, few have been conducted. The objectives of this study were to assess the mental health issues and lifestyle changes associated with the COVID-19 pandemic among adolescents and to find out the coping strategies adopted by them to manage their stress.

Materials and Methods

Study design and setting

A cross-sectional study was performed on school-going children studying in classes VII–X from 2020 to 2022 during the COVID-19 pandemic. All the participants were selected randomly from three selected schools, which are situated within 10 km distance from the IMS and SUM Hospital, Bhubaneswar.

Study participants and sampling

Considering to capture the less prevalent mental health issue in adolescents, we have taken the least prevalent mental health issue (stress) in the study population to estimate the sample size, that is, 47.02%. Based on this prevalence using the standard formula, $n = \frac{z^2 P(1 - P)}{d^2}$, and considering the 15% nonresponse rate,

the final sample size calculated was 688. The completed data were collected from 711 participants and analyzed. Randomly, three schools were selected in Bhubaneswar. The principals of respective schools were approached, and permission to conduct the study was obtained. All students of class VII to class X constituted the study population. Informed consent forms were distributed, and signed copies from parents were received, following which a semi-structured questionnaire was distributed.

Data collection tool and technique

A semi-structured tool (using preexisting validated scales as reference) was formed and validated by nine faculty members with three from each department, that is, Dept. of Pediatrics, Psychiatry and Community Medicine in IMS and SUM Hospital, Bhubaneswar. The tool was evaluated based on relevance, clarity, simplicity, and ambiguity to obtain a detailed history regarding lifestyle changes, mental health issues, and coping strategies. All students of classes VII–X constituted the study population. Of 968 distributed forms, 711 participants gave consent and completed the questionnaire. Confidentiality was ensured at all stages.

Statistical analysis

Descriptive statistics were expressed as frequencies (percentages), means, median, standard deviations, and 95% confidence interval. The independent-samples *t*-test for comparing means and the Chi-squared test for observing association were performed. A *P* value less than 0.05 was considered statistically significant.

Operational definition

Mental health issues addressed included academic stress, sleep disturbances, worry about maintaining friendships, and mood changes. Academic stress, worry about maintaining friendships, and mood changes were assessed by three questions each, and two questions were formed for assessing change in sleep patterns or sleep disturbances.

Lifestyle changes that were addressed were the formation of unhealthy habits such as junk food intake or screen time, healthy habits such as timely meals and fruit intake, change in time spent with family, and COVID-19-appropriate behavior (hand washing, social distancing, etc.). Adoption of unhealthy habits and healthy habits was assessed by two questions each, while to analyze the change in family time and COVID-19-appropriate behavior three and four questions were formed, respectively. Various coping strategies included the formation of new hobbies, meditation, learning computer skills, and indoor games. Each question was answered on a Likert scale, ranging from strongly disagree to strongly agree, corresponding to 1–5, respectively. For each category of mental health issues and lifestyle changes, 50% of the maximum score was obtained as the cutoff for the presence of parameter being assessed. For example, academic stress was assessed by three questions, with a score ranging from 3 to 15, with 7.5 being 50% of the maximum score; hence, a score of >7.5 corresponds to the presence of academic stress.

Ethical consideration

Ethical clearance was obtained from the Institutional Ethical Committee of IMS and SUM Hospital, Bhubaneswar, with letter number IEC/IMS.SH/SOA/2021/220. Randomly, three schools were selected in Bhubaneswar. Permission from the principal, informed written consent from parents, and assent from students were obtained before the study.

Results

A total of 711 participants of a total of 968 children aged 11–16 years, studying in classes VII–X, were included in the study after obtaining informed consent. The mean age group was 12.97 years with a standard deviation of ± 1.023 , with a girl-to-boy ratio of 1:1. The

maximum children were of the age of 13 years, which was 263 (36.99%), of which 135 were girls and 128 were boys. For analysis, the participants were classified as per educational status into middle school (studying in classes VII–VIII) and high school (studying in classes IX–X). The majority of the students were studying in middle school (77.9%) and 22.1% in high school.

