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Addictive behavior and mental health of adolescents aged 11–17 years in Bangladesh in 2014: A cross-sectional study

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Abstract

Background and Aims: This study aimed to evaluate the factors associated with addictive behavior and mental health in adolescents aged 11–17 years in Bangladesh.

Methods: This study analyzed data from the Bangladesh Global School-based Health Survey (GSHS) conducted in 2014. Adolescents aged 11–17 years studying government schools were considered as respondents for this survey. A two-phase group sample design was utilized to deliver illustrative information of all under-studies in grades (classes) 7–10 in Bangladesh. Bivariate analyses followed by a weight-adjusted multiple logistic regression was fitted to a sample of size 2989 adolescents.

Results: One in ten and one in four adolescents had different substance addictions and some forms of mental health conditions, respectively. Sex of participants (adjusted odds ratio [AOR]: 4.49; confidence interval [CI]:2.28–8.84), being bullied (AOR: 3.08; CI:1.46–6.49), use of tobacco among parents (AOR: 5.82; CI:3.16–10.75), parental understanding of adolescents' problems (AOR: 0.45; CI:0.23–0.82), and food affordability (AOR: 1.24; CI:1.09–1.42) were associated with addictive behaviors of adolescents. Bullied males with nonempathetic parents were found to be more vulnerable to addictive behaviors and bullied females showed higher tendencies to mental health issues.

Conclusion: Considering the elevated prevalence of reported mental health concerns, identifying vulnerable groups and formulating intervention-oriented policies engaging youths can pave the way towards achieving robust health and well-being for them in Bangladesh.

KEYWORDS

adolescents, bullying, drinking, mental health, teenagers, tobacco use

1 | INTRODUCTION

Addictive behavior refers to regular tendencies that correlate with the development of dependence on substance abuse, such as the consumption of alcoholic drugs, tobacco, and other harmful substances (e.g., marijuana and methamphetamines).[1] Addiction to different harmful substances has been found to lead to liver damage (alcohol use), lung cancer (tobacco use), stroke, heart disease (smoking use), increased heart rate (marijuana use), and dopamine and serotonin neurons in the brain damage caused by methamphetamine use.[2–5] Although addiction can affect people of all ages, the prevalence of addictive substances is notably high among adolescents, aged 10–19 years.[6,7]

According to the World Health Organization,[8] substance abuse among young people is increasing globally. Approximately 150 million youths worldwide were using tobacco in 2015, and the majority of tobacco users started smoking during adolescence, which could result in premature deaths.[8] Approximately 5% of all deaths of youngsters aged between 15 and 29 worldwide are attributable to alcohol use.[9] Studies have found that addictive behavior (substance abuse of drugs, alcohol, tobacco, marijuana) of adolescents is associated with childhood maltreatment, parental or familial substance use, parent-child relationships, bullying, sexual harassment, and household socioeconomic status.[10–13] Addiction is considered a strong cause of mental health problems for adolescent that increase risk-taking behavior, such as violence.

Similarly, mental health issues have recently become a growing concern among adolescents in Bangladesh. Mental health refers to the psychological, behavioral, and emotional well-being of an individual.[14] Youth psychological well-being frequently encounters overwhelming obstructions, such as stigma, disgrace, and separation, which can affect individual and social life.[15] Approximately 16% of the global disease and injury burden among the 10–19-year-age group is attributed to mental health.[16]

The pooled prevalence of suicide attempts, loneliness, worry, and lack of close friends was 8.4%, 6.9%, and 8.6%, respectively, in Southeast Asia, except for Laos.[17] The prevalence of mental health issues, such as suicidal ideation, anxiety, loneliness, and having no close friends among 13–17-year-old adolescents in Bangladesh is between 5% and 11%.[17] A study conducted in 2022 among Bangladeshi school-going adolescents (age 10–19 years) showed that 45.3% and 40.5% of adolescents reported sadness and aggression, respectively, which were the most prevalent depressive symptoms found in the study, followed by confusion (27.7%), worthlessness (21.8%), fatigue (21.5%), and insomnia (18.0%).[18]

