ORIGINAL ARTICLE

Depressive Symptoms Among Adolescents in Bangladesh

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Abstract

Adolescent mental well-being hardly took precedence in Bangladesh, which is reflected in both policies and literature. This study assessed the common symptoms of depression among school-going adolescents (aged 10–19 years) in Bangladesh. Primary data were collected during October–November 2019 from 289 participants in four schools using a questionnaire based on the WHO global school-based student health survey and WHO stepwise approach to NCD (Tools version 9.5). Sadness (45.3%) and aggression (40.5%) were the most common depressive symptoms found in the study, followed by confusion (27.7%), worthlessness (21.8%), fatigue (21.5%), and insomnia (18.0%). The sex of the student, grade of study, and duration of daily sleep showed differential associations with these symptoms. These findings indicate a crucial stage of adolescence, where the different societal pressures often ignored by primary carers, could have detrimental effect on children. There is an urgent need to address the growing adolescent mental health issue in Bangladesh and a need for health system to recognize its precedence.

Keywords Screen time · Depression · Children · Insomnia · Fatigue · Aggression · Bangladesh

Mental health is the new challenge in public health. While it is slowly getting recognized as public health issue worldwide, in low- and middle-income countries (LMICs) like Bangladesh, the issue is still being less prioritized. Bangladesh has only passed a new Mental Health Act in 2018 with a number of loopholes (Ahn & Jun, 2007; Anjum et al., 2019). The World Health Organization Mental Health Action Plan (2013–2030) sets a global objective for mental health promotion and prevention. One of the targets of Sustainable Development Goals (SDGs) is to "reduce one third of premature mortality from non-communicable diseases through prevention and treatment, and to promote mental health and well-being" (SDG 3.4) (Bennett et al., 2018). However, the World Health Organization (WHO) only focused on suicide mortality rates in adults and has largely ignored the severity of mental distress in adolescents.

Almost 264 million people suffer from depression worldwide (James et al., 2018). Depression-related mortality rate is quite high as suicide is the second leading cause

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of death for 15–29 years old (World Health Organization, 2012). The scenario is not different in Bangladesh, with 16.05% of the adult population in the country suffering from mental disorders. A recent systematic review found a large variation in the prevalence of mental disorders and reported a variation from 6.5 to 31.0% among adults and 13.4 to 22.9% among children (Hossain et al., 2014). These numbers necessitate an assessment of the mental health conditions for children and adolescents in Bangladesh.

Traditionally, mental health rarely takes precedence over infectious and communicable diseases in Bangladesh. However, despite severe resource constraints, there has been a gradual improvement in the public health sector of Bangladesh, and hence, the need to focus on chronic conditions such as mental health conditions of children and adolescents has become urgent (Chowdhury et al., 2013). Although neuropsychiatric disorders contribute to 11.2% of the total disease burden in Bangladesh, only 0.44% of the USD 2.3 billion national health budget was allocated for mental health in 2010 (Hasan & Thornicroft, 2018; Nuri et al., 2018).

Few studies surveyed various aspects of mental disorders among adolescents in Bangladesh. For example, World Health Organization found that 5% of adolescents aged between 13 and 17 years had suicidal ideation and anxiety, and 25% were bullied by other students at school (WHO, 2017). Similar estimates were observed by Begum et al. (2017) who found that unmarried females living without parents had higher suicide ideation.

Survey-based studies mostly assessed eating disorders (Pengpid et al., 2015), depressive symptoms and help-seeking behavior (Nasreen et al., 2016), obsessive–compulsive disorders (Chowdhury et al., 2016), and intimate partner violence (Biswas et al., 2017; Rahman et al., 2014). Despite these studies in recent times, there is a lack of assessment on the other aspects of mental health such as worthlessness, confusion, aggression, insomnia, sadness or hopelessness, and tiredness or fatigue, all of which are considered to be symptoms of depression (Taheri et al., 2019). A focus on these depressive symptoms is particularly important in Bangladesh due to the typical ignorance of parents or primary caregivers while nursing the depressive symptoms of school-going children or adolescents (Selim, 2010). Research on how these depressive symptoms manifest in this vulnerable age group can help future research to develop targeted intervention strategies, specific to the low-income and highly conservative settings like Bangladesh.

Furthermore, literature gap exists regarding the association of lifestyle factors with depression in Bangladesh. While health outcomes such as obesity were found to be associated with electronic screen time (Khan & Burton, 2016), its association with depressive symptoms remains unexplored. Similarly, sleep patterns and physical activity have been shown to be important risk factors for mental health (Askeland et al., 2020; Bailey et al., 2018), which has not yet been adequately studied in the context of Bangladesh.

