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Unraveling Internet Addiction Among Adolescents in Bangladesh and Its Association With the Risk of Eating Disorders, Body Mass Index, and Other Factors: A Cross-Sectional Study

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ABSTRACT

Background and Aims: Internet-related disorders for example, internet addiction (IA) seem to be frequent among adolescents all over the world. However, there could be a possible link between body mass index (BMI) and the risk of eating disorders (EDs) in connection with IA. This study aimed to determine the relationship between risk of EDs, BMI, and IA among Bangladeshi adolescents, as well as factors associated with IA.

Methodology: A cross-sectional study was carried out among 2147 individuals, using a stratified random sampling method, aged 13–19, from various selected schools and colleges spread across Bangladesh using a Google form questionnaire consisting of sections on socio-demographic factors, body mass index (BMI), eating attitude test scale, and internet addiction test scale. Descriptive analysis, Pearson Chi-square test, logistic regression model, and a bivariate correlation analysis were fit to determine the relationship and factors.

Results: We found that 24.1% of students had IA, 23.2% were at risk of EDs, 6.6% were underweight, 1.9% were overweight, 24% were obese and the remainder were normal. The relationship between IA, BMI, and risk of EDs was significant and positively co-related. Moreover, we found gender, the purpose of internet use, daily internet usage, physical exercise, literature reading habits, and victims of bullying were significantly associated with IA.

Conclusion: The findings highlight the need for further research and strategies to diagnose and treat EDs and IA, among adolescents. Promoting physical activity, healthy habits, and awareness at the institutional and parental levels is crucial for mitigating these risks and addressing sociodemographic, internet usage, and emotional health factors.

1 | Introduction

Risk of eating disorders (EDs), characterized by persistent disturbances in eating and related behaviors, often arises from irregular eating habits, which affect both physical and mental health. These disturbances are considered significant psychiatric disorders [1]. Risk of EDs related to Body Mass Index (BMI) through complex varying anorexia nervosa, which is associated with a low BMI. However, bulimia nervosa and risk of EDs may involve a normal or elevated BMI [2]. Adolescents are increasingly becoming obese due to factors such as unhealthy dietary habits, sedentary lifestyles, and environmental influences, which can contribute to the risk of EDs as social pressures, body image concerns, and harmful behaviors become prevalent, impacting their physical and mental well-being [3].

Internet Addiction (IA), characterized by abnormal behaviors that affect various aspects of well-being, is a result of the Internet's growing influence as a crucial tool for adolescents to transmit information and form connections [4]. Experiencing exponential growth, global Internet users reached nearly 5.5 billion by July 31, 2022, constituting 69.0% of the world's population, while 129,180,000 users represent 77.2% in Bangladesh [5].

The growing prevalence of IA among adolescents in Bangladesh, paired with concerns about overeating disorders and BMI, highlights the need for a comprehensive study examining the interplay of these factors [6]., While previous studies have explored these relationships globally, few have addressed this issue within the context of Bangladesh [7]. A significant correlation exists between social media use [8], frequency of fast-food consumption, and negative body image in adolescents. In contrast, IA rates among college students, ranging from 2% to 20%, raise concerns due to sociodemographic factors such as extreme internet usage, presenting a significant public mental health problem [9, 10].

The relationship between BMI and IA was complex and revealed a positive correlation between BMI and IA, specifically among adolescents actively engaged in online activities [11]. Several studies have reported a positive correlation between BMI and IA, particularly among adolescents deeply engaged in online activities. This relationship has been observed across various cultural contexts, including a study in Turkey where severe IA was linked to higher BMI levels [12, 13]. IA, encompassing smartphone use and duration, is associated positively with BMI, while BMI interacts with sociodemographic and clinical factors to influence addictive behaviors differently in risk of EDs subtypes [13]. The prevalence of IA is 21.8%, and it shows a significant association with eating disorders, age, and BMI as indicators of addiction [14]. Moreover, eating disorders tend to be more prevalent among younger individuals [15]. In adolescents and young adults, a link is established between Internet dependence and eating disorders, with mood regulation acting as a common underlying factor and serving as a substitute for food [16].