Despite the high prevalence, studies on addiction and the mental health status quo are scarce in Bangladesh. Mental health conditions among adolescents in Bangladesh (22.9%)[19] were higher than the global average (10%–20%).[16] There is a literature gap in estimating the main effects of sociodemographic factors on addictive behavior and mental health status of adolescents in Bangladesh. Bangladesh has implemented policies to reduce adolescent addiction and improve mental health.[20] The Bangladeshi government collaborated with the World Health Organization (WHO) to address mental health concerns, recognizing it as a fundamental component of their healthcare policy.[21] While the government has developed a strategic plan to tackle mental health and addiction issues among adults, no parallel plan has been formulated specifically for adolescents.

Although some recent studies have focused on the prevalence of addiction and mental health issues and their associated factors among adolescents in Bangladesh, they have presented a combined addiction effect considering all forms of addiction.[20] Additionally, previous studies have not investigated several influential factors that can affect addictive behavior and mental health, including parental addictive behavior, affordability of food, and emotional experiences of loneliness among adolescents. To address this gap, the objective of this study was to estimate the prevalence and predictors of addictive behavior and mental health among adolescents aged 11–17 years in Bangladesh by incorporating the combined addiction effect and mental health issues and the unexplored factors of the outcomes.

2 | THEORETICAL FRAMEWORK

Several theoretical methods have identified the effects of sociodemographic factors, friends' and parents' activities, and financial conditions on adolescents' addictive behavior and mental health. These include the general theory of addiction[22]; modeling for excessive use of drugs, alcohol, and screentime[23]; problem behavior theory (PBT)[24]; and the multilevel approach to theories of addiction.[25] The current study focused on the impact of the demographic and socialization aspects of adolescents and how they infuse behavioral patterns at a young age. This concept formulation was inspired by the PBT.

The PBT explains the emergence and characteristics of problematic behaviors.[24] The model included three systems of psychosocial influences: personality systems (all social cognition), perceived environmental systems (friends' and parents' expectations and activities), and behavior systems (problem and conventional behavioral structures that work in opposition to each other). The ecosystem appears to affect behavioral outcomes. We hypothesized that personality and perceived environmental systems, postulated in the PBT, are affected by demographic and sociocultural factors. A graphical representation of the hypothesis influenced by the PBT concept is presented in (Figure 1).

3 | METHODS

3.1 | Data

The World Health Organization (WHO) has developed several standardized tools to identify risk factors for noncommunicable

