

Research Article**LONG-TERM SCHOOL CLOSURE DURING COVID-19:
PSYCHOLOGICAL ADJUSTMENT AND EXECUTIVE
FUNCTIONING OF BANGLADESHI ADOLESCENTS****Samsad Afrin Himi, Bijon Baroi* and Jonaid Mia***Department of Psychology, Jagannath University, Dhaka, Bangladesh**Received: 23 October 2021, Accepted: 12 June 2022***ABSTRACT**

Despite the fact that long-term school closures during COVID-19 may have a negative impact on adolescents' mental health and cognitive abilities, few studies have been carried out in Bangladesh on this topic. The present study explores the adolescents' psychological adjustment and executive functioning during this pandemic. A total of 120 participants including 60 parents and their children aged 11 to 17 years old filled out an online survey questionnaire, which included pandemic-specific questions, adolescents' psychological adjustment, and executive functioning measures. Results showed that the majority of parents (65%) noted changes in their children's conduct during COVID-19. The most frequently observed adolescents' changing behavior was the attention problem (58%). Besides, around 30% of the parents reported sleep problems, frustration, reluctance to eat, low confidence, and negative thinking. Adolescents' self-reports further demonstrated a significant change in their inhibitory control ability and negative self-esteem in this pandemic. However, the working memory ability and the other personality factors (hostility/aggression, dependency, negative self-esteem, negative self-adequacy, emotional unresponsiveness, emotional instability, and negative world view) had no significant impact. The findings of the study pave the way for developing intervention programs needed for better psychological adjustment and fewer cognitive problems of adolescents during pandemic.

Keywords: *Long-term school closure, psychological adjustment, executive functioning, COVID-19, adolescents*

Introduction

With the outbreak of novel coronavirus-2 (COVID-19), the World Health Organization (WHO) declared this as an international public health emergency, as it is rapidly emerging and evolving across the globe. Even the second wave of COVID-19 pandemic is growing more deadly. To halt the deadly pandemic spread out, almost all countries have adopted unprecedented efforts to maintain health hygiene through establishing the practice of "social distancing". Adolescents are not beyond the grasp of this pandemic, even though COVID-19 may not be as lethal in them as it

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is in adults. Although they are protected by spelling out the stark words, such as ‘wear a mask’, ‘keep social distancing’, these indirectly affect their normal development process. To ensure COVID-19 restriction in this global pandemic context, the Bangladesh government has taken an unprecedented measure by closing all educational institutions from March 17, 2020 till date. Currently, classes are delivered using home-based distance-learning methodologies (Golberstein *et al.* 2020). Consequently, they are compelled to stay at home, resulting in being unable to socialize with friends and others, thereby limiting the opportunity for moving around (Jiao *et al.* 2020). These barriers eventually have a negative impact on adolescents' psychological adjustment as well as cognitive development, causing anxiety, depression, sleeping difficulties, and attention deficiency across countries (e.g., Germany, Ravens-Sieberer *et al.* 2021; Japan, Moriguchi *et al.* 2020; China, Ahmed *et al.* 2020; Spain, Lavigne-Cerván *et al.* 2021; India, Patra and Patro, 2020). Bangladesh is also not far behind in this unwanted but unavoidable race. Several studies have been conducted to show the long-term impact of the COVID-19 pandemic on a wide range of people (such as, university student: Islam *et al.* 2020; physician: Khatun *et al.* 2021; women: Hamadani *et al.* 2020; general people: Rahman *et al.* 2021), although few studies focused on children and adolescents. For example, to assess the mental health of young people, a study with 387 parents having children (aged 5 – 15 years) was conducted and showed that large proportions of children suffer from mental health disturbances in Bangladesh during the lockdown (Yeasmin *et al.* 2020). The findings of Yeasmin *et al.*'s study, however, were limited to parents' responses to their children's mental health issues. Another study (Husain *et al.* 2020) conducted with young adult people (aged 20 – 24 years; but not adolescents in true sense) also demonstrated the negative impact of pandemic. Therefore, in this regard, no single study on adolescents is available in Bangladesh.