Numerous investigations have explored the association between IA and BMI in school-aged adolescents [17]. While numerous studies have focused on the prevalence and psychological aspects of IA, research concerning the connection between IA and adolescent BMI remains limited, with some Iranian studies indicating prevalence rates ranging from 15% to 22% [18]. IA is more prevalent among those who are overweight or obese. Although research has established a direct link, a clear further mechanism connecting IA to BMI is yet to be identified [19]. Similarly, Canan [12] conducted a study among 1938 adolescents, finding that 12.4% met the criteria for IA, with a significant positive correlation between BMI and IA [20]. Güneş et al. [21] revealed that individuals with IA had a higher risk of eating disorders, with the risk increasing 1.02 times for every point increase in the EAT-26 score [21].

IA and risk of EDs share common underlying factors, such as emotional dysregulation. For instance, Azizi et al. (2024) demonstrated that emotional dysregulation significantly predicted both IA and increased BMI levels, while IA also significantly predicted elevated BMI levels [22]. These findings suggest that targeting emotional dysregulation may be necessary for treating excessive Internet use or overeating behavior in individuals with either condition.

Recent studies demonstrated a prevalence rate of 37.6% among adolescents at risk for an eating disorder, high religious involvement, overweight body perception, low body appreciation, and having had cosmetic surgery. Current binge drinking is associated with an eating disorder risk [23]. The prevalence rates of IA among adolescents in Bangladesh vary from 4% to 49.7% [24]. Internet use among university students ranges between 24% and 79.4% [25], surpassing the 67% rate observed among high school students, reflecting the association of increasing internet penetration in Bangladesh [7]. Population-based data on the prevalence of 30.4% underweight, 18.9% overweight, and 4.6% obese associated factors in Bangladeshi adults are limited [26, 27]. In Bangladesh addiction and mental health-related research have been carried out among students and adolescents in different settings [7, 28–31]. However, there is a lack of research investigating the prevalence and association between BMI, eating disorders, IA, and other characteristics, especially considering the presence of mediator variables among adolescents in Bangladesh. This study aimed to evaluate the prevalence of IA and risk of EDs among adolescents in Bangladesh, analyze the BMI of these adolescents, and investigate potential relationships between BMI, risk of EDs, and IA. It will also explore various independent variables associated with IA, including sociodemographic, internet, and lifestyle-related factors.

2 | Methodology

2.1 | Ethical Approval

With the identifier NSTU/SCI/EC/2023/170, the research project was granted logistical assistance and ethical clearance from the Institutional Review Board (IRB) of Noakhali Science and Technology University, Bangladesh. The IRB explicitly acknowledged the school authorities as the designated legal guardians for participants under 18 years old and approved the consent procedure as described. Only participants who provided written consent were included in the study; those without written consent were excluded.

2.2 | Study Design, Procedure, and Data Collection

This study was designed and reported following the CONSORT guidelines for observational research to ensure clarity and reproducibility. The sample comprised 2147 individuals, aged 13–19, from various schools and colleges, spread across Bangladesh between March and July of 2023. The average age of the research participants was 15.6 years, SD = 1.114% and 70.70% were female. Informed consent for participants under 18 was obtained from the school authorities, who acted as their legal guardians. This procedure was approved by the Institutional Review Board (IRB) of Noakhali Science and Technology University, ensuring compliance with ethical guidelines. A stratified random sampling method obtained the sample from the specified institutions. At the outset, 67 students filled out a self-reported questionnaire as part of a pilot survey. After completing the pilot study assessment to evaluate the viability and effectiveness of the research, the entire survey was conducted. A concise online survey application called Google Forms was used to gather data. The questionnaire consisted of sections on sociodemographic factors, body mass index (BMI), eating disorder test (EAT) scale, and internet addiction test (IAT) scale.

