



## Research article

## Prevalence and factors associated with depression among the mothers of school-going children in Dhaka city, Bangladesh: A multi stage sampling-based study



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## ABSTRACT

**Background:** Motherhood is associated with extra stress, and mothers of young children are particularly prone to developing depression and mental health problems.

**Methodology:** This analytical cross-sectional study was conducted in Dhaka city, Bangladesh, from June to December 2019. Mothers of school-going children were recruited through a multistage sampling technique. Dhaka city was divided into two divisions and then further subdivided into public and private sectors. Six schools were selected from each sector by using a simple random sampling technique. A list of class five to eight students were collected from each school by systematic random sampling. Data were collected through face-to-face interviews using semi-structured questionnaires. The rate of depressive symptoms was measured by the validated Zung Self-Rating Depression Scale (SDS).

**Result:** A total of 324 women participated in this study; the majority of the women (85.5%) were Muslim, 67.0% were housewives, and 53.1% had a girl child. Among the women, 15.4% had mild, 22.2% had moderate, and 20.1% had severe depression. Most of the child's behavioral and lifestyle factors were associated with the mother's depression. Adjusted analyses indicate that if a child is often unhappy, depressed, or tearful [(OR (95%CI) = 22.27 (8.39–59.11)], gets nervous in new situations or easily loses confidence [(OR (95%CI) = 5.45 (2.96–10.00)], often lies or cheats [(OR (95%CI) = 8.93 (3.76–21.22)], gets afraid easily [(OR (95%CI) = 7.09 (3.79–13.24)], watches television for 3 h or more [(OR (95%CI) = 23.77 (6.46–87.48)] browses the internet for 3 h or more [(OR (95%CI) = 7.37 (2.76–19.67)] were associated with mother's depression.

**Conclusion:** The study concludes that depression among the mothers of school-going children in Dhaka city of Bangladesh is high. Several lifestyles and behavioral factors of school-going children are significantly associated with the mothers' depression.

## 1. Introduction

Depression, a leading cause of mental health-related disorder, affects an estimated 300million people globally [1]. Based on the severity, depressive symptoms are categorized as mild, moderate and severe. It can result from an interaction of various social, biological and psychological factors. For instance, individuals who had undergone adverse life events are more susceptible to depression [2]. Depression refers to a mental

state of low mood and a loss of interest in activities, severely limiting psychological functions, reducing the quality of life, and acting as a risk factor for suicide [3]. The signs and symptoms of depression comprises of persistent sad or 'empty' mood, fatigue, feeling of helplessness and hopelessness, etc. Moreover, depression can also impair concentration and decision-making ability [4]. As aforementioned, depression acts as a risk factor for suicide, as approximately 0.8 million people die from suicide annually [2]. Ranked by the World Health Organization as the

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largest contributor to global disability, 4.4 % of world's population suffer from depression [3].

Depression is one of the most important causes of morbidity and disability in developing countries, as one-fifth of mental health cases are from South Asia [5, 6]. Bangladesh occupies the 4th position in terms of percentage of the population with depression (4.1 % of the total population) and 3rd position in terms of the number of cases in the region of South-East Asia [7].

The impact of depression is felt by society as a whole, which lags due to the huge burden [8].

Apart from health consequences, depression and anxiety have severe financial implications with an estimated annual cost of US\$1trillion [9]. Mounting evidence suggests that women are much more likely to suffer from depression compared to their male counterparts, with one in every three women suffering from mental disorders globally [10]. Since motherhood is associated with extra stress and that mothers of young children are particularly prone to developing depression and mental health problems, depression in mothers poses a serious public health concern [11]. A very recent study found a high prevalence of major depression among middle-aged Bangladeshi women during the menopause transition [12]. This psychiatric disease is not only limited to mothers but also hamper the psychological development in children and adolescents [13]. Children of depressed mothers exhibit impaired cognitive, psychological, social functions and can acquire depression themselves. Besides, these children are likely to perform poorly in school [14].