Therefore, the paucity of studies in this area indicates research gap that our study has aimed to resolve through the application of a global school-based student health survey. The primary objective of this study is to identify the most prevalent symptoms of depression among school-going adolescents (aged 10–19 years) in urban and rural areas of Bangladesh. The secondary objective is to assess the sociodemographic and lifestyle factors associated with depressive symptoms of secondary school students. These would allow the detection of the vulnerable cohort of children in Bangladesh who are more likely to be depressed and require attention.

Theoretical Framework

Several theories relate to adolescent mental health and its risk factors, including the social-ecological theory, social cognitive theory, social stress model, recovery theory, and the developmental intergroup theory (Heary et al., 2017; Kelly & Coughlan, 2019; van Praag et al., 2009; Yen et al., 2009). These theories explain how the individual traits, relation with parents and peers, environmental factors, and social-cultural values impact youth's mental well-being. The authors postulate that while the social ecologic theory can help explain how the socio-demographic factors are linked to depression, the biological and self-control theories can help explain the lifestyle factors (Bernaras et al., 2019).

In this regard, the social-ecological theory focuses on environmental factors (Cohen et al., 2000; Krieger, 1994) and assumes that low sociodemographic factors, such as poverty, low literacy, household factors, and higher crime rates in the area of residence, influence mental health outcomes (Raneri & Wiemann, 2007). On the other hand, the biological theory links bodily functions such as sleep disorders with mental health (Narbona, 2014). Similarly, self-control is associated with several mental health issues such as mood disorders, which may lead to higher screen time and low self-esteem (Kaslow et al., 1988; Twenge & Campbell, 2018). The distribution of factors and their theoretical connections with the depressive symptoms are illustrated in Fig. 1.

Methods

Study Design and Data Overview

The analytical cross-sectional study was conducted in two different areas—one from the urban and another from a rural area in Bangladesh. Dhaka city in Dhaka district and Ramgonj subdistrict in Lakshmipur district were selected to represent the urban and rural areas, respectively. Four schools, two from urban and two from rural areas, were chosen randomly. The data was collected during October to November 2019.

The students of grades six to nine from secondary schools were selected as the study population. In Bangladesh, grades 6–10 fall under secondary school education. A probability sampling technique was used to determine the sample size, which was 289. The students and teachers were informed about the purpose of the study and the content of the questionnaire. The key components of the questionnaire, such as the definition of the outcome variables, were thoroughly explained to the students prior to the survey. Finally, with the permissions of the principles of the schools and ethical clearance from the Dhaka Medical College, 289 adolescents completed the survey questionnaire in the classroom under the supervision of the lead researcher.

This study investigated depressive symptoms among secondary school-going children. Research revealed that urban adolescents use cell phones (64%) more than rural adolescents (48%) (National Institute of Population Research and Training - NIPORT/Bangladesh et al., 2016). Furthermore, because of unplanned urbanization, adolescents in urban areas do not have sufficient time or are unable to spend time in open or green spaces (Dubey et al., 2018). Lack of greenness near school and home reduces access to physical activities (Rumayan Hasan et al., 2020). Past studies found a close association between reduced physical activity and screen time with psychiatric distress (Taheri et al., 2019). Urbanization may also lead to sedentary lifestyles. Thus, pubescent children from urban areas
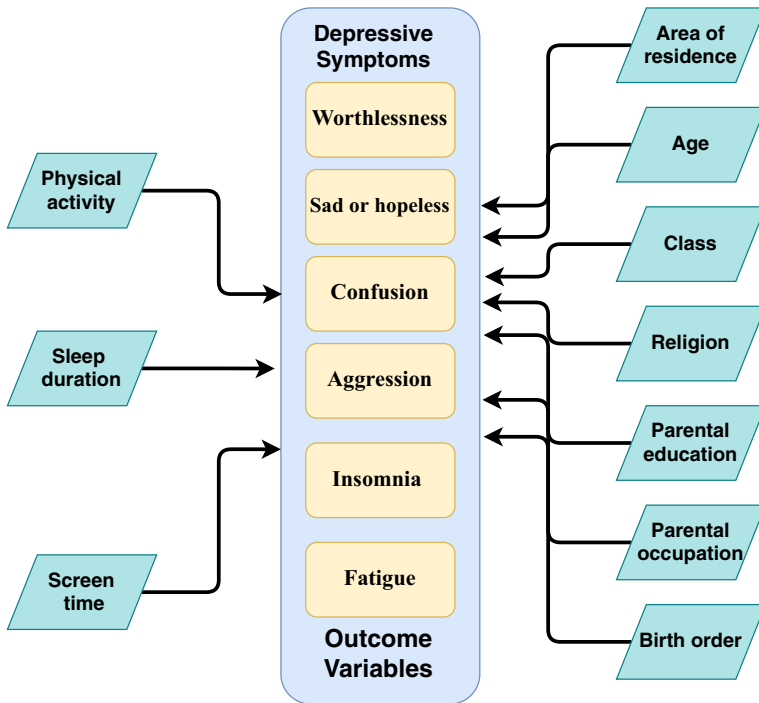
Fig. 1 Theoretical framework of this study

become more accustomed with television and other electronic media compared to rural children, leading to psychiatric distress (Taheri et al., 2019). Therefore, type of residential area (urban and rural) was considered as a variable in this study to assess the nature of daily physical activity and daily duration of screen time in depressive symptoms among secondary school children.