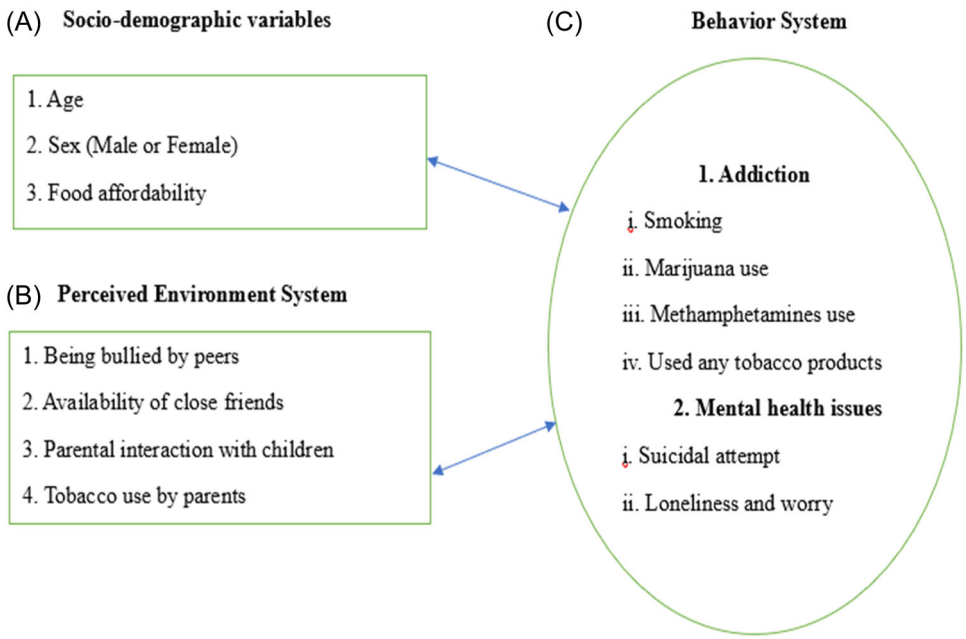

FIGURE 1 Theoretical framework (problem behavior theory) for this study.

diseases (NCD), such as tobacco, physical activity, and mental health, among both young people and adults.[26] The Global School-Based Health Survey (GSHS) was also developed following WHO standardized tools that included 10 core modules (alcohol use, dietary behaviors, drug use, hygiene, mental health, physical activity, protective factors, sexual behaviors, tobacco use, violence, and unintentional injury) to address the top global causes of morbidity and mortality among adolescents. 'GSHS core questionnaire modules' was used to collect demographic information and "GSHS core-expanded questionnaire modules" was used to attain detailed information on aforementioned 10 core modules.[27]

3.2 | Sampling design

This study analyzed data from the Bangladesh GSHS conducted in 2014. Adolescents aged between 11 and 17 years, in government schools were considered as respondents for this survey. A two-phase group sample design was utilized to deliver illustrative information of all understudies in grades (classes) 7–10 in Bangladesh.[28] In the primary stage, schools were chosen with a likelihood corresponding to the enlistment size. In the subsequent stage, grades were arbitrarily chosen and all studies in the chosen classes were qualified to participate. The original GSHS data set included 2989 samples. The Bangladesh GSHS estimated alcohol use, dietary practices, cleanliness, emotional well-being, physical movement, defensive elements, sexual practices, tobacco use, brutality, and unexpected injuries.[28] This survey is nationally representative as it GSHS collected information on adolescents from each division in Bangladesh.

3.3 | Two-phase sampling design

Double sampling, also known as two-phase sampling, involves a two-step approach to gathering data. Initially, a sample of units was selected to collect auxiliary information exclusively. In the second phase, another sample is chosen, and this time, the variable of interest is observed in addition to the auxiliary information.[29]

3.4 | Dependent variable

Two outcome variables were considered in this survey: addictive behavior and mental health. An adolescent was considered to have addictive behavior if they answered "yes" to any of the following items: smoked cigarettes (at least once during the 30 days before the survey); used tobacco products other than cigarettes (at least once during the 30 days before the survey); drank alcohol (at least one alcoholic drink during the 30 days before the survey); became drunk from alcohol (one or more times during their lifetime); students who got into trouble with their family or friends, missed school, or got into fights as a result of drinking alcohol (one or more times during their life); used drugs before age 14 years; ever used marijuana (one or more times during their lifetime); currently used marijuana (one or more times during the 30 days before the survey); ever used amphetamines or methamphetamines (one or more times during their life), which is based on previous studies.[30–33]

Adolescents were considered to have mental health issues if they gave an affirmative response to any of the items: felt lonely most of the time or always, was worried about something most of the time or always, seriously considered attempting suicide at any time, made plans on suicide attempts (during the 12 months before the survey),

attempted suicide (at least once during the 12 months before the survey), and did not have any close friends at the time of the survey.[34,35]

In our study, all the variables related to addictive behavior and mental health were treated as binary, with a coding system where we represent "yes" and 0 represents "no." To determine addictive behavior, we categorized an individual as having addictive behavior (coded as 1) if they reported "yes" to any of the categories mentioned earlier; otherwise, we categorized them as not having addictive behavior (coded as 0). We followed the same coding procedure to assess and categorize mental health issues as 1 (indicating the presence of mental health issues) or 0 (indicating the absence of mental health issues).