Many mothers combat depression daily as they feel let down and sad, and many of them are not even aware of it, which further compounds the issue. Hence, early diagnosis and treatment are imperative for improving both mothers' and children's quality of life. Although there is a dearth of published literature reporting depression in mothers of Low-and Middle-Income Countries, few prior studies reported a significant burden of maternal depression and depression during pregnancy in the South Asian region [15]. Besides, numerous studies revealed the relationship between behavioral problems in children and depression in mothers [16, 17, 18]. Similarly, a high prevalence of depression was reported in mothers whose children had autism spectrum disorder [19]. However, to our best knowledge, no study has yet been conducted which explored the depression level of mothers with school-going children and the factors associated with it. This study is the first to explore this issue and identify important knowledge gaps in determining the prevalence and factors associated with it. Therefore, this study is aimed to investigate the prevalence and factors associated with depression among the mothers of school-going children in Dhaka city, Bangladesh.

## 2. Methods

This analytical cross-sectional study was conducted in Dhaka, Bangladesh, from June to December 2019. Mothers of school-going children (class five to eight) studying in public and private schools of Dhaka city were recruited from twelve schools.

Considering 18% prevalence of depression [20], 4.18% error, and a 95% confidence interval. Our study's sample size was 324. Sample size was calculated using software G\*power. Our inclusion criteria were the mothers of children from class five to eight and studying in the same school for at least six months. As we have tested different lifestyle factors of children such as cycling, internet use, mobile games with mothers' depression, that's why we hypothesized those factors may not present before the child's academic year of class five. Exclusion criteria were mothers not willing to participate in the study.

A multistage sampling technique (Figure 1) was followed to reach the target population as Dhaka was divided into two divisions (Dhaka North and South) and then further subdivided into public and private sectors from which a list of public and private schools was collected. At the initial stage, six public and six private schools were selected from each sector by using a simple random sampling technique. At the subsequent stage, a list

of class five to eight students was collected from each school as the target sample size was drawn by systematic random sampling technique.

Informed written consent was taken from participants before the interview ensuring strict data confidentiality. The protocol evaluation committee of the Department of Public Health in Daffodil International University (DIU) approved the study. The Principal Investigator (PI), with the mentor's assistance, developed the questionnaires for socio-economic variables and characteristics of the children, which further comprised of temperamental, behavioral, and lifestyle aspects of the children were assessed. The temperament of the children (whether the child was sanguine/choleric/melancholic/phlegmatic) was determined by the respective mothers' statement.

The questionnaires were reviewed by the other co-authors. The Research Ethics Committee, Faculty of Allied Health Sciences, DIU reviewed and approved the study. Questionnaires were finalized after pretesting. Pretesting was undertaken to check for validity, appropriateness, and consistency of the variables used in the study. The questionnaires were initially prepared in English and then translated to Bengali to check the appropriateness again translated to English for the manuscript. The Bengali version of the questionnaire was pretested in the six areas not part of the study (non-sampling area) to get feedback on the suitability, appropriateness, and sequencing of the questions. Since there was only one interviewer, (the PI) inter-rater reliability check was not deemed necessary. Data were collected through face-to-face interviews by using semi-structured questionnaires. The rate of depressive symptoms was measured by the validated Zung Self-Rating Depression Scale (SDS), which quantified the depressed state of a patient, comprising of 20 items and scored on a scale of 1–4. The SDS is convenient for identifying clinically significant depressive symptoms in older adults [21, 22]. The scores have been weighted to 100 percent, with 25–49 categorized as no depression, 50–59 as mild depression, 60–69 as moderate depression, and 70 or above as severe depression. The reliability score or Cronbach's alpha for the questionnaires (20 items) was 0.894, denoting a relatively high internal consistency level [23]. The evaluation was done once as no retesting was conducted. As the aim was to identify the prevalence and factors associated with depression, subjects scoring in the range of 50 to above 70, i.e., evaluated with mild to severe depression, were not given any interventions.

The completeness and accuracy of the data were checked thoroughly. Data were coded, entered, and cleaned using SPSS software (version 25.0). Descriptive statistics like frequencies and proportions were used to summarize the data. The Cronbach's alpha coefficient was calculated to check the reliability of the English version of the Zung Self-rating depression scale. The chi-square test was used to measure the degrees of association between the outcome and the independent variables. Fisher's exact test was conducted when at least one cell had an expected value of less than 5. Multivariable analyses were carried out using binary logistic regression to examine the relationship between the outcome variable and independent variables. Our dependent variable was mother's depression and independent variables were socioeconomic characteristics, child's behavioral factors, and child's lifestyle factors. We set the statistical significance (p-value) of <0.05. Adjusted odds ratios (AOR) and their 95% confidence intervals (CIs) were used as indicators for the strength of association.