Two issues motivated the current exploration. First, the contemporary studies conducted in Bangladesh were immediately after the stay-at-home order (lockdowns) last year (e.g., time duration April to July 2020 in Husain *et al.* 2020; April to May 2020 in Yeasmin *et al.* 2020). However, it has been almost more than one year since adolescents are away from schools. Because of long-term school closure, their normal social life is missing and their usual learning process is disrupted. Consequently, they might develop a sense of loneliness that can be difficult to manage for some people. Second, most of the previous studies investigated only mental health issues, rather than cognitive functions. However, along with psychological distress, it is reasonable to believe that mental anxiety affects cognitive performance, particularly executive functioning, which is regulated by the prefrontal cortex (Park and Moghaddam 2017). Executive functions are defined as goal-directed control behavior, comprising working memory, cognitive flexibility, inhibition, and relational integration (Himi *et al.* 2019; Miyake *et al.* 2000). Research with adolescents showed negative associations between psychological adjustment and executive functions (Cassidy 2015). In the present case, stress resulting from the pandemic can develop psychological maladjustment of adolescents, and thereby leading to interfere with the attention control task (Lavigne-Cerván *et al.* 2021; Navarro-Soria *et al.* 2021).

In light of this, the COVID-19 pandemic is one of the few social events to have had such a profound psychological influence. Given the seriousness of the situation, it is the right time to investigate the long-term repercussions of the pandemic on psychological adjustment and

executive functioning ability of the adolescents in Bangladesh as well as make some recommendations for mitigating the negative effects. We focused on adolescent people because the challenges of COVID-19 could obstruct mastery of their developmental tasks, such as the need for social interactions during this crucial period of developmental process (Orben *et al.* 2020). In sum, the objective of the current study was to explore the long-term repercussions of COVID-19 on psychological adjustment (i.e., hostility/aggression, dependency, negative self-esteem, negative self-adequacy, emotional unresponsiveness, emotional instability, and negative world view) and executive functioning (i.e., working memory and inhibitory control) among Bangladeshi adolescents. We further examined the relationship between psychological adjustment and executive functioning of adolescents.

Materials and Methods

Participants

A total of 120 participants including 60 parents (51.7 % fathers) and their children (aged between 11 and 17 years) participated in this study. Data were collected through an online platform (i.e., using Google form) from 15th April to 28th April, 2021. The advertisement for the data collection was posted in social media (e.g., Facebook, WhatsApp, Imo, etc.). A standard and self-administered online-based questionnaire consisting of socio-demographic information, pandemic-specific questions, psychological adjustment, and executive functioning measures was shared with the interested participants through e-mail or social networking platform. Participants voluntarily contributed to this study. Their responses were accepted if they: 1) completed the entire survey; 2) had at least one child (in the given age range); 3) lived in Bangladesh during the COVID-19 pandemic. All respondents staying at their home completed this survey through mobile, tab or computer. The current study was conducted by following cross-sectional survey design.

Measures

Socio-demographic Variables

The online parents survey included questions about age, gender, occupational position, and parental education for socio-demographic data, whereas the adolescents survey contained questions about age, gender, study level, type of family, and number of siblings.

Pandemic-specific Measurement

Self-developed pandemic-specific items were included in both versions of the online survey (adolescent and parent reports) to study pandemic adherence behavior. Parents were asked about their children's behavior. For example, they indicated whether the ongoing COVID-19 had resulted in an increase in poor psychological and cognitive behaviors among their children, as well as adolescents' frequency of smartphone/internet use. Along with, adolescents indicated whether they had been infected with COVID-19 and were afraid of COVID-19.