Furthermore, in Bangladesh, grades 6–10 fall under the secondary school. A noticeable increase in depression is observed among adolescents at this stage, primarily due to the advancement to a higher grade and the participation in the Secondary School Certificate (SSC) examination. A study found that the highest percentage (47.5%) of adolescents suffering from depression were from grade 9 rather than from grade 8 or 10. Additionally, the proportion of depressive adolescents was found to increase with the increase in age, particularly from the age 13 to 17 years (Anjum et al., 2019). Thus, two specific adolescent age groups (10–14) and (15–19), studying in grades VI and IX, respectively, were considered in this study.

Additionally, parental education and occupational statuses were found to have significant contributions in the development of depression among children and adolescents (Hutchinson et al., 2003; Nambambi & Mufune, 2011; Park et al., 2012). These studies found that children, whose parents are engaged in highly time-consuming

jobs and, therefore, had substantially reduced interactions with their children, are more likely to develop depressive symptoms. Interestingly, well-educated mothers were found to better understand the mental health complications in their children and provide more psychological support compared to mothers who were less educated (Park et al., 2012). Consequently, the parental education and occupational statuses were included as predictors of depressive symptoms in this study.

Variables

The study evaluated depression among the adolescents by studying the symptoms of worthlessness, sadness, confusion, aggression, insomnia, and fatigue. The questionnaire used in this study was prepared based on the WHO global school-based student health survey and the WHO stepwise approach to NCD (Tools version 9.5) to measure these symptoms, which were also considered as the outcome variables in this study (Taheri et al., 2019). Previously, the reliability and validity of the modified questionnaire were evaluated (Kelishadi et al., 2012). Five symptoms out of the seven from the global school-based student health survey questionnaire were investigated, and fatigue was added as well. The questions are detailed in Table 1.

The sociodemographic information was collected from the participants through the questionnaire survey. These variables included the type of area of residence (urban or rural); sex (male, female, or others); age (continuous in years); the grade of study (grade VI, grade IX); religion (Muslim, Hindu, or others); birth order (1, 2, over 3); education level of mother and father (under secondary, secondary, or higher level); father's occupation (service holder, business, migrant worker, or others); and mother's status as a homemaker (yes, no). In order to get an idea of the daily lifestyle of the respondents, the study included three additional factors: the daily physical activity (yes, no); duration of physical activity per day (< 30 min, 30–60 min, > 60 min); duration of sleep per day (< 7 h, 7–9 h, ¿9 h); and daily screen time (< 1 h, 1–2 h, > 2 h).

Table 1 Outcome variables based on the global school-based student health survey questionnaire

Questions	Responses
1) During the past 6 months, how often did you experience a feeling of worthlessness so that you could not perform your daily activities?	a) Almost every day (categorized as "Yes")
2) During the past 6 months, how often did you experience confusion so that you could not perform your daily activities?	b) More than once a week (categorized as "Yes")
3) During the past 6 months, how often did you experience aggression so that you could not perform your daily activities?	c) Almost every week (categorized as "Yes")
4) During the past 6 months, how often did you experience insomnia so that you could not perform your daily activities?	d) Almost every month (categorized as "No") e) Rarely or never (categorized as "No")
5) During the past 12 months, did you ever feel sad or hopeless?	Yes or No
6) Do you often find yourself feeling extremely tired or exhausted?	

Statistical Analysis

Data analysis involved descriptive statistics as well as inferential statistics. For the identification of the primary association between the outcome variables and sociodemographic factors, the chi-square (χ^2) and Fisher's exact tests were used. Binary logistic regression models were fitted with the outcome variables described in Table 1 to assess the direction (positive or negative) and the magnitude of the associations. All variables were adjusted in the models and reported as adjusted odds ratios (ORs) with their corresponding 95% confidence intervals (CI). The level of significance was set as p value < 0.05. All analyses were conducted using Stata 14.0.

Results

In the studied sample, sadness (45.3%) and aggression (40.5%) were the most common depressive symptoms, followed by confusion (27.7%), worthlessness (21.8%), fatigue (21.5%), and insomnia (18.0%). Adolescents from urban areas were more affected by sadness than rural areas (54.4% vs 34.1%). Compared to their male peers, the female adolescents reported to have suffered more from sadness (52.0% vs 38.1%), insomnia (22.7% vs 13.0%), and fatigue (28.0% vs 14.4%) (Table 2).