2.3 | Criteria for Selection

The study's criteria for including participants were as follows: (i) Enrollment of students who were currently studying at the school level; (ii) Students who were currently studying at the college level; (iii) Adolescents under the age of 19; (iv) Requirement of Bangladeshi nationality by birth. Exclusion criteria for this study were: (i) Adolescents with dual citizenship; (ii) Foreign students currently studying in Bangladesh; (iii) Adolescents currently studying abroad under the Bangladeshi curriculum.

2.4 | Measures

2.4.1 | Sociodemographic, Internet, and Lifestyle Measures

Questions including socio-demographics, lifestyle and internet-related behavior were asked, including age, sex (male, female), academic class (8, 9, 10, 11, 12), study group (arts, commerce, science), mother's highest education, father's highest education, main purpose of using internet (chatting, gaming, social networking, watching TikTok or Instagram videos, others), daily internet usage (1–2 h, 2–3 h, 3–4 h, 4–5 h, 5–6 h, less than 1 h, more than 6 h), smoking habit (yes, no), reading literature habit (yes, no), victims of bullying (yes, no).

2.4.2 | Body Mass Index

Based on the self-reported information of height (cm) and weight (kg) of the participants, BMI was classified based on age and sex-specific cut-off values of the US Centers for Disease Control and Prevention (CDC). According to the CDC, BMI was classified into four categories as follows: underweight (< 5%), normal weight (5% to < 85%), overweight (85% to < 95%), and obese (≥ 95%) [32]. We followed the criteria referred to by the CDC in the current study.

2.4.3 | Risk of Eating Disorder Questionnaire

The Eating Attitude Test (EAT-26) was granted and determined following accepted behaviors [33]. The EAT-26 scale has been validated for use in the Bangladeshi population, as demonstrated by Mamun and Griffiths (2019) in their study on internet addiction [34]. There were 26 items in the questionnaire, divided into three categories: dieting, bulimia, food preoccupation, and aboral control. Responses on a 6-point scale from "always" to "never" were recorded. The responses to questions 1–25 indicated "always," "usually," "often," "sometimes," "rarely," and "never," respectively, with scores of 3, 2, 1, 0, 0, and 0; the sequence was different for question 26. The possible total score was 0-78. Less than 20 indicates "no risk," 20–49 indicates "at risk," and 50–78 indicates "consistent with at risk of eating disorder." This study counted below 20 scores as having no risk of EDs, and above 20 as at risk [35].

2.4.4 | IAT Scale

K. Young created Young's IAT Scale (IAT-20), a uni-dimensional, standardized psychometric instrument [36]. Based on users' online recreational activities on any internet-connected device, this validated scale was used to determine the degree of internet addiction. The IAT-20 scale has been validated for use in the Bangladeshi population, as shown by Tariq et al. (2021) in their study on eating disorder risks among university students [22]. The 20 questions comprised of the IAT were scored on a five-point Likert scale: 0 = Not Applicable, 1 = Rarely, 2 = Occasionally, 3 = Frequently, 4 = Often, 5 = Always. The examinee's scores for each of the 20 potential responses were added to determine the final score of the IAT. The maximum number of points that may be earned was one hundred. Internet addiction was classified as having a score above 50, whereas not having an addiction was indicated by a score below 50 [36].

2.4.5 | Statistical Analysis

Descriptive analysis included sociodemographic, IAT, EAT, and BMI variables. Score bands on the IAT-20 and EAT-26 classified respondents as internet addicted, and at risk of EDs. We used the Pearson Chi-square test to find connections between the parameters and IA. IA was the dependent variable in a binary logistic regression model, while all other components were independent variables. A Shapiro-Wilk test verified multivariate normality before the chi-square and logistic regression model. Data set multicollinearity was examined using a correlation matrix. The Kolmogorov-Smirnov test determined data dependence and confirmed multivariate normality, independence, and absence of multicollinearity. In all categorical variables, odds ratios (OR) and 95% confidence intervals were determined. A pie chart revealed IA rates among school and college students. At last, a bivariate co-relation test was employed to assess

the correlation between BMI, risk of EDs, and IA. All analyses were conducted using SPSS 26.0.