Adapted Personality Assessment Questionnaire- Child Version (Child PAQ, adapted by Uddin and Ahmed 2012)

The child PAQ (originally developed by Rohner 1999), a self-report questionnaire was used to measure seven personality dispositions (i.e., hostility/aggression, dependency, negative self-

esteem, negative self-adequacy, emotional unresponsiveness, emotional instability, and negative world view). These seven dispositions altogether measure participant's overall psychological adjustment. The Child PAQ consists of 42 items with 6 items in each subscale: item no. 1, 8, 15, 22, 29, and 36 representing hostility/ aggression; item no. 9, 16, 23, 30, and 37 representing dependency; item no. 3, 10, 17, 24, 31, and 38 representing negative self-esteem; item no. 4, 11, 18, 25, 32, and 39 representing negative self-adequacy; item no. 5, 12, 19, 26, 33, and 40 representing emotional unresponsiveness; item no. 6, 13, 20, 27, 34, and 41 representing emotional instability and item no. 7, 14, 21, 28, 35, and 42 representing a negative world view. Participants are asked to report their feelings about each of the statements (such as, 'I am cheerful and happy one minute and gloomy or unhappy the next' or 'I think I am a failure'). Their responses are taken through a 4 point Likert-type scale, ranging from 4 (almost always), 3 (sometimes true), 2 (rarely true) to 1 (almost never true). Before adding all scores, the response format of the 13 items in child form (item no. 3, 4, 7, 12, 16, 18, 21, 26, 31, 34, 39, 40, and 42) is reverse scored. The lowest possible score 42 indicates excellent psychological adjustment, while the maximum possible score 168 indicates severe psychological maladjustment. The midpoint 105 represents greater overall maladjustment than adjustment. Each subscale has a score range of 6 to 24, with the midpoint 15 indicating serious psychological issues with the relevant personality trait. The total mean-weighted impact size of coefficient alpha was 0.83, according to a meta-analysis of 51 studies (Khaleque and Rohner 2002).

Teenage Executive Functioning Inventory (TEXI) Self-Report (adapted from Thorell et al. 2020)

The TEXI is a 20-item questionnaire used to measure the executive functioning of adolescents within two factors namely, working memory and inhibitory control. In this inventory, item no. 1, 2, 5, 7, 8, 9, 11, 12, and 13 represent working memory (e.g., "I have difficulties remembering lengthy instructions?"), and item no. 3, 4, 6, 10, 14, 15, 16, 17, 18, 19, and 20 represent inhibitory control (e.g., "I have difficulties stopping an activity when asked to do so."). The original version relied on two types of responses: self-ratings and reports from parents. The self-rating response pattern was adopted in this investigation, in which the adolescents respond their feelings to each item. The 20 items are presented with 5-point response scales (1 = "definitely not true"; 2 = "not true"; 3 = "partially true"; 4 = "true" or 5 = "definitely true"). The lowest possible score 20 indicates good executive functioning, while the maximum possible score 100 indicates poor executive functioning. The TEXI has high internal consistency reliability ($\geq .85$).

Data Analysis

To investigate the psychological as well as the cognitive impact of the pandemic, the pandemic-specific items were examined in terms of frequency and descriptive statistics. A series of independent-sample *t*-tests was used to see whether cognition and psychological adjustment deteriorated during COVID-19. Cohen's *d* effect size measures (described as mean differences) were reported for significant findings. All analyses were performed using SPSS version 26, but effect sizes were calculated using the open-source statistical software R (R Development Core Team 2015) with 'powerAnalysis' package (Fan 2017).

Ethical Considerations

We were fully aware of ethical issues. This research was carried out in accordance with the Declaration of Helsinki guidelines, and approved by the ethical committee of the Faculty of Life and Earth Sciences, Jagannath University, Dhaka. In addition, prior to navigating the main data collection form, participants provided informed consent in a Google form. Anonymity and confidentiality were maintained at this stage.