## 3. Results

The study evaluated the prevalence of depression among mothers of school-going children. About 42.3% of mothers had no depression, 15.4% of mothers had mild depression, 22.2% of mothers had moderate depression, and 20.1% of mothers had severe depression (Figure 2).

Our study found that religion, educational qualification, husband's education, occupation, monthly family income and gender of the child are significantly associated with depression of mothers of school-going children at 5% level of significance as p value less than 0.05 (Table 1).

In our study, the distribution of a child's behavior and their association with the mother's depression. It is found that child's temperament; child often unhappy, depressed or tearful; child nervous in new situations, easily loses confidence; child often lie or cheats, child steals from home, school or elsewhere; and child has fear & easily scared are significantly associated with depression of mothers of school-going children at 5% level of significance as p value less than 0.05 (Table 2).

Our study has shown the association between a child's lifestyle factors with the mother's depression. From the table, it can be observed that apart from playing mobile games, all other lifestyle factors - child watch television; child do physical activities; child perform outdoor games; child spent hour to use internet; child's sleeping hour have a significant association with the mother's depression at 5% level of significance as p value less than 0.05 (Table 3).

The results of odds ratio for depression of mothers of school-going children. The gender of a child is insignificant with depression among the mothers after adjusting for other independent variables. A child often unhappy, depressed, or tearful is strongly significant with mother's depression. If a child gets nervous in a new situation or easily loses confidence, the odds of depression were five-fold higher in their mothers. Likewise, a mother's depression was almost nine times higher if a child lies or cheats after adjusting for other variables. The mother's depression

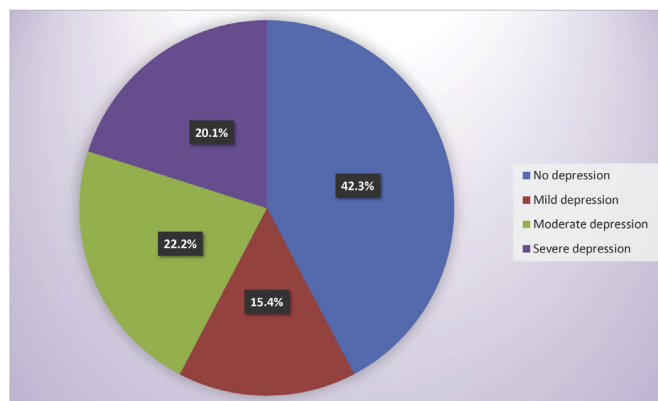


Figure 2. Level of depression among the mothers of school-going children.//cgqa

was seven times higher if a child gets afraid easily. For the variable duration of a child's television watching, 1–2 h of watching was significant, however, when the child's duration of watching television was equal or more than 3 h, the depression of the mother was very high.