3 | Results

3.1 | Description of the Participants

Table 1 shows the descriptive analysis of the study. In total, 2147 students filled out the survey. The sample consisted of 70.70% female students (1518) and 29.30% male students (629) with a mean age of 15.6 years. From our study, we found that 20.1% of female students (305) were severely addicted to the internet, where 79.9% (1213) were not, and 33.7% (212) of male students were severely addicted to the internet where 66.3% (417) were not. In addition, 2.5% (54) of students were addicted to the Internet in class 12, 2.6% (55) in class 11, 10.2% (219) in class 10, 8.6% (185) in class 9, and 0.2% (4) in class 8.

3.2 | Prevalence of Risk of Eating Disorders and Internet Addiction and Body Mass Index Categories

Figure 1 shows the prevalence of IA (Figure 1A), risk of EDs (Figure 1B), and different categories of BMI (Figure 1C) of the participants. Our study found that 24.1% of students were internet addicted, and the rest, 75.9%, were not internet addicted. Again, 23.2% of participants were at risk of EDs, and the rest (76.8%) were not. In terms of BMI, we found that 6.6% of participants were underweight, 1.9% were overweight, 24% were obese and the rest were normal.

3.3 | Factors Associated With Internet Addiction

Table 2 displays the factors associated with IA. Gender ($p < 0.02$), the purpose of the internet ($p < 0.001$), daily internet use ($p < 0.001$), physical exercise ($p < 0.001$), study novels/story ($p < 0.001$), bullying by friends ($p < 0.04$), risk of EDs ($p < 0.001$) and BMI ($p < 0.001$) had a significant effect on increasing IA among the school and college students of Bangladesh.

Logistic regression analysis in Table 2 shows the factors behind the development of IA among the adolescents of Bangladesh. From our study, we found that female students were 0.56 times [OR = 0.56, 95% CI = 0.24–1.31] less internet addicted than male students, which means male students were (1/0.56) = 1.78 times more internet addicted than female students.

The students using internet for gaming purpose were 2.04 times [OR = 2.04, 95% CI = 1.86–3.02]; social networking were 3.14 times [OR = 3.14, 95% CI = 2.78–3.90]; watching Tiktok were 9.74 times [OR = 9.74, 95% CI = 9.17–10.19] and other purposing users were 1.82 times [OR = 1.82, 95% CI = 1.4–2.36] more Internet addicted than the students who used internet for studying purpose.

In addition, the students who used internet 3–4 h per day were 1.2 times [OR = 1.2, 95% CI = 1.02–1.76]; who used 4–5 h were 2.8 times [OR = 2.8, 95% CI = 2.01-2.99]; who used 5–6 h were 3.5 times [OR = 3.5, 95% CI = 3.07–3.80] and who used more than 6 h were 5.5 times [OR = 5.5, 95% CI = 5.01–6.27] more internet addicted than the students who didn't used internet for an hour per day. Students who didn't exercise regularly were 3.8 times [OR = 3.8, 95% CL = 3.09–4.10] more internet addicted than others who exercised regularly.

The students who had studied novels/stories were 0.45 times [OR = 0.45, 95% CI = 0.31–1.40] less internet addicted than the students who didn't study novels/story, which means students who didn't study novels/stories were (1/0.45) = 2.22 times more internet addicted than the students who studied novels/story. On the other hand, students who were victims of friend bullying were 1.69 times [OR = 1.69, 95% CI = 1.45–2.29] more internet addicted than others who were not victims of friend bullying.