Results

Socio-demographics

Data (self and parents reports) from $n = 60$ families with adolescents aged 11–17 years ($Mean_{age} = 14.70$, $SD_{age} = 2.00$, 68.3% boys) were analyzed. Among the participating parents, 41.7% of them had an undergraduate degree or more, 30% had completed secondary or higher secondary education and 28.3% had lower secondary education. Fathers were more educated as compared to mothers. Most of the mothers (72.41%) were unemployed (i.e., housewives) but all fathers were employed. About half of the respondents were from urban areas. Means and standard deviations, and reliability estimation for all measures are presented in Table 1. All of the measures were approximately normally distributed, with skewness values less than 2 and kurtosis values less than 4 (Kline 1998).

Table 1. Mean, Standard Deviation, and Reliability (Cronbach's Alpha) of the Measures.

Measures	Mean	SD	Skewness	Kurtosis	Reliability
TEXI					
Inhibition	29.00	8.57	.59	.02	.85
Working Memory	21.58	6.27	.61	.13	.82
Child PAQ					
Aggression	14.00	3.95	.31	-.52	.71
Dependency	18.42	3.03	-.67	-.28	.60
Negative self-esteem	12.78	3.28	-.13	-.67	.70
Negative self-adequacy	13.4	2.9	.09	-.30	.58
Emotional unresponsiveness	16.52	2.5	.31	-.28	.21
Emotional instability	16.28	3.25	.06	.58	.54
Negative world view	13.32	4.25	-.02	-.53	.80

Parents reporting about children's behavior

More than half of the parents (61.7%) reported that their children were engaged in home schooling. The rest of them reported that they read at home alone or with the assistant of a house tutor. Nearly half of the parents stated that their children almost always stayed at home, even about two-fifths (41.7%) had no outside space. Two-thirds of the parents (65%) stated that their children faced psychological adjustment as well as cognitive problems during the pandemic.

Considerable rates for parent-reported attention problems (58%), sleep problems (34%), frustration (34%), reluctant to eat (32%), low confidence (28%), negative thinking (26%), anger (22%), loneliness (24%), loss of memory (14%), and aggressiveness (12%) were found during the pandemic. In addition, more than three-fourth parents (83.3%) reported that close relatives were infected by COVID-19, but no one died in most of the cases. With respect to parents' reports, a paired sample *t*-test showed that smart-phone or computer use among adolescents significantly increased during the pandemic ($t = -8.68, p < .001, MD = -3.06, d = 1.13$).

Cognitive and psychological problems during the pandemic

Based on adolescence self-report data, three-fourth of individuals belonged to a single-family pattern, but had more than one sibling. Two-thirds (73.17%) of the adolescents (aged 11–17 years) stated that they felt frightened of the COVID-19 pandemic. Among them, 6.7% of individuals were scared most. However, about all participants (98.3%) were not affected by COVID-19. Based on parents' reports on adolescent's psychological and cognitive problems before and during the pandemic, two groups were defined: pre-existence symptoms and symptoms developed during the pandemic. Thus, corresponding adolescent's responses towards executive functioning and psychological adjustment were divided accordingly, which was subjected to an independent sample *t*-test in order to see whether executive functioning skills and psychological adjustment varied by pre-existence symptoms and symptoms developed during the pandemic. Concerning executive functions, the results revealed that inhibition ability significantly differed by pre-existence symptoms and symptoms developed during pandemic groups ($t = -2.04, p = .046$), but not for working memory ability ($t = -1.77, p = .082$). Adolescents faced more difficulties in inhibition during pandemic ($MD = -2.95, 95\% CI = -6.29 - .391, d = .268$). With respect to psychological adjustment, only one personality disposition – negative self-esteem was found to be significantly changed between these two groups ($t = -2.16, p = .035$), in which during pandemic respondents developed more negative self-esteem ($MD = -1.86, 95\% CI = -3.59 - -.14, d = .287$). In addition, we did not observe any significant correlation between psychological adjustment and executive functioning ($p > .05$).

Discussion

The study aimed to assess the psychological adjustment and executive functioning of adolescents during COVID-19 pandemic in Bangladesh. In order to establish a clear picture in this regard, we used adolescent self-reports as well as parental self-reports questionnaires.

