Stress-The hidden pandemic for school children and adolescents in India during COVID-19 era

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Abstract

The effects of coronavirus are not just physical but also psychological in all age groups and more so common among children. Some children may have had experience of quarantine restrictions during this COVID-19 pandemic. Due to increased digital connections ‘emotional contagion’ where the distress and fear experienced by one spread to another person may also be common in children. The present study aims to determine whether COVID-19 pandemic and the lockdown has caused stress and affected mental health of children and youth. The current study assessed stress in children and youth between 9 and 18 years age based on Short Self-Rating Questionnaire (SSRQ) during the COVID-19 pandemic. The study design was an observational study, a descriptive cross-sectional study using online survey. Total 369 schools children participated in the survey. Score Scale and analysis was done to categorize the stress levels as Low, Moderate and Severe. Data analysis based on the total score levels (Delhi+Mathura zone, $n=369$) showed 30.08% ($n=111$) students with Low stress level, 62.87% ($n=232$) within Moderate stress level and 7.08% ($n=26$) with severe stress level. Students T Test revealed that there was a significant difference ($p \leq 0.04$) of the stress level male vs. female in total (Delhi + Mathura zone combined). However, the stress level was not significantly different between Delhi and Mathura zone alone. It is utmost to give primary importance to address the stress issues in children and adolescents in the current scenario. Inclusion of Intervention strategies that are empirically supported and culturally appropriate as per the need of the communities for children and families may be helpful.

Keywords Stress · children · youth · psychological · mental · health policy

Introduction

COVID-19, the greatest pandemic of last 100 years, although generally believed to have milder course in children in terms of disease severity, has multifaceted impacts on children that is psychological, mental, physical, social and cultural. Due to COVID-19 pandemic, many children have had no physical

access to friends, peers, schoolmates and relatives for past one and half year and most of the school curricular activities were being done online on digital platform. Limited or no opportunity for outdoor games and socialization may have a great effect on mental health of children, making them easily bored, angry and sometimes frustrated and hence, vulnerable to mental stress. Due to increased digital connections ‘emotional contagion’ where the distress and fear experienced by one spread to another person may also be common in children. Besides, some children may have had experience of quarantine restrictions during this COVID-19 pandemic, also be another factor leading to mental stress. All these together has multifaceted impacts on children which may be psychological, mental, physical, social and cultural. The effects of coronavirus are not just physical but they are also psychological in all age groups but more so among children. A recent study points towards the critical need to respond to the global mental health effects on children and adolescents at the global level due to COVID-19 pandemic (Racine et al., 2021). This is in fact a global call to action, hence, there is a

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need for equitable mental health care for all children across the world (Benton et al., 2021).

Although there is paucity of data regarding prevalence of stress among Indian children prior to COVID-19 pandemic, it is presumed to be in line of global figures. Earlier studies have estimated that the prevalence of depression and anxiety, of the most common mental health conditions of childhood, were 8.5% for depression and 11.6% for anxiety before the COVID-19 pandemic (Tiirikainen et al., 2019). A meta-analysis for psychiatric disorders estimated the global prevalence rates from 27 countries found that 2.6% of youth had depressive disorder and 6.5% had any anxiety disorder among children and adolescents (Polanczyk et al., 2015). According to UNICEF, 41% of India's population is less than 18 years of age. In a huge country with limited facilities for pediatric psychiatrists and psychologists, the treatment gap for mental disorders still remains very high. These facts raise issues pertaining to mental health status of our children post COVID-19.

For many children, school is a place where interactions with other children and their teacher's a great mental support and in some schools they can also access support services such as counselling.

Higher levels of anxiety, stress, and depression after the stay-at-home order post COVID-19 could lead to further psychological trauma besides mental health impact of raging pandemic itself. Younger age, female gender, and caregiver status have greater degree of stressfulness due to the pandemic. Their mental health issues cannot be neglected during the pandemic and post-pandemic, their health and wellbeing is the concern today. A recent report support that frontline workers and children both were among those most at risk of mental health issues during the pandemic. In the United States, particularly among adolescents, the prevalence of mental disorders during pandemic included depression, anxiety, and substance abuse and supported by other studies across the globe that showed similar increases in depression and anxiety (Editorial., 2021).