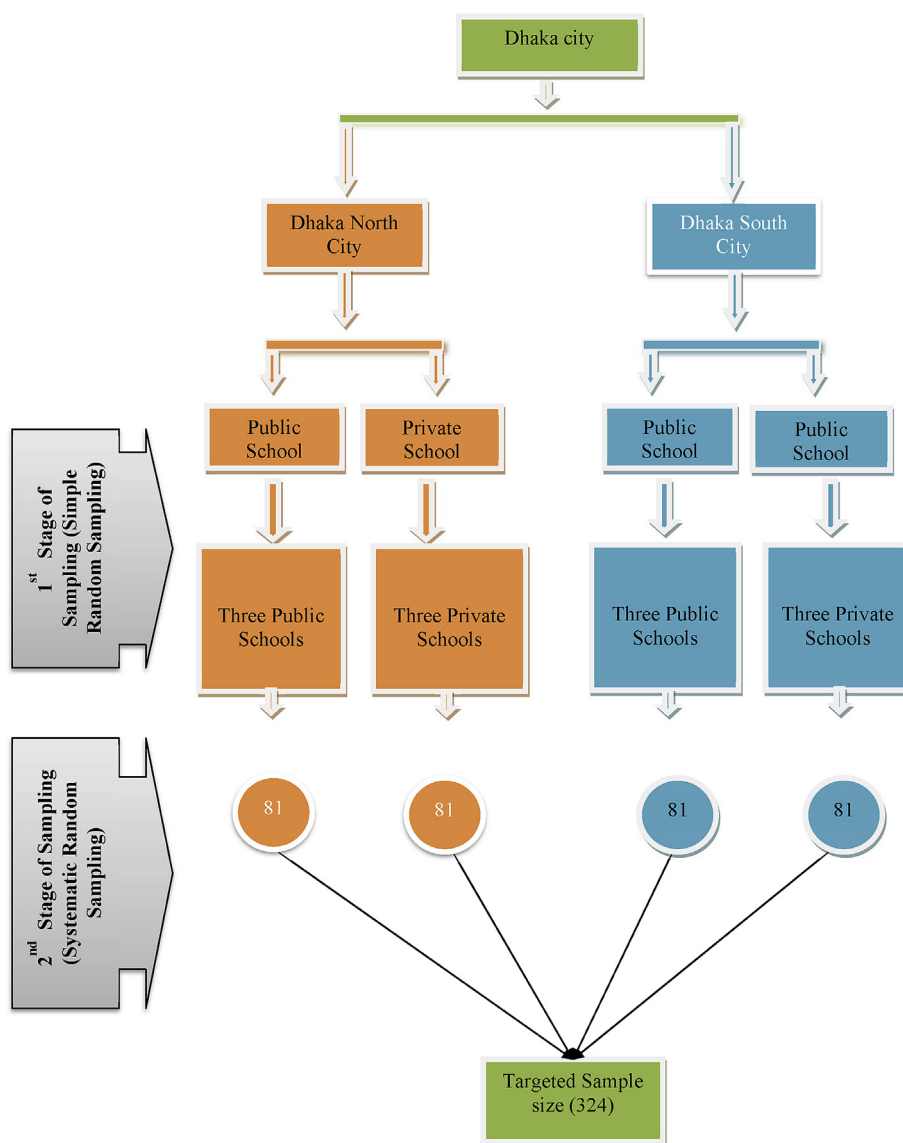


Figure 1. Multistage sampling strategy (n = 324).

**Table 1.** Association between socioeconomic statuses of the participants and depression.

Characteristics	No depression n (%)	Mild depression n (%)	Moderate depression n (%)	Severe depression n (%)	Total n (%)	p value
<b>Religion</b>						
Muslim	125 (45.1)	43 (15.5)	52 (18.8)	57 (20.6)	277 (85.5)	<b>0.003</b>
Others	12 (25.5)	7 (14.9)	20 (42.6)	8 (17.0)	47 (14.5)	
<b>Educational qualification</b>						
≤Higher Secondary	77 (45.3)	32 (18.8)	29 (17.1)	32 (18.8)	170 (52.5)	<b>0.046</b>
>Higher secondary	60 (39.0)	18 (11.7)	43 (27.9)	33 (21.4)	154 (47.5)	
<b>Husband's education</b>						
≤Higher Secondary	20 (25.6)	17 (21.8)	20 (25.6)	21 (26.9)	78 (24.1)	<b>0.006</b>
>Higher secondary	117 (47.6)	33 (13.4)	52 (21.1)	44 (17.9)	246 (75.9)	
<b>Occupation</b>						
Housewife	124 (57.1)	35 (16.1)	29 (13.4)	29 (13.4)	217 (67.0)	<b>&lt;0.001</b>
Employed	13 (12.1)	15 (14.0)	43 (40.2)	36 (33.6)	107 (33.0)	
<b>Monthly family income</b>						
<50,000	69 (45.1)	29 (19.0)	23 (15.0)	32 (20.9)	153 (47.2)	<b>0.021</b>
≥50,000	68 (39.8)	21 (12.3)	49 (28.7)	33 (19.3)	171 (52.8)	
<b>Types of family</b>						
Nuclear	112 (42.1)	41 (15.4)	61 (22.9)	52 (19.5)	266 (82.1)	0.909
Joint	25 (43.1)	9 (15.8)	11 (19.0)	13 (22.4)	58 (17.9)	
<b>Gender of the child</b>						
Boy	73 (48.0)	32 (21.1)	28 (18.4)	19 (12.5)	152 (46.9)	<b>&lt;0.001</b>
Girl	64 (37.2)	18 (10.5)	44 (25.6)	46 (26.7)	172 (53.1)	

Bold values signifies  $P < 0.05$ .