3.5 | Independent variable

The independent variables considered for this study were based on available information in the survey, including adolescents' age (categorized as 11–13 years and 14–17 years), sex (male or female), bullied (yes, no), availability of close friends (yes, no), parents understood their children's problems (yes, no), felt lonely most of the time or always (yes, no), parents or guardians used tobacco (yes, no), and food affordability (0–12, 0 = no affordability, 12 = more affordability).[36] Food affordability was defined by regularity in purchasing fast food, soft drinks, vegetables, and fruits, and was categorized on a scale of 0–12, where 0 = cannot afford food, 12 = can afford to eat fast food three times/day, soft drinks three times/day, vegetables three times/day, and fruits three times/day. Moreover, we categorized the food affordability variables as low (can afford any food type 2 or less times/day), medium (can afford any food type 3–6 times/day), and high (can afford any food type 7–12 times/day). We also fit the model by considering this categorical food affordability variable. The same results were obtained for these two models (Supporting Information S1: Table S1).

3.6 | Statistical analysis

Bivariate analysis with chi-square tests was used to analyze the primary strength of the association between factors and both outcomes: addictive behavior and mental health. We used the chi-square test to determine the row percentages of each variable and to observe the association between two categorical variables. Variables showing any association were fitted to multiple logistic regression models with addictive behavior and mental health adjusted for primary sampling units, strata, and survey weights. In this study, we considered logistic regression because our outcome variables were binary and coded 1 and 0. We considered the variable to be significant if the p-value for any variable was lower than or equal to 0.05 (level of significance) and we considered two-sided significance test here. In this study, the outcome variables did not contain any missing values. However, some independent variables had missing values. We conducted a complete case analysis that excluded participants with missing information. Statistical analyses were conducted using STATA (version 14).[37] The STATA command "svyset" was used to model the data using two-stage sampling and survey weights.[38] In our analysis, "svyset" command provides weighted frequency, percentage, and odds ratio. A weighted multiple logistic regression model was used for further analysis. Moreover, we also fitted a multilevel logistic regression model for sensitivity analysis and obtained the same results as the multiple regression model (see Supporting Information S1: Table S1). Therefore, we considered multiple logistic regression models as the final models for this study.

3.7 | Chi-square test

The chi-square test is a statistical analysis employed to assess the relationship between two categorical variables by comparing the observed and expected outcomes. The primary objective is to determine whether any discrepancies between the actual and anticipated data are the result of random chance or are indicative of a meaningful association between the variables in question. Consequently, the chi-square test serves as a valuable tool for enhancing our comprehension and interpretation of the relationship between these two categorical factors.[39]

3.8 | Formula for chi-square test

$$X_c^2 = \sum \frac{(O - E)^2}{E},$$

where, c is the degrees of freedom, O is the observed value, E is the expected value.

3.9 | Logistic regression model

Logistic regression involves building a model to predict the likelihood of a specific discrete outcome based on input variables. Typically, it is used to model binary outcomes, which are situations in which there are only two possible results, such as true/false or yes/no. However, multiple logistic regression extends this approach to handle scenarios with more than two distinct outcomes.[40] Our empirical model for mental health and addictive behavior is as follows:

$$\text{Model} \quad 1 : \log\left(\frac{P_A}{1 - P_A}\right) = \beta_0 + \sum_{i=1}^{7} \beta_i X_i,$$

$$\text{Model} \quad 2 : \quad \log\left(\frac{P_M}{1 - P_M}\right) = \beta_0 + \sum_{i=1}^{7} \beta_i X_i.$$

Here, P_A and P_M are the probabilities of addiction and mental disturbance, respectively.