The present study has primary objective of determining whether COVID-19 pandemic and the lockdown has caused stress and affected mental health of children aged between 9 and 18 years.

Methodology

Study Design

The present study assessed stress in children and youth between 9 and 19 years age based on Short Self-Rating Questionnaire (SSRQ) during the COVID-19 pandemic. The study design was observational study a descriptive cross-sectional study using online survey. Assessment of

stress in children and youth between 9 and 19 years age was done based on Short Self-Rating Questionnaire (Osika et al., 2007) and the methods used were online survey, data extraction, collection and analysis. Prior one-to-one interaction was done with Schools Principals/Teachers for their consent and participation for the survey study. Random sampling method was followed for the survey. The survey was done during July, 2021. Figure 1 demonstrates the flow chart of the survey method in the study.

Sample Size

Based on 51.3% prevalence of stress disorder in meta-analysis by Sarkar et al. (2017), a sample size of 384 was determined for estimating the expected proportion of 0.51 with 5% absolute precision and 95% confidence using statulator. Government (two) and Private Schools (three) affiliated to Central Board of Secondary Education (CBSE) total 5 schools from two zones, were randomly selected and invitation to participate/permission to conduct study on their pupils, were sent to school authorities/Principals. Out of 10 schools, 7 responded and granted permission (5 in Mathura Zone and 2 in Delhi Zone). Presuming 10 percent non

Fig. 1 Complete flow chart of the survey method for the responses received from the schools and students who participated in the study

response the questionnaire was to be shared with 422 students. In 7 schools with help of stratified random sampling in each class from 6th to class 12th, every 5th student, (8-9 students from each class depending on their class strength) to which SSR Questionnaire was sent online.

Out of 422, 369 (313 in Mathura Zone and 56 in Delhi Zone) responded and all complete responses ($n=369$) were included in data analysis.

Ethical Considerations

The online questionnaire was administered to students with permission of respective school authorities. The informed consent of parents as well as informed assent of children were obtained online with sharing participant information sheet and informed consent form online along with the questionnaire.

Score Scale and Analysis

Total 21 questions were used for the survey and the score range from 0-3 were given for each response against each Question. Details of the scoring against each of the 21 Questions is given in Supplementary Table 1. The stress levels were categorized according the Score scale: Low (0-21), Moderate (22-35), Severe (36 & above). Students TTest was used for statistical analysis, with $p \leq 0.05$ as a significant difference value. Table 3 A & B demonstrates the stress levels due to COVID-19 (low, moderate and severe) and the total responses with questions in stratified age groups.

Results

The responses were collected from the school children of two zones-Delhi zone, a metropolitan city and Agra zone of UP, India. Figure 2(A) represents the overall response and score levels categorized as low, moderate and severe stress levels.

Age and Gender

Age range of the students who responded were from 9-18 years, 218 were male students and 151 were female students. The details of the response from schools and students who participated in the survey is shown in Table 1 and Fig. 2(B). The trend of age vs. score values is depicted in Fig. 2(C).

Urban vs. Remote & Rural

We found that most of the response were from Mathura zone ($n=313$) as compared with Delhi zone ($n=56$). Mathura zone belong to remote area whereas Delhi zone is a metropolitan city. Statistical analysis of the survey responses based on the scores of the respondents revealed that there was no zone wise difference in the stress levels. Table 1 shows the details of the Delhi and Mathura zone responses, from schools and students in stratified age groups who participated in the survey.

Male vs. Female Stress Levels

Table 2 depicts the statistical analysis of the survey responses based on the scores of the respondents. Score Scale and analysis with Students TTest revealed that there was a significant difference ($p \leq 0.04$) of the stress level in male compared with female students in total (Delhi + Mathura zone combined). However, the stress level was not significantly different between Delhi and Mathura zone. The stress level was found to be predominant ($p \leq 0.001$) in 17-18 years age group of male students only. Figure 2 shows stress response in % in stratified age groups and children tested COVID-19 positive or in quarantine due to COVID-19 in past.