Of all categories, worry about friendship was observed in maximum participants with a total of 617 (86.8%), academic stress was observed in 578 (81.3%) participants, and mood changes were observed in 575 (80.9%) participants. Sleep disturbance was the least commonly seen issue in a total of 402 (56.5%) participants. The mean score for all mental health issues was found to be significantly higher in girls than boys (*P* value < 0.05). Of 617 students who were worried about maintaining friendships, girls were found to have statistically significantly more worry than boys (*P* value- 0.044). Similarly, girls were also found to have statistically higher academic stress and more sleep disturbances than boys with *P* values of 0.05 each. However, mood changes were observed to be statistically insignificant among boys and girls [Table 1].

The mean score for mood changes experienced by students as per educational status was significantly higher in high school students, whereas in other mental health issues that were assessed, the mean scores were similar in both middle and high school students. Even though all mental health issues were present almost equally among students, irrespective of educational status, high school students significantly experienced more mood changes than middle school students (*P* value < 0.05) [Table 2].

Upon analysis of lifestyle changes, COVID-19-appropriate behavior was observed in maximum participants with a total of 701 (98.6%), followed by an increase in time spent with family in 653 (91.8%) and adoption of unhealthy habits in 544 (76.5%) participants. Healthy habit formation was the least commonly seen behavioral change in a total of 541 (76.1%) participants. The mean scores for the development of healthy habits and assessment of family time were found to be significantly higher in girls than boys with a *P* value of 0.00 and 0.005, respectively. Of all observed changes, the development of unhealthy habits was found to be significantly higher in girls than boys [Tables 1 and 3].

All other categories had similar changes in lifestyle irrespective of gender. Among the mean score for various changes in lifestyle, middle school students were found to have a significantly higher score than high school students for the assessment of time spent with family with a *P* value < 0.05. The mean score for all other lifestyle

Table 1: Distribution of mental health issues and lifestyle changes as per gender

Mental and Lifestyle variables	Subgroups	Male		Female		P
		(n=354)	%	(n=357)	%	
Mental health issues						
Academic stress	No stress	75	21.2	58	16.2	0.05
	Stress present	279	78.8	299	83.8	
Sleep disturbances	Absent	165	46.6	144	40	0.05
	Present	189	53.4	213	60	
Worry about friendships	No worry	55	15.5	39	11	0.044
	Worried	299	84.5	318	89	
Mood changes	No change	74	21	62	17.4	0.135
	Experienced mood changes	280	79	295	82.6	
Lifestyle changes						
Unhealthy habits	Not developed	96	27.1	71	19.9	0.014
	Developed	258	72.9	286	80.1	
Healthy habits	Not developed	82	23.2	88	24.6	0.353
	Developed	272	76.8	269	75.4	
Family time	Remained same	34	9.6	24	6.7	0.102
	Increased	320	90.4	333	93.3	
COVID-19-appropriate behavior	Not adapted	6	1.7	4	1.1	0.371
	Adapted	348	98.3	353	98.9	

*Chi-squared test

Table 2: Distribution of mental health issues and lifestyle changes as per educational status

Mental and Lifestyle variables	Subgroups	Middle school		High school		P
		n=554	%	n=157	%	
Mental health issues						
Academic stress	No stress	100	18	33	21	0.232
	Stress present	454	82	124	79	
Sleep disturbances	Absent	242	43.6	67	42.7	0.448
	Present	312	56.3	90	57.3	
Worry about friendships	No worry	74	13.4	20	12.7	0.480
	Worried	480	86.6	137	87.3	
Mood changes	No change	117	21.1	19	12.1	0.006
	Experienced mood changes	437	78.9	138	87.9	
Lifestyle changes						
Unhealthy habits	Not developed	133	24	34	21.7	0.309
	Developed	421	76	123	78.3	
Healthy habits	Not developed	135	24.4	35	22.3	0.336
	Developed	419	75.6	122	77.7	
Family time	Remained same	41	7.4	17	10.8	0.113
	Increased	513	92.6	140	89.2	
COVID-19-appropriate behavior	Not adapted	8	1.4	2	1.3	0.614
	Adapted	546	98.6	155	98.7	

*Chi-squared test

changes was found to be almost equal. All assessed lifestyle changes were found to be distributed almost equally among middle school and high school students, with no statistical significance, which may be attributed to the availability of equal amount of free time at home due to the closure of schools [Table 2].