Results demonstrated that the pandemic has a negative influence on adolescents as reported by their parents. About more than half of the adolescents face attention problems. Besides, one-third of the adolescents are becoming frustrated, losing their confidence, and facing difficulty in sleep and eating. However, the rates of other symptoms (e.g., negative thinking, loss of memory, aggressiveness) are not very noticeable. The findings based on parents' perceptions also somewhat echo the adolescents' self-report responses. The inhibitory ability (i.e., controlled attention) of the adolescent's declines during the pandemic, but working memory capacity does not change much. Individual differences in executive functions appear to be relatively stable, therefore, this findings is not surprising (Friedman *et al.* 2016). A significant difference observed

in inhibitory control ability could be attributed to the individuals' excessive usage of the internet. Because people who spend too much time on the internet are inefficient in allocating and monitoring their attentional control activities (Gao *et al.* 2019). In this context, it is worth mentioning that adolescents' smart-phone or computer use increased significantly during the pandemic, as stated by parents.

With respect to psychological adjustment, there was only significant maladjustment observed in adolescents' personality disposition that was negative self-esteem. However, the results concerning the negative impact of COVID-19 on psychological adjustment (parents report and adolescents self-report) are in line with recently published researches, for example, China (Zhou *et al.* 2020; Duan *et al.* 2020), India (Saurabh *et al.* 2020), Spain (Ezpeleta *et al.* 2020), and Italy (Orgilés *et al.* 2020). However, comparing the impacts cross-culturally, adolescents in Bangladesh do not appear to be as negatively affected as those in China, Spain, and Italy. This can be explained using the demographic data from the current study: 1) they had more than one sibling with whom they could share their emotions; 2) they had open space to play (Amerio *et al.* 2020); 3) their parents had a medium level of education (Sonogo *et al.* 2013); and 4) they were not affected by COVID-19.

Apparently, because of long-term school closures (UNESCO 2020; Spinelli *et al.* 2020; Holmes *et al.* 2020) adolescents are deprived of learning, interaction with friends and teachers, and physical activities. In addition, fear of being infected by COVID-19 might be another reason for their discomfort, as evidenced by the present results. However, in the long run, these problems (though minimal) ultimately may contribute to developing more serious mental problems such as adjustment disorder, acute stress disorder, or grief (Sprang and Silman 2013).

Therefore, now the question is how we can mitigate adolescents' distress. We may draw some suggestions based on the current findings to ensure a healthier environment for adolescents. We must remember that we should not just focus on meeting their basic needs; we have to focus on their holistic health as well. First, adolescents should be guided to lessen their excessive internet use, rather than engage them in physical activities. Second, after knowing an adolescent's belief and understanding about COVID-19, family members can provide enough information about COVID-19, but information has to be meaningful to them (Brooks *et al.* 2020; Dalton *et al.* 2020). Family members can also help them to develop positive feelings by highlighting the advantages of staying at home (e.g., it is beneficial to them and others, which is why the government is grateful to them). Besides, parents need to spend one-on-one time with their children, share ideas with them, assist them in restructuring their routine to adapt in pandemic situations and strive to maintain a peaceful and loving family atmosphere throughout this difficult time. In this regard, it might be advantageous to implement an intervention aimed at improving perceived behavioral control (Cavicchiolo *et al.* 2021). Third, in our country; there are several psychological organizations, who voluntarily promote telecounseling service. If young people need any kind of psychological support, they can access this opportunity.

One important limitation of our study is the small sample size, which may restrict the generalizability of the findings. Furthermore, because this study only included those parents and

adolescents who had access to digital devices with internet connectivity, there may be response bias. The second limitation was that data was acquired through an online platform, which resulted in a loss of control over the data collection. Due to social distancing measures, face-to-face interaction was not possible at this time.

Conclusion

To this end, despite the fact that the current findings are primarily descriptive, the findings of the study pave the way for developing intervention programs needed for better psychological adjustment and fewer cognitive problems of adolescents during pandemics.

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