The worthlessness (33.3% vs 13.3%), sadness (56.9% vs 36.8%), and insomnia (26.0% vs 12.1%) were more frequent among the study participants from the age group 15–19 years than from the 10–14 years age group. The grade IX students felt more worthless (33.6% vs 9.3%), sad (53.7% vs 36.4%), confused (32.9% vs 22.1%), sleep deprived and fatigued (27.5% vs 15.0%), compared to 10–14-year-old children. Those with fathers having education below secondary school were more affected by sadness (51.5% vs 37.1%) than others whose fathers had higher levels of education.

Table 3 shows that the participants engaged in daily physical activity for less than 30 min reported to have experienced more frequent insomnia (26.0% vs 15.6% vs 7.1%, $p = 0.003$) and fatigue (29.3% vs 21.9% vs 7.1%) than the participants with daily physical activity of 3060 min or above. Adolescents having inadequate sleep such as less than 7 h felt more worthlessness (35.5% vs 16.7% vs 20.0%), insomnia (27.6% vs 15.2% vs 6.7), and fatigue (30.3% vs 19.7% vs 0%) than adolescents having 7–9 and more hours of sleep. Adolescents exposed to more than 2 h of screen time reported increased confusion (38.8% vs 19.7% vs 26.7%) and aggressiveness (52.2% vs 44.7% vs 32.9%) than adolescents with less than 1 and 1–2 h of screen time.

The binary logistic model revealed that the sex, grade of study in school, and sleep duration are significantly associated with depression of adolescents in the study (Table 4). The model showed that girls were 2.1 times (95% CI: 1.10–3.80) more likely to feel sadness compared to boys (Table 4). Those who were in grade IX had 3.6 times higher odds (95% CI: 1.40–9.40) of considering themselves as worthless than those who were at grade VI. Among the lifestyle variables, those who had slept in between 7 and 9 h a day were 50% less likely to feel worthlessness (95% CI: 0.20–0.30) than those who slept less than 7 h per day.

For this study, no significant differences in the depressive symptoms between the adolescents residing in urban and rural areas were found. Furthermore, no age-specific difference was observed for any of the depressive symptoms. Additionally, student's

Table 2 Distribution of sociodemographic variables over the depressive symptoms ($N=289$)

Sociodemographic factors	Sample size (%)					
	Worthlessness	Sad or hopeless	Confusion	Aggression	Insomnia	Fatigue
Area of residence						
Rural	25 (19.4)	44 (34.1)	30 (23.3)	52 (40.3)	26 (20.2)	28 (21.7)
Urban	38 (23.8)	87 (54.4)	50 (31.3)	65 (40.6)	26 (16.3)	34 (21.3)
P value	0.371	0.001	0.131	0.957	0.390	0.925
Sex						
Boys	32 (23.0)	53 (38.1)	37 (26.6)	56 (40.3)	18 (13.0)	20 (14.4)
Girls	31 (20.7)	78 (52.0)	43 (28.7)	61 (40.7)	34 (22.7)	42 (28.0)
P value	0.628	0.018*	0.697	0.948	0.032*	0.005*
Age in years						
10–14	22 (13.3)	61 (36.8)	40 (24.1)	65 (39.2)	20 (12.1)	33 (19.9)
15–19	41 (33.3)	70 (56.9)	40 (32.5)	52 (42.3)	32 (26.0)	29 (23.6)
P value	<0.001*	0.001*	0.114	0.593	0.002*	0.449
Attending grade						
Grade VI	13 (9.3)	51 (36.4)	31 (22.1)	51 (36.4)	15 (10.7)	21 (15.0)
Grade IX	50 (33.6)	80 (53.7)	49 (32.9)	66 (44.3)	37 (24.8)	41 (27.5)
P value	<0.001*	0.003*	0.041*	0.173	0.002*	0.010*
Religion						
Muslim	56 (21.2)	124 (47.0)	75 (28.4)	108 (40.9)	47 (17.8)	57 (21.6)
Hinduism	07 (28.0)	07 (28.0)	05 (20.0)	9 (36.0)	05 (20.0)	5 (20.0)
P value	0.432	0.069	0.369	0.633	0.786	0.853
Father education: SSC or higher						
No	37 (22.4)	85 (51.5)	46 (27.9)	62 (37.6)	26 (15.8)	28 (17.0)
Yes	26 (21.0)	46 (37.1)	34 (27.4)	55 (44.4)	26 (21.0)	34 (27.4)
P value	0.767	0.015*	0.931	0.245	0.254	0.032*
Mother education: SSC or higher						
No	36 (20.3)	85 (48.0)	52 (29.4)	73 (41.2)	28 (15.8)	29 (16.4)
Yes	27 (24.1)	46 (41.1)	28 (25.0)	44 (39.3)	24 (21.4)	33 (29.5)
P value	0.450	0.247	0.418	0.741	0.226	0.008*
Father occupation						
Service holder	15 (20.0)	30 (40.0)	15 (20.0)	26 (34.7)	12 (16.0)	15 (20.0)
Business	21 (19.8)	45 (42.3)	32 (30.2)	46 (43.4)	22 (20.8)	23 (21.7)
Migrant worker	05 (17.2)	09 (31.0)	05 (17.2)	16 (55.2)	08 (27.6)	08 (27.6)
Others	22 (27.9)	47 (59.5)	28 (35.4)	29 (36.7)	10 (12.7)	16 (20.3)
P value	0.487	0.019*	0.090	0.213	0.253	0.846
Mother as homemaker						
No	09 (24.3)	17 (46.0)	13 (35.1)	17 (46.0)	05 (13.5)	05 (13.5)
Yes	54 (21.4)	114 (45.2)	67 (26.6)	100 (39.7)	47 (18.7)	57 (22.6)
P value	0.690	0.936	0.278	0.469	0.447	0.208
Birth order						
1	25 (19.5)	52 (40.6)	31 (24.2)	51 (39.8)	21 (16.4)	26 (20.3)
2	19 (21.8)	39 (44.8)	25 (28.7)	38 (43.7)	18 (20.7)	17 (19.5)
3+	19 (25.7)	40 (54.1)	24 (32.4)	28 37.8)	13 (17.6)	19 (25.7)
P value	0.595	0.180	0.438	0.739	0.720	0.585