Low, Moderate and Severe Stress Levels

Data analysis based on the total score levels (Delhi+Mathura zone, $n=369$) showed 30% ($n=111$) students with low stress level, 63% ($n=232$) within moderate stress level and 7% ($n=26$) with severe stress level (Fig. 2). Most of the students were found to be in the moderate stress level, a matter of great concern for the parents, teachers and healthcare authorities. Although, only 7 % students are in the category of severe stress, it is alarming situation to prevent future pandemic due to stress among children. Stress response in % in stratified age groups and children tested COVID-19 positive or in quarantine due to COVID-19 in past as demonstrated in Fig. 2 indicates that 15-16 years of age group children were most affected with moderate stress levels. The stress response in % in stratified age groups in children tested COVID-19 positive or in quarantine due to COVID-19 in past showed that the age groups 13-14 years was mostly affected with severe stress levels (Fig. 2).

Trend of Stress Response

Figure 3 shows trend of stress response in male vs. female, the most frequent response trend against each Question of the Survey Questionnaire and also the responses of children

Fig. 2 Stress level analysis of the respondents: **(A)** Stress response in % (Delhi + Mathura Zone combined)-Low (30%), Moderate (63%) and Severe (7%) stress level **(B)** Stress response in % in stratified age groups **(C)** Stress response in % in stratified age groups in children tested COVID-19 positive or in quarantine due to COVID-19 in past.

Table 1 Survey response details and score scale (A) Showing the details of the response from schools and students participated in the survey. (B) Survey response of students in stratified age groups (C) Stress level of the responses of the students participated in the survey in age groups and (D) Stress level in stratified age groups.

(A)

Total number of schools participated in the survey =7 (of the 10 schools approached)

Total number of students responded=369 (n)

Age range of the students who responded=9-18 years

Region	Number of students responded	
	Male	Female
Mathura	187	126
Delhi	31	25
Total	218	151

(B)

Survey response of students in stratified age groups

(responses excluded that did not reveal their age, n=5)

Regions	Age group in years				
	9-10 years	11-12 years	13-14 years	15-16 years	17-18 years
Delhi (n)	0	18	6	17	14
Mathura (n)	19	67	101	98	24
Total (n)	19	85	107	115	38

(C)

Score scale: Low (0-21), Moderate (22-35), Severe (36 & above) stress

Total, n=369	Low	Moderate	Severe		
	30.08% (111)	62.87% (232)	7.04% (26)		
Male, n=218	29.81% (65)	61.46% (134)	8.71% (19)		
Female, n=151	31.78% (48)	63.57% (96)	4.63% (7)		

(D)

Score scale in stratified age groups: Low (0-21), Moderate (22-35), Severe (36 & above) stress

(responses excluded that did not reveal their age, n=5)

Total=364	9-10 years	11-12 years	13-14 years	15-16 years	17-18 years
Low	2.74% (10)	5.49% (20)	10.43% (38)	8.79% (32)	3.57% (13)
Moderate	1.92% (7)	15.38% (56)	16.48% (60)	21.70% (79)	6.86% (25)
Severe	0.54% (2)	0.024% (9)	0.024% (9)	1.09% (4)	0% (0)

tested COVID-19 positive or in quarantine due to COVID-19 in past. Overall male students were more affected with stress as per the feedback survey responses.

Discussion

Our findings revealed that moderate level of stress was most prevalent in children and adolescents. This is more significant in males as compared with the females. Finding of the study is supported by a recent study that showed high rates of anxiety, depression, and post-traumatic symptoms among children post COVID-19 pandemic impact (Marques de Miranda et al., 2020). Another study based on the systematic review of depression, anxiety, and stress among medical students in India showed that the pooled prevalence rate of anxiety from four studies ($n = 686$) was 34.5% and the pooled prevalence rate of stress from 28 studies ($n = 5354$) was 51.3% (Sarkar et al., 2017). Our survey study of the children and adolescents showed the prevalence rate of stress level Low (30%), Moderate (63%) and Severe (7%).

The trend of stress response in male vs. female varied significantly with males more prone to severe stress compared with the females.