Nevertheless to television watching, use of the internet for 1–2 h was not significantly associated with mother's depression, whereas using for 3 h or more was strongly significant. Lastly, no association was observed between a child's playing of mobile games and depression among the mothers (Table 4).

#### 4. Discussion

The rationale of our study was to evaluate the prevalence and factors associated with depression among the mothers of school-going children in Dhaka city, Bangladesh. Our study found that more than 40% of

mothers of school-going children suffered from moderate to severe depression. A very recently published Bangladeshi study conducted among pre-, peri-, and post-menopausal women of Dhaka city found major depression to be 30.4% [8]. One study examined prevalence of depressive symptoms in secondary school children in the same city and found 25% of the students reported depressive symptoms and with more common among females than males (30% vs 19%) [24]. A multi-country study reported maternal depression to be very high among women with children between 0 to 5 years old, which is similar to our findings [25].

An old study reported mood difference between four Galen personality types, which stated Ill-tempered/Choleric types of people showed

**Table 2.** Association between child's behavioral factors and mother's depression.

Characteristics	No depression n (%)	Mild depression n (%)	Moderate depression n (%)	Severe depression n (%)	Total n (%)	p value
<b>Child's temperament</b>						
Sanguine	88 (58.7)	30 (20.0)	22 (14.7)	10 (6.7)	150 (46.3)	<b>&lt;0.001</b>
Choleric	8 (11.0)	7 (9.6)	33 (45.2)	25 (34.2)	73 (22.5)	
Melancholic	0 (0.0)	3 (12.0)	4 (16.4)	18 (72.0)	25 (7.7)	
Phlegmatic	41 (53.9)	10 (13.2)	13 (17.1)	12 (15.8)	76 (23.5)	
<b>Child often unhappy, depressed or tearful</b>						
Not true	132 (62.3)	38 (17.9)	29 (13.7)	13 (6.1)	212 (65.4)	<b>&lt;0.001</b>
Somewhat/certainly true	5 (4.5)	12 (10.7)	43 (38.4)	52 (46.4)	112 (34.6)	
<b>Child nervous in new situations, easily loses confidence</b>						
Not true	114 (57.3)	34 (17.1)	29 (14.6)	22 (11.1)	199 (61.4)	<b>&lt;0.001</b>
Somewhat/certainly true	23 (18.4)	16 (12.8)	43 (34.4)	43 (34.4)	125 (38.6)	
<b>Child often lie or cheats</b>						
Not true	130 (51.4)	38 (15.0)	48 (19.0)	37 (14.6)	253 (78.1)	<b>&lt;0.001</b>
Somewhat/certainly true	7 (9.9)	12 (16.9)	24 (33.8)	28 (39.4)	71 (21.9)	
<b>Child steals from home, school or elsewhere</b>						
Not true	136 (45.8)	47 (15.8)	63 (21.2)	51 (17.2)	297 (91.7)	<b>&lt;0.001</b>
Somewhat/certainly true	1 (3.7)	3 (11.1)	9 (33.3)	14 (51.9)	27 (8.3)	
<b>Child has fear, easily scared</b>						
Not true	116 (55.2)	34 (16.2)	37 (17.6)	23 (11.0)	210 (64.8)	<b>&lt;0.001</b>
Somewhat/certainly true	21 (18.4)	16 (14.0)	35 (30.7)	42 (36.8)	114 (35.2)	

Bold values signifies  $P < 0.05$ .