As shown in Table 2, the students who were at risk of an EDs were 2.78 times [OR = 2.78, 95% CI = 2.33–2.83] more internet addicted than others who weren't at risk of EDs. In terms of BMI, we found that underweight students were 1/0.65 = 1.54 times [OR = 0.65, 95% CI = 0.42–0.86]; overweight were 1.56 times [OR = 1.56, 95% CI = 1.37–1.77]; and obese were 2.64 times [OR = 2.64, 95% CI = 2.08–3.31] times more internet addicted than others who had normal weight.

3.4 | Co-Relation Between Internet Addiction, Risk of Eating Disorders, and Body Mass Index

The correlation analysis shown in Table 3 demonstrates statistically significant associations between internet addiction, likelihood of risk of EDs, and BMI. There was a strong positive correlation between internet addiction and the likelihood of risk of EDs (correlation coefficient = 0.686, $p < 0.001$) as well as BMI (correlation coefficient = 0.764, $p < 0.05$). Furthermore, there was a significant association between the likelihood of risk of EDs and BMI, with a correlation coefficient of 0.771 ($p < 0.001$), indicating a strong relationship between behavioral and health aspects.

4 | Discussion

Our results showed that among the adolescents, the prevalence rate of the risk of EDs was 23.2%, 6.6% were underweight, 1.9% were overweight, 24% were obese, and 24.1% were addicted to the internet. Compared to the findings of other studies that examined the prevalence of addictive internet use among adolescents in Asian countries, India (30.28%) [37], Nepal (27.9%) [38], Sri Lanka (17.2%) [39], Malaysia (29.6%) [40], and China (25.4%) [41], the present study revealed a prevalence of internet addiction among adolescents of 24.1%, which was lower than in India, Nepal, Malaysia, and China but higher than in Sri Lanka. 2018). The current research revealed a lower frequency than other Asian studies because adolescents in Bangladesh still have limited internet access. Mobile internet is more expensive and slower than in the above nations [42].

The current study is consistent in some cases and inconsistent in some cases with previous research that has suggested a link

TABLE 1 | Descriptive analysis of the participants by internet addiction (*n* = 2147).

| Variables	Categories	No n (%)	Yes n (%)	p value
Age		Mean 15.6 years, SD = 1.114		
Gender	Female	1213 (75.9%)	305 (24.1%)	0.02*
	Male	417 (19.4%)	212 (9.9%)	
Class	Class-12	51 (2.4%)	54 (2.5%)	
	Class-8	39 (1.8%)	4 (0.2%)	
	Class-10	690 (32.1%)	219 (10.2%)	0.112
	Class-11	79 (3.7%)	55 (2.6%)	
	Class-9	771 (35.9%)	185 (8.6%)	
Study group	Arts	705 (32.8%)	199 (9.3%)	
	Commerce	106 (4.9%)	53 (2.5%)	0.523
	Science	819 (38.1%)	265 (12.3%)	
Mothers' highest education	I don't know	337 (15.7%)	109 (5.1%)	
	University	238 (11.1%)	87 (4.1%)	0.083
	Up to college level	228 (10.6%)	112 (5.2%)	
	Up to school level	827 (38.5%)	209 (9.7%)	
Father's highest education	I don't know	347 (16.2%)	121 (5.6%)	
	University	345 (16.1%)	148 (6.9%)	0.772
	Up to college level	269 (12.5%)	118 (5.5%)	
	Up to school level	669 (31.2%)	130 (6.1%)	
Purpose of using internet	Chatting	34 (1.6%)	37 (1.7%)	
	Gaming	60 (2.8%)	24 (1.1%)	
	Others	114 (5.3%)	64 (3.0%)	< 0.001**
	Social networking	660 (30.7%)	299 (13.9%)	
	Watching TikTok or Instagram videos	762 (35.5%)	93 (4.3%)	
Daily internet usage	1 h–2 h	434 (20.2%)	77 (3.6%)	
	2–3 h	125 (5.8%)	114 (5.3%)	
	3–4 h	87 (4.1%)	70 (3.3%)	
	4–5 h	35 (1.6%)	53 (2.5%)	< 0.001**
	5–6 h	16 (0.7%)	30 (1.4%)	
	Less than 1 h	918 (42.8%)	92 (4.3%)	
	More than 6 h	15 (0.7%)	81 (3.8%)	
Smoking habit	No	1596 (74.3%)	489 (22.8%)	0.432
	Yes	34 (1.6%)	28 (1.3%)	
Study novels/story	No	660 (30.7%)	231 (10.8%)	< 0.001**
	Yes	970 (45.2%)	286 (13.3%)	
Victims of bullying	No	1409 (65.6%)	359 (16.7%)	0.04*
	Yes	221 (10.3%)	158 (7.4%)	
Eating disorders	No	1374 (64.0%)	275 (12.8%)	< 0.001**
	Yes	256 (11.9%)	242 (11.3%)	
Body mass index	Underweight	103 (4.8%)	38 (1.8%)	
	Obese	372 (17.3%)	144 (6.7%)	< 0.02*
	Normal weight	1126 (52.4%)	324 (15.1%)	
	Overweight	29 (1.4%)	11 (0.5%)	