From various studies as quoted in the systemic review by Marques de Miranda et al. (2020), 13 to 47% children had anxiety and 12 -48 % have depressive illness. Mental disorders has been indicated as one of the leading causes of non-fatal disease burden in India (Dandona, 2020). A recent cross-sectional study also highlights the impact of the COVID-19 Pandemic on Mental Health and Quality of Life among local residents in Liaoning Province, China (Zhang, 2020). Another study revealed the highest tendency toward psychological problems was in the 14 to 20 years-old group in comparison to the 21 to 35 years-old group (Liang et al., 2020).

Mental health and psychosocial considerations during the COVID-19 outbreak was given a priority by WHO which advised to stay connected and maintain social networks and pay attention to own needs and feelings during in times of stress. The needs of vulnerable groups, including those with severe mental illness, learning difficulties,

Table 2 Statistical analysis of the survey responses based on the scores of the respondents (A) Male vs. Female; Delhi vs. Mathura. There is a significant difference ($p \leq 0.041$) of the stress level male vs. female in total but not Delhi vs. Mathura zone. (B) Male vs. Female

score levels in stratified age groups. The stress level was found to be predominant ($p \leq 0.001$) in 17-18 years age group of male students only. (C) Total responses in children tested COVID-19 positive or in quarantine due to COVID-19 in past

(A)				
	<i>P</i> value			
Total (Delhi+ Mathura)				
Male vs. Female	0.04			
Delhi				
Male vs. Female	0.41			
Mathura				
Male vs. Female	0.76			
Delhi vs. Mathura				
a. Male vs. Male	0.20			
b. Female vs. Female	0.43			
c. Male vs. Female	0.13			
(B)				
Male vs. Female	<i>P</i> value			
9-10 years	0.31			
11-12 years	0.06			
13-14 years	0.29			
15-16 years	0.42			
17-18 years	0.001			
(C)				
Questions	Yes	No	Maybe	Total Responses
22.I was tested positive for COVID-19 earlier/ कोविड-19 की मेरी पहली जांच रिपोर्ट पॉजिटिव आई थी।	27	243	31	301
23.I was suffering from mental illness or brain disorders before COVID-19 pandemic/ कोविड-19 महामारी से पहले मैं मानसिक रोग अथवा मस्तिष्क रोग से पीड़ित था/ थी।	56	245	0	301
24.I was in quarantine earlier due to COVID-19/ कोविड-19 महामारी के कारण मैं क्वारंटीन में था/ थी।	72	229	0	301

and neuro developmental disorders etc. due to COVID-19 pandemic need attention (Editorial., 2020). The exposure of children to online screens, television etc. should be reduced. According to The Indian Association for Child and Adolescent Mental Health, children need reassurance that pandemic period will be over soon. Hence, parents and caregivers to be calm and proactive so that the child feel free to express their emotions, and by monitoring both their own and their children's behavior as well (UNICEF, 2020b).

COVID-19 pandemic has led to various concerns regarding its mental health effect on patients with psychiatric disorders and also the health-care workforce. Psychological distress among those already suffering from psychiatric syndromes is on rise due to coronavirus-induced lockdown, isolation and quarantine recently reported in India (Melo and Soares, 2020). A narrative review on the challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health showed that COVID-19-associated mental health risks to disproportionately hit

children and adolescents who are already disadvantaged and marginalized (Fegert et al., 2020).

Due to closure of schools there has been an increase in screen time, sedentary life, not following daily routine which are also having both physical and psychological effects on children. Children are also being exposed to the media coverage about coronavirus which might create fear among children due to the unpredictability and uncertainty of the illness. In such a scenario, parents and immediate caregivers specially need to take up major responsibility to help children in distress and hence, need to create a sense of normalcy at home. This may be done several ways that include play involving some physical workouts, academic activities which is joyable and participative, interaction with family members, creative writing, socialization that can connect to friends and relatives.

Data from the longitudinal studies and intervention trials in this population also need to be consolidated to further confirm the current study which includes cross-sectional survey study with students from two zone only,

Table 3 (A) Stress levels due to COVID-19 (low, moderate and severe). (B) Total responses with questions in stratified age groups.