In this study, we also surveyed the various coping strategies developed by the students to deal with stress, boredom, loneliness, etc. Among these, most students recorded the response to the development of a new hobby (45.4%). Other strategies observed included

spending time with family members (12.8%), learning by playing indoor games (8.4%), using social media (5.1%), computer skills (3.9%), and meditation (2.25%). Of 711, 157 students (22%) admitted to not developing any coping strategies [Table 4].

Discussion

The objectives of the study were to assess the mental health issues and lifestyle changes associated with the COVID-19 pandemic among school-going adolescents. The mean age was 12.97 years, with a standard deviation

Table 3: Comparison of mean scores of mental health issues and lifestyle changes with gender

	Mean±SD		P
	Male	Female	
Mental health issues			
Total score for academic stress	1.79±0.409	1.84±0.369	0.001
Total score for sleep disturbances	1.53±0.500	1.60±0.491	0.002
Total score for worry about friendships	1.84±0.363	1.89±0.312	0.000
Total score for mood changes	1.79±0.407	1.83±0.379	0.017
Lifestyle changes			
Total score for unhealthy habits	1.77±0.422	1.75±0.432	0.354
Total score for healthy habits	1.73±0.445	1.80±0.400	0.000
Total score for family time	1.90±0.295	1.93±0.251	0.005
Total score for COVID-19-appropriate behavior	1.98±0.129	1.99±0.105	0.194

*Independent t-test

Table 4: Distribution of coping strategies among participants

Coping strategies adopted	n=711	Percentage (%)
New hobby	323	45.4
Family time	91	12.8
Indoor games	60	8.4
Social media	36	5.1
Computer skills	28	3.9
Meditation	16	2.25
None	157	22
	711	100

of 1.023. The majority of youngsters were under the age of 13, contributing around 263 (36.99%) of the total participants, with 135 female and 128 male students. We found that a majority of participants belonged to middle school. Of three, only one school consented to high school students' participation in the study due to upcoming preliminary and board examinations, and the total number of participants from middle school was notably higher than those from high school. Other possible reasons may include academic commitments and increased hesitancy among high school students.

On analysis of mental health issues, the most common issue was worry about friendships (86.8%), closely followed by academic stress (81.3%) and mood changes (80.9%). It is possible that due to hampered social interactions during the pandemic, Gadassi Polack *et al.*^[9] observed that uncertainty and anxiety about maintaining friendships in adolescents led to mental health issues. Sleep disturbances, including increase in sleep hours and decreased quality of sleep, were the least common observed issue related to mental health and was seen in 56.5% of participants.

On comparing mental health issues as per gender, girls had significantly higher academic stress, worry about maintaining friendships, and sleep disturbances than boys ($P < 0.05$), but no significant mood changes were seen. On the contrary, a literature review by Guessoum

et al.^[10] reported more prevalence of post-traumatic stress disorder (PTSD) in females. However, Mallik and Radwan^[7] stated that the prevalence of emotional disorder was higher among girls before the lockdown, but during the lockdown period, the boy-girl prevalence was the same.

The mean score of mental health issues was significantly higher in girls than boys (P value < 0.05) as expected attributing to societal stigmas, physical changes in puberty, premenstrual syndrome, days lost to physical debilitation during menstruation (contributing to academic stress and mood swings), cultural expectations of society, etc. It is also possible that due to social stigma in India, boys are expected to be less vocal about mental health issues.

The association of mental health issues with educational status revealed that high school students experienced significantly more mood changes including emotional outbursts and mood swings (P value < 0.05). Possible reasons for this observation could be due to lockdown frustration, more hormonal changes, academic pressures, parental pressures, hesitation in confiding with parents, etc. The mean score for mood changes was also significantly higher among high school students (P value = 0.006), which could contribute to social stereotypes and overzealous expectations of maturity from older children. These findings were in corroboration with the study by Sandal *et al.*^[11] and the prevalence of depression, anxiety and stress increase with age.