**Table 3.** Association between child's lifestyle factors and mother's depression.

Characteristics	No depression n (%)	Mild depression n (%)	Moderate depression n (%)	Severe depression n (%)	Total n (%)	p value
<b>Child watch television (per day)</b>						
Not watch	65 (53.3)	21 (17.2)	20 (16.4)	16 (13.1)	122 (37.7)	<b>&lt;0.001</b>
1–2 h	69 (45.1)	23 (15.0)	41 (26.8)	20 (13.1)	153 (47.2)	
3 h or more	3 (6.1)	6 (12.2)	11 (22.4)	29 (59.2)	49 (15.1)	
<b>Physical activities (i.e. walk/bicycle riding/physical exercise at least 1 h per day)</b>						
Yes	77 (50.7)	32 (21.1)	28 (18.4)	15 (9.9)	152 (46.9)	<b>&lt;0.001</b>
No	60 (34.9)	18 (10.5)	44 (25.6)	50 (29.1)	172 (53.1)	
<b>Perform outdoor games (at least 3 h per day)</b>						
Yes	85 (50.0)	33 (19.4)	31 (18.2)	21 (12.4)	170 (52.5)	<b>&lt;0.001</b>
No	52 (33.8)	17 (11.0)	41 (26.6)	44 (28.6)	154 (47.5)	
<b>Play mobile games (at least 30 min per day on school days and at least 2 h per day on non- school days)</b>						
Yes	67 (45.0)	28 (18.8)	32 (21.5)	22 (14.8)	149 (46.0)	0.093
No	70 (40.0)	22 (12.6)	40 (22.9)	43 (24.6)	175 (54.0)	
<b>Hour of internet use (per day)</b>						
Not use	70 (50.4)	26 (18.7)	21 (15.1)	22 (15.8)	139 (42.9)	<b>&lt;0.001</b>
1–2 h	61 (48.0)	19 (15.0)	27 (21.3)	20 (15.7)	127 (39.2)	
3 h or more	6 (10.3)	5 (8.6)	24 (41.4)	23 (39.7)	58 (17.9)	
<b>Hour of sleep (per day)</b>						
<8 h	54 (34.8)	17 (11.0)	42 (27.1)	42 (27.1)	155 (47.8)	<b>&lt;0.001</b>
≥8 h	83 (49.1)	33 (19.5)	30 (17.8)	23 (13.6)	169 (52.2)	

Bold values signifies P < 0.05.

**Table 4.** Odds ratio for depression of mothers of school-going children.

Variables	AOR (95% CI)	p value
<b>Gender of child</b>		
Boy	Reference	
Girl	1.593 (0.938–2.707)	0.085
<b>Child often unhappy, depressed or tearful</b>		
Not true	Reference	
Somewhat/certainly true	<b>22.273(8.392–59.114)</b>	<b>&lt;0.001</b>
<b>Child nervous in new situations, easily loses confidence</b>		
Not true	Reference	
Somewhat/certainly true	<b>5.448(2.966–10.006)</b>	<b>&lt;0.001</b>
<b>Child often lies or cheat</b>		
Not true	Reference	
Somewhat/certainly true	<b>8.934(3.762–21.218)</b>	<b>&lt;0.001</b>
<b>Child get fear easily</b>		
Not true	Reference	
Somewhat/certainly true	<b>7.087(3.793–13.239)</b>	<b>&lt;0.001</b>
<b>Child watch television (per day)</b>		
Not watching	Reference	
1–2 h	<b>2.059(1.160–3.653)</b>	<b>0.014</b>
3 h or more	<b>23.768(6.458–87.480)</b>	<b>&lt;0.001</b>
<b>Child play mobile games (at least 30 min per day on school days and at least 2 h per day on non- school days)</b>		
No	Reference	
Yes	0.824 (0.494–1.374)	0.457
<b>Hour of internet use per day</b>		
Not use	Reference	
1–2 h	1.230 (0.701–2.158)	0.471
3 h or more	<b>7.368(2.760–19.665)</b>	<b>&lt;0.001</b>

Adjusted by religion, education, husband's education, occupation and monthly family income.

AOR = Adjusted Odds Ratio.

CI = Confidence Interval.