4 | RESULTS

In a data set comprising 2989 individuals, two age groups were examined: 11–13 years (with an average age of 12.85 years and a standard deviation of 0.006) and 14–17 years (with an average age of 14.62 years and a standard deviation of 0.004). Among these individuals, 8.9% of those aged 11–13 years exhibited addictive behaviors and 25% of those aged 14–17 years showed tendencies toward mental health issues. Additionally, 10.24% of adolescents in the 14–17 age group displayed addictive behavior, while only 4.33% of those in the 11–13 age group exhibited similar traits (Table 1). The prevalence of mental health issues among the 11–13 and 14–17 age groups was 26.54% and 24.40%, respectively. Males displayed higher addictive behavior (18.62%), and 27.13% females faced mental health problems.

Respectively, 14.31% and 40.30% of bullied adolescents displayed addictive behavior and mental health issues, respectively. Furthermore, 9.26% of adolescents with no close friends showed addictive behavior. Only 13.67% of the respondents were addicts whose parents did not understand their problems, and the proportion of mental health issues was 24.91%. A total of 12.81% of adolescents with addictive behavior felt lonely. Around 25.77% and 25.89% of adolescents showed addictive behavior and mental health issues when their parents used any form of tobacco. The mean score of food availability among addicted and mentally disordered adolescents was 7.24 and 4.64, respectively.

TABLE 1 Cross classification of addictive behavior and mental health by different variables.

Background characteristics		Addictive behavior			Mental health		
		Yes	No	*p*-Value	Yes	No	*p*-Value
Age	11–13	31 (4.33%)	685 (95.67%)	<0.001	190 (26.54%)	526 (73.46%)	0.25
	14–17	232 (10.24%)	2034 (89.76%)		553 (24.40%)	1713 (75.0%)	
		$\chi^2 = 23.62$	$df = 1$		$\chi^2 = 1.32$	$df = 1$	
Sex	Male	222 (18.62%)	970 (81.38%)	<0.001	257 (21.56%)	935 (78.44%)	0.001
	Female	41 (2.29%)	1747 (97.71%)		485 (27.13%)	1303 (72.87%)	
		$\chi^2 = 237.05$	$df = 1$		$\chi^2 = 11.85$	$df = 1$	
Bullied	Yes	87 (14.31%)	521 (85.69%)	<0.001	245 (40.30%)	363 (59.70%)	<0.001
	No	177 (7.48%)	2190 (92.52%)		498 (21.04%)	1869 (78.96%)	
		$\chi^2 = 27.92$	$df = 1$		$\chi^2 = 95.73$	$df = 1$	
Availability of close friends	Yes	12 (4.69%)	244 (95.31%)	0.01	-	-	-
	No	250 (9.26%)	2451 (90.74%)		-	-	
		$\chi^2 = 6.0433$	$df = 1$		-	-	
Parents understood their children problems	Yes	59 (4.13%)	1371 (95.87%)	<0.001	342 (23.92%)	1088 (76.08%)	0.53
	No	197 (13.67%)	1244 (86.33%)		359 (24.91%)	1082 (75.09%)	
		$\chi^2 = 80.51$	$df = 1$		$\chi^2 = 0.39$	$df = 1$	
Felt lonely most of the time or always	Yes	36 (12.81%)	245 (87.19%)	0.01	-	-	-
	No	227 (8.42%)	2468 (91.58%)		-	-	
		$\chi^2 = 6.08$	$df = 1$		-	-	
Parents or guardians used tobacco	Yes	202 (25.77%)	582 (74.23%)	<0.001	203 (25.89%)	581 (74.11%)	0.40
	No	57 (2.62%)	2120 (97.38%)		528 (24.25%)	1649 (75.75%)	
		$\chi^2 = 386.91$	$df = 1$		$\chi^2 = 0.83$	$df = 1$	
Addictive behavior	Yes	-	-	-	60 (22.64%)	205 (77.36%)	0.40
	No	-	-		687 (25.22%)	2.037 (74.78%)	
		-	-		$\chi^2 = 0.85$	$df = 1$	
Food affordability		7.24[a] (2.94)[b] $F = 29.94$	5.05[a] (2.50)[b] $df = 2868$	<0.001	4.64[a] (2.12)[b] $F = 12.10$	5.45[a] (2.73)[b] $df = 2868$	<0.001

[a]Mean.