Among 711 participants, the adoption of COVID-19-appropriate behavior was the most common change in lifestyle seen in 98.6% of participants, followed by an increase in time spent with family (91.8%). Our result was supported by Soest *et al.*^[12] where they observed that the majority of the adolescents reported to comply with the infection control rules to a large extent. This could be linked to the obscure nature of

the virus, expanding mortality of the disease, and fear of getting infected. The widespread propagation of COVID-19-appropriate behavior by the World Health Organization, United Nations organization and media certainly influenced the public to adapt hand hygiene and social distancing.

The development of healthy and unhealthy habits was observed to be almost equal, seen in 76.1% and 76.5% of participants, respectively. Schnaiderman *et al.*^[18] concluded that although due to lockdown, families had more time to cook, there was no overall improvement in diet quality with a remarkable increase in screen time during weekdays. The increase in unhealthy habits could be attributed to the closure of schools, irregular academic schedule, disruption of daily routine, development of binge eating disorders, and consumption of meals while watching television, more time spent indoors, increased access to social media, etc. The increase in screen time could be credited to the conduction of classes online, along with increased access to video games, online television series or movies, and social media content. Alternatively, the inaccessibility of junk food, the perennial presence of parents, and the development of exercise routines could have played a pivotal role in an almost equal increase in healthy habits.

In our study, we also found a significant increase in the development of unhealthy habits among girls more than boys, which was a surprising observation, as a study by Ruiz-Roso *et al.*^[13] discussed that when comparing average food intake on the basis of gender, girls consumed more fruits and vegetables than boys. Psychological stress in the form of academic stress, sleep disturbances, and mental health issues was more in girls, hence contributing to binge eating disorders and increased comfort food intake.

On comparing mean scores with gender, girls experienced significantly higher increasing family time and development of healthy habits than boys.

Associating lifestyle changes with educational status in our study, even though there was no significant difference observed between responses given by middle school and high school students, the mean score for time spent with family was significantly higher in middle school students (P value <0.05). This could be credited to more number of classes, academic commitments, and tendency in confiding more in friends rather than family among high school students.

In our study, the coping strategies were broadly categorized and it was observed that the majority of students (45.4%) developed a new hobby such as

sketching, art and craft, dancing, learning a musical instrument, and cooking. Other responses that were observed included spending time with family members (12.8%), playing indoor games (8.4%) such as carom and board games, indulging in social media (5.1%), playing video games, or learning various computer skills (3.9%), and least commonly practicing meditation (2.25%). The lockdown brought families closer by bringing back the joy of indoor games, or by converting what used to be an occasional family tea into a daily routine. Simultaneously, the availability of social media and associated peer pressure made the lockdown difficult for adolescents too.

Limitations and Recommendations

The strength of this study resides in the intricacy with which we touched upon various aspects of adolescent life that were influenced by the pandemic and analyzed the same with respect to gender and educational status. However, our study also has its limitations. Due to its novelty, there is minimal literature to compare the results. The distribution of students as per educational status should be more uniform to achieve more accurate results. At the same time, this study in Bhubaneswar threw light on the universality of mental health issues and lifestyle behaviors among adolescents during the COVID-19 pandemic.

Conclusion

The lockdown, apprehension of the pandemic and associated morbidity, fear of losing loved ones, academic and peer pressures, and sudden adjustment to new study methods contributed to the changes experienced by adolescents physically and emotionally; hence, all of these issues were addressed in this study. This study pointed toward the need for the propagation of adolescent mental health awareness during pandemics. Adolescent mental health, physical health, social interactions, and academic performance are all linked and must be analyzed together. The study helps us in anticipating the problems faced by adolescents during times of crisis. Further research in the field of adolescent mental health is warranted for the mitigation of future pandemics and disaster management.

Acknowledgements

The authors of this study thankfully acknowledge the study participants for their cooperation and support during data collection. This research has been conducted as an approved research project with the support of the Dean, IMS and SUM Hospital, and Vice-Chancellor, Siksha 'O' Anusandhan deemed to be University, Bhubaneswar (ethics code: IEC/IMS.SH/SOA/2021/220).

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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