(A)																					
Stress levels due to COVID-19 that included the following Questions:																					
● I was tested positive for COVID-19 earlier/ कोविड-19 की मेरी पहली जांच रिपोर्ट पोजिटिव आई थी।																					
● I was in quarantine earlier due to CVOID-19/ कोविड-19 महामारी के कारण मैं क्वारंटाइन में था/ थी।																					
Total responses= 301		9 to 10			11 to 12			13 to 14			15 to 16			17 to 18							
Low		9.30% (28)			33.22% (100)			50.16% (151)			50.83% (153)			11.62% (35)							
Moderate		0.33% (1)			2.65% (8)			2.99% (9)			2.65% (8)			0.99% (3)							
Severe		1.99% (6)			7.30% (22)			13.28% (40)			7.64% (23)			2.65% (8)							
(B)																					
Questions		9 TO 10 years			11 to 12 years			13 to 14 years			15 to 16 years			17 to 18 years							
		FEMALE		MALE	FEMALE		MALE	FEMALE		MALE	FEMALE		MALE	FEMALE		MALE					
		MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD				
1. I get angry		0.82	0.94	1.50	1.22	0.89	0.22	1.22	0.17	0.86	0.25	1.78	0.21	0.89	0.26	1.28	0.11	0.91	0.32	1.31	0.19
2. I get headaches		0.80	1.08	1.00	1.00	0.94	0.08	1.16	0.04	0.81	0.26	1.00	0.45	1.05	0.05	1.07	0.08	1.24	0.25	1.04	0.11
3. I like going to school		0.64	1.15	0.50	1.00	0.76	0.15	0.53	0.01	0.44	0.21	0.19	0.43	0.65	0.07	0.26	0.18	0.63	0.22	0.69	0.05
4. I feel calm		1.09	1.16	1.25	1.30	1.11	0.05	1.33	0.03	1.23	0.39	1.93	0.28	1.31	0.05	1.20	0.20	1.74	0.28	1.25	0.00
5. I feel happy		0.82	1.03	0.38	0.70	1.00	0.11	1.15	0.09	0.93	0.15	1.54	0.52	1.25	0.04	1.09	0.25	1.42	0.34	0.92	0.10
6. I get stomach pains		0.36	0.64	0.75	0.97	0.70	0.13	0.96	0.05	0.61	0.17	0.68	0.21	0.96	0.10	1.10	0.08	0.71	0.17	0.63	0.16
7. I feel lonely		1.00	1.13	1.00	1.22	0.80	0.27	1.23	0.00	1.27	0.27	1.02	0.54	1.43	0.10	1.24	0.26	1.23	0.15	0.86	0.27
8. I get sad		0.73	0.96	0.75	0.97	0.83	0.13	1.28	0.06	1.12	0.15	1.19	0.16	1.44	0.02	1.11	0.06	1.10	0.10	0.85	0.14
9. I like to be at school		2.45	1.16	2.86	0.35	2.27	0.02	2.40	0.15	2.38	0.25	2.71	0.45	2.57	0.25	2.47	0.03	2.41	0.21	2.18	0.14
10. The other kids tease me		0.18	0.39	1.00	1.22	0.53	0.01	0.97	0.09	0.94	0.55	0.95	0.51	0.65	0.07	0.89	0.05	0.68	0.28	0.40	0.07
11. I fall asleep easily at night		1.09	1.24	1.43	1.29	1.05	0.08	1.02	0.09	1.30	0.27	1.21	0.12	0.91	0.35	1.21	0.15	1.38	0.21	0.88	0.09
12. Things work out as I have planned		1.09	1.16	1.38	0.86	1.44	0.17	1.35	0.00	1.38	0.28	1.47	0.18	1.24	0.10	1.25	0.30	1.60	0.33	1.16	0.25
13. When I am happy I show it		0.55	0.99	1.63	1.41	1.47	0.02	1.59	0.06	1.47	0.39	0.97	0.31	1.38	0.10	1.08	0.16	1.28	0.67	1.18	0.06
14. Sometimes I do not reach the goal I have planned for		1.50	0.81	1.63	1.22	1.81	0.06	1.51	0.12	1.60	0.23	1.32	0.03	1.61	0.14	1.37	0.20	0.88	0.10	1.43	0.16
15. When I have a hard time it helps being with my friends		0.82	1.19	1.00	1.22	1.79	0.06	1.25	0.05	1.72	0.13	0.67	0.57	1.18	0.01	0.95	0.17	0.52	0.26	1.18	0.15
16. When I am sad I show it		2.45	0.99	2.00	1.12	2.17	0.19	1.84	0.05	1.81	0.40	1.70	0.19	1.82	0.03	1.71	0.17	1.48	0.16	1.89	0.10
17. Sometimes I can't manage with the things I have to do		2.18	0.72	1.13	1.05	2.14	0.22	1.66	0.04	1.61	0.35	1.79	0.57	1.63	0.31	1.50	0.14	1.34	0.38	1.80	0.04
18. When I have a hard time there is an adult to talk to		0.91	1.08	1.50	1.00	2.00	0.06	1.64	0.03	1.23	0.18	0.75	0.59	1.31	0.23	1.45	0.12	1.08	0.03	1.78	0.12
19. If anyone teases me I protest		1.55	1.23	1.38	1.41	2.06	0.23	1.60	0.19	1.37	0.32	1.90	0.36	1.64	0.14	1.43	0.02	1.88	0.15	1.05	0.20
20. It is easy to concentrate during lessons at school		0.27	0.86	0.50	1.00	1.14	0.01	1.28	0.05	1.04	0.13	0.94	0.00	1.20	0.01	0.85	0.05	1.54	0.27	0.73	0.14
21. Able to concentrate in online classes as schools are closed (past six months)		1.00	1.35	0.75	1.30	1.47	0.08	1.84	0.14	1.52	0.35	1.73	0.08	1.42	0.01	1.26	0.13	1.92	0.38	1.37	0.12