[b]Standard deviation.

The logistic regression showed that sex (odds ratio [OR] = 6.38; confidence interval [CI]: 3.24–12.56), being bullied (OR = 3.58, CI: 1.53–8.37), parents understanding problems (OR = 0.35, CI: 0.19–0.64), tobacco use as parents or guardians (OR = 7.36; CI: 3.70–14.61) and food affordability (OR = 1.22; CI: 1.05–1.42) were significantly associated with addictive behavior when not adjusting for all variables. Being bullied was significantly associated (OR = 3.58; CI: 1.53–8) with both addictive behavior and mental health issues (OR = 2.75; CI: 1.81-4.18).

After adjusting for all variables, the multiple logistic regression model showed that sex (AOR: 0.76, CI: 0.61–0.96) was significantly associated with mental health issues. Addictive behavior was significantly more prevalent among male adolescents than among female adolescents (AOR: 4.49; CI: 2.28–8.84).

In the case of mental health, female adolescents had a 24% higher chance of showing tendencies toward mental health issues than males (AOR: 0.76; CI: 0.61–0.96). Respondents who were bullied were three times more likely to be addicts than those who were not bullied (AOR: 3.08; CI: 1.46–6.49). The odds of displaying tendencies toward mental health issues were 2.78 times higher for those who were bullied (AOR: 2.78; CI: 1.77–4.34). Adolescents with parents who understood their children's problems were 55% less likely to exhibit addictive behaviors. Adolescents with parents or guardians who used tobacco had 5.82 times higher odds of being addicted (AOR: 5.82; CI: 3.16–10.75). The odds of addictive behavior were positively associated and increased with food affordability (Table 2). It is important to note that addictive behavior was not significantly associated with mental health issues among adolescents.

The significance level and estimate of all variables using the multilevel logistic regression model are closely related to the multiple logistic regression models. The noteworthy observation is that food affordability has a significant association with the mental health of adolescents, and as the level of food affordability increases, the likelihood of experiencing mental disturbances significantly decreases (see Supporting Information S1: Table S2).

5 | DISCUSSION

The results of this study provide valuable insights into the prevalence of addictive behaviors and mental health issues among adolescents in Bangladesh and their associated risk factors. The findings revealed

TABLE 2 Logistic regression analysis of addictive behavior and mental health.

Background characteristics		Addictive behavior		Mental health	
		OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Age	11–13	1.00	1.00	-	-
	14–17	2.07 (0.95–4.52)	1.70 (0.76–3.79)	-	-
p-Value		0.07	0.18	-	-
Sex	Female	1.00	1.00	1.00	1.00
	Male	6.38 (3.24–12.56)	4.49 (2.28–8.84)	0.88 (0.70–1.11)	0.76 (0.61–0.96)
p-Value		<0.001	<0.001	0.30	0.02
Bullied	No	1.00	1.00	1.00	1.00
	Yes	3.58 (1.53–8.37)	3.08 (1.46–6.49)	2.75 (1.81–4.18)	2.78 (1.77–4.34)
p-Value		0.004	0.004	<0.001	<0.001
Availability of close friends	No	1.00	1.00	-	-
	Yes	0.83 (0.40–1.70)	1.04 (0.39–2.74)	-	-
p-Value		0.61	0.93	-	-
Parents understood their children's problems	No	1.00	1.00	-	-
	Yes	0.35 (0.19–0.64)	0.45 (0.23–0.82)	-	-
p-Value		0.001	0.01	-	-
Parents or guardians used tobacco	No	1.00	1.00	-	-
	Yes	7.36 (3.70–14.61)	5.82 (3.16–10.75)	-	-
p-Value		<0.001	<0.001	-	-
Food affordability		1.22 (1.05–1.42)	1.24 (1.09–1.42)	0.93 (0.86–1.01)	0.94 (0.87–1.01)
p-Value		0.01	0.002	0.09	0.13

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio.

several noteworthy patterns and associations, shedding light on the complexities of adolescent health.