*p < 0.05; **p < 0.001.
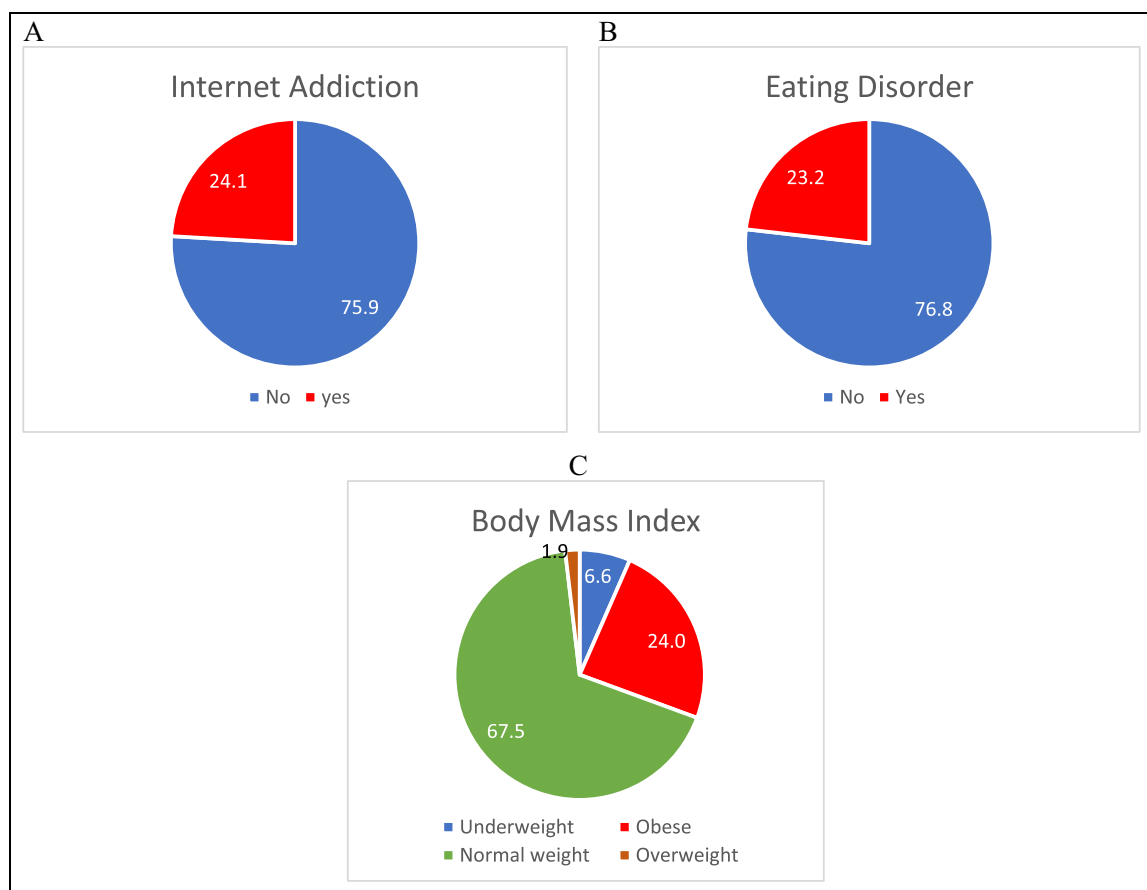
FIGURE 1 | Prevalence of internet addiction, risk of eating disorders, and body mass index categories among adolescents.