Table 3 Distribution of lifestyle variables over the depressive symptoms (N=289)

Sample size (%)

Lifestyle variables	Worthlessness	Sad or hopeless	Confusion	Aggression	Insomnia	Fatigue
Perform physical activity daily						
No	18 (25.4)	33 (46.5)	16 (22.5)	30 (42.3)	31 (14.2)	37 (17.0)
Yes	45 (20.6)	98 (45.0)	64 (29.4)	87 (39.9)	21 (29.6)	25 (35.2)
P value	0.404	0.823	0.264	0.727	0.003*	0.001*
Physical activity duration (min/day)						
<30	25 (20.3)	61 (49.6)	34 (27.6)	54 (43.9)	32(26.0)	36 (29.3)
30–60	23 (24.0)	43 (44.8)	25 (26.0)	34 (35.4)	15 (15.6)	21 (21.9)
>60	15 (21.4)	27 (38.6)	21 (30.0)	29 (41.4)	05 (7.1)	05 (7.1)
P value	0.809	0.332	0.853	0.439	0.003*	0.002*
Sleep duration (h/day)						
<7	27 (35.5)	40 (52.6)	20 (26.3)	31 (40.8)	–	23 (30.3)
7–9	33 (16.7)	84 (42.4)	54 (27.3)	77 (38.9)	–	39 (19.7)
>9	03 (20.0)	07 (46.7)	06 (40.0)	09 (60.0)	–	00 (0.00)
P value	0.004*	0.313	0.570	0.275	–	0.014*
Screen time (h/day)						
<1	15 (19.7)	30 (39.5)	15 (19.7)	34 (44.7)	13 (17.1)	18 (23.7)
1–2	30 (20.6)	63 (43.2)	39 (26.7)	48 (32.9)	27 (18.5)	28 (19.2)
>2	18 (26.9)	38 (56.7)	26 (38.8)	35 (52.2)	12 (17.9)	16 (23.9)
P value	0.514	0.089	0.037*	0.019*	0.968	0.635

Table 4 Binary logistic model fitted to sociodemographic and lifestyle factors with depressive symptoms