Bold values signifies P < 0.05.

greater anger, Sanguine types greater Optimism, Phlegmatic/Calm exhibited less State Anxiety and least Depression while Melancholic was high on State Anxiety [26]. In our study, we have found that various behavioral factors of children were associated with mother's depression, especially the mothers who have ill-tempered and melancholic children who suffered from moderate to severe depression. Our findings were in a similar vein to a comparative study that included children of both depressed and non-depressed parents, which reported that children of depressed parents suffered from higher emotional and behavioral issues compared to the latter [27]. Likewise, another United States of America (USA) study revealed temper tantrums and unhappiness in children are associated with elevated levels of depression in mothers [14]. Our findings showed mothers of children who were nervous or easily lost confidence had a greater level of depression compared to those who were not. This was closely related to a study conducted with pre-school children where anxiety in children was associated with maternal depression [28]. Likewise, a study conducted in the USA reported depression in mothers was strongly associated with a child's internalizing behaviors (i.e., fear, depression) and externalizing behaviors (i.e., stealing, cheating, and temper tantrums) [29]. Also, a recently published study explored mothers' experiences of having an adolescent child with depression and revealed five interlinked superordinate themes, and the key finding across the themes was the emotional distress and sense of uncertainty experienced by the mothers [30]. Similarly, a recent study assessed longitudinal pathways between maternal depressive symptoms, parenting self-esteem, and infant temperament and found the mothers' confidence is influenced by their experience with a difficult infant and by their depressive symptoms [31].

Our study found a strong association of maternal depression with children's television watching. A study conducted at four pediatric clinics in Indianapolis, USA, found TV viewing added risks for reduced interpersonal interactions, which ultimately contributes to developing maternal depression [32], which was in line with another recent South Korean study [33].

Interestingly, our study did not find any association between children's mobile use and mother's depression. However, a very recent study revealed problematic phone use was positively associated with time



spent with children during meals, but it was significantly and positively associated with technology interference in 9 of 11 parenting domains (e.g., playtime, mealtime, and playtime excursions) and maternal depression was associated with problematic phone usage, which in turn was associated with technology interference in parenting [34]. Lastly, we found children's internet addiction is associated with the mother's depression as a recent South Korean study aligns with our findings [35].

Due to study design, the opposite direction of association needs to be considered as mothers with depression have poorer quality interactions, are less emotionally available, and can negatively report their children's behavior [36, 37, 38].

Our study's strength is the multistage sampling technique to reach the target population in both city corporations of Dhaka. The present study has some limitations which need to be addressed.

First, as this a cross-sectional study, we cannot conclude the causal association between the school-going child's behavior and the mother's depression. Second, reporting bias may also be an issue, owing to the data collection method. Finally, the participants were solely from Dhaka, so lack of generalization is another drawback for the study.

## 5. Conclusion

In conclusion, we can say that our analysis revealed the prevalence of depression among the mothers of school-going children in Dhaka city is very high, which represents an alarming public health concern for Bangladesh. Our study findings revealed the interconnection between children's lifestyles and behavioral factors, such as child's temperament, television watching, and internet use with the elevated level of depression in mothers. Moreover, socioeconomic aspects of participants like occupation, education attainment level and religion were also significantly associated with mothers' depression. Considering the perspective of Bangladesh, where there is a paucity of literatures exploring this issue, the current findings will act as a guideline as further investigation on this topic is warranted.

Parents need to be aware of the child's behavior from early childhood, and mothers should also be adaptive to their child's behavior instead of becoming anxious. Researchers can conduct a longitudinal and more extensive study with a greater sample size, recruiting participants from other cities, which would enhance the generalizability. Other behavioral and socioeconomic factors can be included to get a better insight into the factors which may trigger depression in mothers of school-going children. Future studies should also look into genetic or other psychosocial factors that could have an impact on maternal depression.

## Declarations

### Author contribution statement

Sharmin Sultana, Sanjana Zaman and Mohammad Delwer Hossain Hawlader: Conceived and designed the experiments; Wrote the paper.

ABM Alauddin Chowdhury: Conceived and designed the experiments.

Istiaque Hasan and Kazi Rumana Ahmed: Conceived and designed the experiments; Performed the experiments.

Md. Imdadul Haqu: Analyzed and interpreted the data; Wrote the paper.

Md. Kamrul Hossain: Analyzed and interpreted the data.

Promit Ananto Chakraborty: Performed the experiments; Analyzed and interpreted the data.

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### Data availability statement

Data will be made available on request.

## Declaration of interests statement

The authors declare no conflict of interest.

## Additional information

No additional information is available for this paper.

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