between IA and the factors mentioned above. According to our study, males are more addicted to the internet than females, like the previous findings in Bangladesh [43]. This is because males tend to exhibit more eggar towards video gaming, exploring the unknown, gambling, pornography use, etc. than females [44]. However, some research in Bangladesh also reported that no gender differences were found in terms of internet addiction [45].

The present study found that IA among participants not engaging in regular physical exercise was higher than among those who exercise regularly and supports findings from previous Bangladeshi studies [45, 46]. Several studies reported that those who did not engage in physical exercise experienced stress, negative emotions, and a sedentary lifestyle and that to cope, they were addicted to the internet [47]. These studies were also conducted on adolescents in Bangladesh and are consistent with the present study. Additionally, a recent study has more generally demonstrated that individuals who are afflicted with IA tend to lead more uncontrolled and unhealthy lives and vice versa [48].

Our findings also indicated that students who used the internet for 3–4 h, 4–5 h, 5–6 h, and more than 6 h per day were more internet addicted than those who didn't use the internet for an hour. Similarly, the students who used the internet for gaming, social networking, watching TikTok, and other purposes were more addicted to the internet than the students who used the internet only for studying purposes. Multiple factors could potentially contribute to the susceptibility of Bangladeshi students toward IA, including free access to social networking features and entertainment options like TikTok and online gaming [49], utilizing the internet as a means of alleviating stress [50], attaching to the smartphones for a long time and watching TikTok or Instagram reels [51], identity created in online communities (Twitter, Facebook, Skype) such as forums, fans and content creating groups or, interest-based groups. Moreover, people detached from family often experience depression and use the internet more as a coping mechanism [52, 53].

This study has revealed that students who did not read novels/stories were more internet addicted than students who studied novels/stories. This finding contradicts a previous study, which reported no statistically significant distinction between internet addict students and those who did not regard reading habits [54]. One possible reason that internet addiction and other behaviors are varied due to cultural differences between Bangladesh and Egypt [55]. Moreover, the Egyptian study was carried out during COVID-19; other factors, such as reading novels/stories, may have created differences between interned addicts and non-addicts. However, a recent study conducted in Turkey among medical college students showed similarities to the present study regarding reading extracurricular books and IA [56]. Our results additionally pointed out that students who were bullied by friends were more likely to be internet addicted than those who were not. Multiple prior studies among

TABLE 2 | Logistic regression analysis result.