Fig. 3 **A** Trend of stress response in Male vs. Female, Mean Score value in the Y axis against each of the 21 questions in the X axis **(B)** Trend of stress response in Male vs. Female Mean Score value in the Y axis against each of the 22, 24 COVID-19 specific questions in the X axis **(C)** Age versus score values of the respondents ($n=365$) indicating the trend of stress levels with respect to age, 4 respondents did not mention their age hence, not included in the graph. **D** Most frequent response trend against each Question of the Survey Questionnaire

hence the results may not be accurate to represent the wide population of the country as such. Assessment of Psychological morbidity with the quality of life and academic performance of children and adolescents need to be considered for future study. It is important to include the efficacy and adverse effects, as well as acceptability and issues for psychotherapy as well. Multicentre studies would help for future roadmaps to combat the hidden pandemic stress in children and adolescents revealed in our study.

Intervention strategies to be better prepared for future developments:

- Identification of the mental health as per the needs of the community, children, family levels.
- Strengthening the accessible mental health resources in communities for children and families.
- Implementation of evidence-supported practices that are scalable, expands access to care, and eliminates disparities.
- Collaborative care models that can address children's health care needs in low-resource settings.
- Enhance the telehealth capacity, services via text, telephone, or video access to a spectrum of services for individuals and expert consultation for people in low-resource communities.
- Screen time reduction may potentially reduce harmful effects.
- Estimation of the cost-benefit of the measures currently being adopted such as home schooling etc.

Conclusions

Children and adolescents are prone to accumulate several risk factors for mental health during COVID-19 pandemic. These factors and their relevance for stress-regulating coping processes may be disentangled through longitudinal real-time based studies. Though a mild level of stress was evident in children and adolescents as per survey of the Schools, but if unattended, the stress levels may increase. At this time point, it is important to focus on scale-up of mental health interventions and targeted learning strategies to reduce the inequality gap, and may require investment and training to be sustainable. It is utmost to give primary importance to assess the implications of policies enacted to contain the hidden pandemic on mental health of children and adolescents.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s12144-022-02827-3>.

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Data Availability Data sharing will be done on demand if any by contacting the individual authors.

Declaration

Ethics Approval and Consent to Participate The online questionnaire was administered to students with permission of respective school authorities. The informed consent of parents as well as informed assent of children were obtained online. There is no Institutional Ethical Committee for the survey studies as it does not deal with the treatment/sample collection/experimental procedure etc. therefore, Ethical approval is not applicable.

Consent for Publication Not applicable.

Conflict of Interest None.

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