Covariates	Worthlessness		Sad or hopeless		Confusion		Aggression		Insomnia		Fatigue	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Area of residence (ref: rural)												
Urban	1.3 (0.7,2.3)	–	2.3 (1.4, 3.7)	1.5 (0.8, 2.9)	1.5 (0.9, 2.5)	1.1 (0.6, 2.0)	1.0 (0.6, 1.6)	–	0.8 (0.4, 1.4)	–	0.9 (0.6, 1.7)	–
P values	0.372		0.001	0.182	0.132	0.838	0.957		0.391		0.925	
Sex (ref: boys)												
Girls	0.9 (0.5, 1.5)	–	1.8 (1.1, 2.8)	2.1 (1.1, 3.8)	1.1 (0.7, 1.9)	–	1.0 (0.6, 1.6)	–	2.0 (1.1, 3.7)	1.5 (0.7, 3.0)	2.3 (1.3, 4.2)	1.7 (0.8, 3.3)
P values	0.628		0.018	0.018	0.697		0.948		0.034	0.316	0.006	0.142
Age in years (ref: 10–14)												
15–19	3.3 (1.8, 5.9)	1.3 (0.5, 3.1)	2.3 (1.4, 3.7)	2.2 (0.9, 5.1)	1.5 (0.9, 2.5)	1.0 (0.4, 2.3)	1.1 (0.7, 1.8)	–	2.6 (1.4, 4.8)	1.8 (0.7, 4.6)	1.2 (0.7, 2.2)	–
P values	<0.0001	0.563	0.001	0.065	0.115	0.993	0.593		0.003	0.253	0.449	
Attending grade (ref: grade VI)												
Grade IX	4.9 (2.5, 9.6)	3.6 (1.4, 9.4)	2.0 (1.3, 3.2)	1.1 (0.5, 2.7)	1.7 (1.0, 2.9)	1.6 (0.7, 3.8)	1.4 (0.9, 2.2)	–	2.8 (1.4, 5.3)	1.4 (0.5, 4.0)	2.2 (1.2, 3.9)	1.4 (0.8, 2.8)
P values	<0.0001	0.010	0.003	0.770	0.042	0.267	0.174		0.002	0.496	0.011	0.270
Religion (ref: Muslim)												
Hinduism	1.4 (0.6,3.6)	–	0.4 (0.2, 1.1)	0.5 (0.2, 1.4)	0.6 (0.2, 1.7)	–	0.8 (0.3, 1.9)	–	1.2 (0.4, 3.2)	–	0.9 (0.3, 2.5)	–
P values	0.434		0.075	0.170	0.373		0.633		0.785		0.853	
Father education: SSC or higher (ref: no)												
Yes	0.9 (0.5, 1.6)	–	0.6 (0.3, 0.9)	0.7 (0.4, 1.1)	0.9 (0.6, 1.6)	–	1.3 (0.8, 2.1)	–	1.4 (0.8, 2.6)	–	1.8 (1.1, 3.3)	1.2 (0.6, 2.5)
P values	0.767		0.015	0.140	0.931		0.246		0.255		0.034	0.639

Table 4 (continued)

Covariates	Worthlessness		Sad or hopeless		Confusion		Aggression		Insomnia		Fatigue	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Mother education: SSC or higher (ref: no)												
Yes	1.2 (0.7, 2.2)	–	0.8 (0.5, 1.2)	–	0.8 (0.5, 1.4)	–	0.9 (0.6, 1.5)	–	1.5 (0.8, 2.7)	–	2.1 (1.2, 3.8)	1.5 (0.7, 3.2)
P values	0.450		0.248		0.418		0.741		0.228		0.009	0.258
Father occupation (ref: service holder)												
Business	0.9 (0.5, 2.1)	–	1.1 (0.6, 2.0)	1.0 (0.5, 1.9)	1.7 (0.9, 3.5)	1.8 (0.9, 3.6)	1.4 (0.8, 2.7)	1.4 (0.8, 2.7)	1.4 (0.6, 3.0)	–	1.1 (0.5, 2.3)	–
p values	0.975		0.741	0.989	0.126	0.123	0.238	0.264	0.421		0.782	
Migrant worker	0.8 (0.3, 2.5)	–	0.7 (0.3, 1.7)	0.8 (0.3, 2.4)	0.8 (0.3, 2.5)	1.1 (0.3, 3.6)	2.3 (0.9, 5.6)	2.4 (0.9, 5.8)	2.0 (0.7, 5.6)	–	1.5 (0.6, 4.1)	–
P values	0.749		0.398	0.747	0.749	0.873	0.059	0.060	0.184		0.405	
Others	1.5 (0.7, 3.3)	–	2.2 (1.2, 4.2)	1.4 (0.7, 3.0)	2.2 (1.1, 4.6)	2.1 (0.9, 4.5)	1.1 (0.6, 2.1)	0.9 (0.5, 1.8)	0.8 (0.3, 1.9)	–	1.0 (0.5, 2.2)	–
P values	0.256		0.016	0.340	0.035	0.052	0.792	0.852	0.554		0.969	
Mother housewife (ref: no)												
Yes	0.8 (0.4, 1.9)	–	0.9 (0.5, 1.9)	–	0.7 (0.3, 1.4)	–	0.8 (0.4, 1.5)	–	1.5 (0.5, 4.0)	–	1.9 (0.7, 5.0)	–
P values	0.691		0.936		0.280		0.469		0.450		0.214	
Birth order (ref: 1)												
2	1.2 (0.6, 2.3)	–	1.2 (0.7, 2.1)	1.0 (0.5, 1.8)	1.3 (0.7, 2.3)	–	1.2 (0.7, 2.0)	–	1.3 (0.7, 2.7)	–	0.9 (0.5, 1.9)	–
P values	0.681		0.541	0.995	0.459		0.575		0.425		0.889	
3+	1.4 (0.7, 2.8)	–	1.7 (0.9, 3.1)	1.4 (0.7, 3.0)	1.5 (0.8, 2.8)	–	0.9 (0.5, 1.7)	–	1.1 (0.5, 2.3)	–	1.4 (0.7, 2.7)	–
P values	0.309		0.066	0.293	0.208		0.778		0.832		0.378	