Among the 2989 sampled adolescents, the prevalence of addictive behavior and mental health issues was 8.9% and 25%, respectively. Factors such as sex (), bullying, lack of parental understanding of children's problems, parental use of tobacco, and food affordability increase the likelihood of addictive behaviors among adolescents. Females who were bullied seemed to have a higher tendency toward mental health issues.

In the conservative society of Bangladesh, males exhibit a higher propensity for addictive traits, possibly influenced by their greater social openness. This predisposes them to substance use and a heightened inclination toward experimenting with narcotics.[41] Although females were less likely to be addicts, they were more susceptible to mental health issues than males. In patriarchal households in Bangladesh, females frequently encounter stressful situations, grapple with suppressed emotional issues, and contend with adverse conditions, contributing to their vulnerability,[42] which are consistent with previous studies conducted in Asia and other lower and iddle income countries (LMICs).[43-45]

Bullied adolescents seemed to have a higher chance of showing addictive behaviors and suffering from mental health issues, agreeing with the literature.[45,46] One explanation for this relationship might be that young people who show violence and forceful practices to other people may expand their involvement with different youths with deviant practices such as substance use.[47] Victimized children show an increased risk of a myriad of clinical problems, such as anxiety, depression, school phobia, unhappiness at school, loneliness, and isolation.[48] A systematic review investigating the prevalence of substance abuse and mental health issues among bullied adolescents across 19 LMICs revealed that those who experienced bullying were at a heightened risk of addiction and mental disorders. This aligns with the findings of the current study.[49]

Adolescents whose parents listened to and comprehended their problems had lower odds of displaying addictive behaviors. Parenting has a lasting impact on children's behavior, and a healthy environment for children requires parents to be more understanding and empathic.[50] A good parent–child relationship could help reduce antisocial behavior, and empathy from primary caregivers could ease psychological changes during adolescence.[51] A recent study among adolescents in Bangladesh found that lack of peer support was positively associated with substance abuse.[52] The current study findings are consistent with previous studies in which authoritative parenting was found to be associated with less drug abuse in adolescents.[53,54]

Adolescents whose parents and/or guardians engaged in any form of tobacco use showed a higher likelihood of displaying addictive behaviors. It's understandable that teenagers often mimic their parents and replicate their habits.[55,56] This phenomenon underscores the influence of family and neighborhood environments on addiction, as adolescents naturally emulate their surroundings.[56,57] A systematic review of household and familial alcohol use and adolescents' behavioral outcomes reached a similar conclusion.[58]

Food affordability is positively associated with addictive behavior. It could be postulated that adolescents from solvent households would have higher purchasing capabilities.[59] This can enable them to afford expensive alcohol, drugs, and tobacco, unlike youths from low-income families. This financial capacity may contribute to the higher prevalence of addictive behaviors among affluent children.[60] Similar results were found in previous studies, where childhood with a higher family socioeconomic status was associated with addictive behavior.[56,61,62]

In our study, we identified a significant association between food affordability and mental health disturbances (see Supporting Information S1: Table S2). Previous studies have consistently demonstrated a strong link between food insecurity and mental health disturbances, showing that as the level of food insecurity increases, so does the prevalence of mental health disturbances among adolescents.[63] Our findings align with those of previous studies, confirming that an increase in food affordability corresponds to a decrease in mental health disturbances.

Addiction to alcohol, smoking, tobacco, and other illegal substances has been shown to have adverse effects on adolescents. In addition, addictive behaviors have psychogenic properties that could result in detrimental effects, such as mental disorders among addicted adolescents.[31] However, no significant association between addictive behaviors and mental health issues was found in this study. This could be due to the limited sample size and the sampling of only school-going adolescents in the GSHS. A more elaborate sampling frame that includes children from all walks of life might provide a more generalizable scenario.

The findings of this study are based on an analysis of a nationally representative data set, ensuring that the findings apply to a wide range of adolescents across Bangladesh, thus enhancing the study's external validity. This study attempts to close the knowledge gap regarding the behavioral and mental health of adolescents in Bangladesh, opening the door for further investigation. This research provides practical implications for policymakers, healthcare professionals, and educators to develop targeted interventions and support systems for adolescents facing these challenges.

This study had a few limitations. First, the study covered only government school-going students, excluding a portion of the adolescent population outside these institutions. Hence, the generalization of the results requires caution. Second, the GSHS relies on self-reported data from students, which can be subject to bias. Students may underreport or overreport their behaviors because of social desirability bias, fear of consequences, or lack of accurate self-awareness. Third, this study analyzed data from the 2014 survey because no GSHS data beyond 2014 are available for Bangladesh. More recent data would better portray the current scenario, as the authors were limited by the resources to collect new data. Fourth, the responses could be influenced by recall bias, as students may have difficulty accurately recalling and reporting their behaviors, especially when asked about events that occurred in the past. Fifth, there could be other confounders, including parental information, screen time, criminal history, and area of residence, that could have affected both

addiction and mental health but were not available in the survey data. Finally, the cross-sectional nature of the data limits the causal interpretation of the findings.

6 | CONCLUSION

This study emphasizes the need for targeted interventions and support networks that shed light on the prevalence of addictive behaviors and mental health challenges among teenagers in Bangladesh. We have identified several risk factors, including gender, bullying experiences, parental understanding, parental tobacco usage, and food affordability, that contribute to addictive behaviors. Strengthening parent-child relationships and employing compassionate parenting practices are crucial for maintaining good mental health among teenagers. Moreover, addressing bullying and its consequences should be a priority, as it has been linked to both addictive behaviors and mental health issues in young adults. While this study offers valuable insights, a broader and diverse research is needed to comprehensively understand the intricate connections between addictive behaviors and mental health challenges in this population. Addressing these issues requires a holistic approach involving the collaboration of families, schools, and communities. Policymakers, public health practitioners, and educators should join forces to advocate for the behavioral and mental well-being of teenagers, promoting comprehensive initiatives aimed at enhancing their overall health and resilience.

AUTHOR CONTRIBUTIONS

Sorif Hossain: Conceptualization; methodology; software; data curation; formal analysis; validation; investigation; writing—original draft; writing—review and editing. **Promit B. Chowdhury**: Data curation; validation; investigation; writing—original draft. **Md Mohsin**: Supervision; writing—review and editing; writing—original draft; project administration. **Raaj K. Biswas**: Project administration; supervision; writing—review and editing; writing—original draft. All the authors have read and approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available in the article and its supplementary materials. Secondary data were extracted from the Global School-Based Health Survey 2014, publicly available at https://extranet.who.int/ncdsmicrodata/index.php/catalog/485 under the guidance of the World Health Organization (WHO).

ETHICS STATEMENT

The authors did not personally collect the data for this study. Secondary data were extracted from the Global School-Based Health Survey 2014, publicly available at https://extranet.who.int/ncdsmicrodata/index.php/catalog/485 under the guidance of the World Health Organization (WHO). Concepts from the participants and ethical clearance were handled by the WHO. All respondents gave their consent before collecting the data, which was confirmed by the enumerators. These are secondary data and concepts from participants, and ethical clearances were handled by the WHO. All respondents provided consent for the publication of the survey results. All authors have read the manuscript and provided consent to publish this article. All authors have read and approved the final version of the manuscript, had full access to all the data in this study, and took complete responsibility for the integrity of the data and the accuracy of the data analysis.

TRANSPARENCY STATEMENT

The lead author Sorif Hossain affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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