Table 4 (continued)

Covariates	Worthlessness OR (95% CI)	Worthlessness AOR (95% CI)	Sad or hopeless OR (95% CI)	Sad or hopeless AOR (95% CI)	Confusion OR (95% CI)	Confusion AOR (95% CI)	Aggression OR (95% CI)	Aggression AOR (95% CI)	Insomnia OR (95% CI)	Insomnia AOR (95% CI)	Fatigue OR (95% CI)	Fatigue AOR (95% CI)
Perform physical activity (ref: no)												
Yes	0.8 (0.4, 1.4)	–	0.9 (0.5, 1.6)	–	1.4 (0.8, 2.7)	–	0.9 (0.5, 1.6)	–	0.4 (0.2, 0.7)	0.7 (0.3, 1.7)	0.4 (0.2, 0.7)	0.6 (0.2, 1.4)
P values	0.405		0.823		0.266		0.727		0.004	0.420	0.001	0.217
Physical activity duration (ref: <30 min/day)												
30–60	1.2 (0.6, 2.3)	–	0.8 (0.5, 1.4)	1.3 (0.7, 2.5)	0.9 (0.5, 1.7)	–	0.7 (0.4, 1.2)	–	0.5 (0.3, 1.0)	0.9 (0.3, 2.2)	0.7 (0.4, 1.3)	1.3 (0.5, 3.1)
	0.519		0.480	0.368	0.791		0.204		0.066	0.749	0.217	0.590
>60	1.1 (0.5, 2.2)	–	0.6 (0.4, 1.2)	1.0 (0.5, 2.2)	1.1 (0.6, 2.1)	–	0.9 (0.5, 1.6)	–	0.2 (0.1, 0.6)	0.4 (0.1, 1.4)	0.2 (0.1, 0.5)	0.5 (0.1, 1.5)
P values	0.856		0.140	0.913	0.727		0.739		0.003	0.159	0.001	0.203
Sleep duration (ref: <7 h/day)												
7–9	0.4 (0.2, 0.7)	0.5 (0.2, 0.9)	0.7 (0.4, 1.1)	0.7 (0.4, 1.3)	1.1 (0.6, 1.9)	–	0.9 (0.5, 1.6)	–	–	–	0.6 (0.3, 1.0)	0.7 (0.4, 1.4)
	0.001	0.018	0.130	0.230	0.873		0.773				0.063	0.355
>9	0.5 (0.1, 1.7)	0.7 (0.2, 3.0)	0.8 (0.3, 2.4)	0.9 (0.3, 3.2)	1.9 (0.6, 5.9)	–	2.2 (0.7, 6.7)	–	–	–	–	–
P values	0.251	0.663	0.673	0.939	0.288		0.177					
Screen time (ref: <1 h/day)												
1–2	1.1 (0.5, 2.1)	–	1.2 (0.7, 2.1)	0.9 (0.4, 1.7)	1.5 (0.8, 2.9)	1.4 (0.7, 2.8)	0.6 (0.3, 1.1)	0.6 (0.4, 1.1)	1.1 (0.5, 2.3)	–	0.8 (0.4, 1.5)	–
P values	0.887		0.598	0.646	0.252	0.384	0.083	0.124	0.799		0.433	
>2	1.5 (0.7, 3.3)	–	2.0 (1.0, 3.9)	1.4 (0.6, 3.2)	2.6 (1.2, 5.5)	2.2 (0.9, 5.0)	1.4 (0.7, 2.6)	1.6 (0.8, 3.1)	1.1 (0.4, 2.5)	–	1.0 (0.5, 2.2)	–
P values	0.314		0.040	0.398	0.013	0.068	0.371	0.202	0.899		0.978	

religion, parent's educational and occupational status, birth order, and daily screen time duration did not have any significant association with any of the six depressive symptoms in this study.

Discussion

Mental health is a much-neglected issue for developing countries like Bangladesh. In few of the mental health-related studies that exist for Bangladesh, the adult population was prioritized, and thus, very little is known about mental health disorders, such as depression, in children and adolescents. In that backdrop, this study set an objective to understand the prevalence of depressive symptoms in adolescents aged 10–19 years in Bangladesh and to evaluate the putative sociodemographic and lifestyle risk factors associated with these symptoms. It was observed that out of the sampled 289 adolescents, the percentage of adolescents suffering from worthlessness, sadness, confusion, aggression, insomnia, and fatigue were 21.8%, 45.3%, 27.7%, 40.5%, 18.0%, and 21.5%, respectively. The sex of the student, grade of study, and duration of daily sleep showed differential associations with these symptoms. These findings indicate a crucial stage of adolescence, where the study pressure could exacerbate depressive symptoms and may lead to chronic depression in the later phase of life. This study also revealed that adolescent girls could be more susceptible to depressive symptoms compared to boys.

While adolescence is a transition part of life for girls and boys, girls in Bangladesh are typically burdened with multifaceted societal pressure. Child marriage in Bangladesh remains highly prevalent; over 52% of children are married before reaching 18 (Biswas et al., 2019; UNICEF, 2016). Given the study sample includes late teenagers, who reached a critical age where girls also expected to leave school and start a family (Amin, 2011; Mahmud & Amin, 2006), these could lead to a higher tension among girls at this stage, and the inevitable outcome could lead to increased sadness, as found in this study.

Furthermore, due to the conservative settings of Bangladesh, girls are mainly confined to homes and are highly discouraged from engaging in activities that promote mental well-being. Parents tend to pressurize female adolescents to suppress their mental health problems, as a preparation for the adversities to be faced at the in-law's place after marriage. In addition to these family pressures, the poor law and order conditions in the country expose girls to regular sexual harassments, which instigate further stress, fear, and tension among adolescent girls. Therefore, compared to boys of the same age, girls have to tackle multidimensional problems, which could explain the observed differences in the results.

Grade IX is a crucial stage in Bangladesh academically as students are expected to prepare for their first major national examination—secondary school certificate—based on the syllabus of grades IX and X (Rahman et al., 2010). It is expected that this stage will create additional pressure on the adolescents, particularly the start of grade IX (Mamun et al., 2019). Suicidal tendencies following these examinations are regularly reported and are headlined each year (Arusha & Biswas, 2020; The New Age, 2020). Furthermore, parents in Bangladesh are observed to put an additional burden on students during such examinations, often with higher concern of social glory than academic practicality (Hossain, 2013). These could lead to an increased feeling of worthlessness among grade IX students compared to younger students, as reported in this study.

Inadequate sleep was found to be associated with worthlessness, which is consistent with several studies that have shown the negative impact of sleeplessness and found it to

be linked with depressive symptoms (McAdam & Johnson, 2018; Ulusoy & Demir, 2005). Lack of sleep is generally associated with excessive pressure, either from studies or the shift to adulthood, which eventually could lead to self-doubt (Clarke & Harvey, 2012). Sleep duration in modern days is often disrupted by activities such as active use of social media, excessive application of electronic games, or rampant internet use (Biswas & Kabir, 2018; Hale & Guan, 2015). Degressive symptoms such as worthlessness are common in adolescents with such modern-day behavioral patterns.

The three risk factors detected in this study—sex, school grade, and sleep pattern, all lead to a subset of vulnerable groups. Females in grade IX, on average, were aged 14.98 years, which is the peak time of marriage for half of the women in the country (Biswas et al., 2019). These added pressures could lead to a lack of sleep and, thus, the depressive symptoms. While the interaction between these variables could infer more information, it remained unexplored in this study due to limited sample size.

The study had few limitations. First, the study was quantitative in nature. It did not have qualitative information to analyze deeper into the depressive symptoms. Second, the analysis was cross-sectional, which bars it from causal interpretation. Third, due to the secondary school certificate examination, data on grade X could not be collected, which would have substantiated the argument on academic pressure. Fourth, the study was limited to one questionnaire and was cross-sectional. Thus, causal interpretation of the findings requires caution. Finally, the study did not target a population that was undergoing major mental health issues; thus, the findings might not have picked up major depressive symptoms.

Despite these limitations, this study took up the challenge of studying the depressive symptoms prevailing among adolescents in Bangladesh. Given the funding and time constraints, the study attempted to cover two of the most vulnerable adolescent age groups (10–14 and 15–19) and attempted to provide insights on the nature of depression during the beginning and end of puberty years. The findings of this primary study allowed an estimation of mental health issues in the general population, which could provide critical directions to future researchers for devising a more comprehensive and in-depth study. This study has identified the need to focus on mental health issues during adolescence to help reduce mental health burdens among adults in the future.

Conclusion

Bangladesh, similar to most LMICs, has not prioritized mental health despite growing burden of disease. Moreover, with the increase of suicide rate every year, this is important to recognize the issue. The current study has identified that almost half of the random sample on adolescents have showed some forms of depressive symptoms. This is a concern because most of the schools or universities in Bangladesh are not equipped to deal with mental health matters in Bangladesh. Furthermore, these problems are also attracting less academic attention, which are yet to translate to evidence-based policies. Thus, more studies on adolescent mental health and depressive behaviors are required in Bangladesh to monitor progress on goals such as SDG 3.4 and raise its concern to the relevant stakeholders.

Declarations

Ethics Approval and Consent to Participate Ethical clearance was taken from the Ethical Committee of Dhaka Medical College (MEUDMC/ECC/2019/130).

Consent for Publication All authors read the final manuscript and approved it.

Competing Interests The authors declare no competing interests.

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