Variables	Categories	Exp(B) (95% CI Lower–Upper)	p value
Gender	Male	Reference	0.02
	Female	0.56 (0.24–1.31)	
Purpose of using internet	Studying	Reference	
	Gaming	2.04 (1.86–3.02)	
	Others	1.82 (1.4–2.36)	< 0.001
	Social networking	3.14 (2.78–3.90)	
	Watching TikTok, Instagram videos	9.74 (9.17–10.19)	
Daily internet use (hour)	< 1 h	Reference	
	1–2h	0.13 (0.03–0.70)	
	2–3 h	0.21 (0.02–0.53)	
	3–4 h	0.29 (0.02–0.76)	< 0.001
	4–5 h	2.8 (2.01–2.99)	
	5–6 h	3.5 (3.07–3.80)	
	> 6 h	5.5 (5.01–6.27)	
Physical exercise	Yes	Reference	< 0.001
	No	3.8 (3.09–4.10)	
Study novels/story	No	Reference	<0.001
	Yes	0.45 (0.31–1.40)	
Bullied by friends	No	Reference	0.04
	Yes	1.69 (1.45–2.29)	
Eating disorders	No	Reference	< 0.001
	Yes	2.78 (2.33–2.83)	
Body mass index	Underweight	0.65 (0.42–0.86)	
	Overweight	1.56 (1.37–1.77)	< 0.001
	Obese	2.64 (2.08–3.31)	
	Normal weight	Reference	

TABLE 3 | Correlation analysis.

Variables	1	2	3	4
Gender	1			
Internet addiction	0.648**	1		
Risk of eating disorders	0.761*	0.686**	1	
BMI	0.613**	0.764*	0.771**	1

Note: Gender is a dummy variable.
*$p < 0.05$; **$p < 0.001$.

adolescents in China and Bangladesh have shown similarities with the present study [57, 58]. This is because students may experience stress and anxiety from peer bullying, which can lead to IA [59, 60].

The observed prevalence of internet addiction among adolescents at risk of eating disorders (23.2%) was higher than those who had not been at risk of the eating disorder, which is consistent with previous studies on adolescents in India, China, and Turkey [61, 62]. Social media sites frequently portray an idealized picture of life, wherein individuals exhibit their accomplishments, physical appearances, and way of life. Individuals who are at risk of eating disorders may experience higher social comparison and feelings of insufficiency due to constant access to precisely picked and unattainable images [63]. Consequently, this may potentially contribute to the development of internet addiction as a coping mechanism to seek validation [64]. Not surprisingly, we found that adolescents at risk of eating disorders also reported higher levels of BMI. The results showed that participants who were underweight, overweight, and obese were more internet addicted than others who were normal weight. Similar results were obtained from other studies among adolescents in Bangladesh [65, 66]. Overweight or obese individuals are susceptible to social isolation and stigmatization, which may contribute to a tendency to engage in online interaction [67]. They can communicate with others in a virtual environment where they feel more accepted and are not susceptible to potential judgment based on their appearance. This suggests that the adolescents with a higher BMI were more internet addicted than others who were underweight.

Unlike the previous literature [49], parents' education level was not significantly related to IA. This may be because the data obtained from a wide range of socio-demographic backgrounds allowed the present study to evaluate the impact of parents' education on IA comprehensively. Findings repeatedly demonstrated that this factor was not a major predictor of IA. Additionally, there was no evidence linking students' internet addiction to the class (from Grade 8 to Grade 12) they were currently studying.

However, the contradictions in the pattern of associations between variables in the current study versus other studies in Bangladesh and internationally may be owing to distinct target populations, a lack of adequate sampling, different screening tools, and unexpected factors.

5 | Limitations

A major limitation of this cross-sectional study is the reliance on self-rated measures, including adolescent-reported weight and height, which may lack accuracy. Mental health factors, such as mood disorders, anxiety, impulsivity, social desirability, body dissatisfaction, and dietary preferences, were not assessed, despite their potential impact on the relationship between IA and ED risk. Subgroups like students on medically prescribed diets, those in mental health treatment, or those engaged in online jobs, which may influence IA and ED risk, were also not considered. Furthermore, the study did not explore biological mechanisms linking IA and EDs. Future research should address these gaps with broader inclusion criteria and investigation into physiological pathways.

6 | Conclusion

This study investigated the relationship between the risk of EDs, BMI, and IA among adolescents in Bangladesh. The findings emphasize the need for further research to confirm these findings and to develop effective strategies for diagnosing and treating EDs and IA among adolescents. Promoting physical activity and healthy reading habits, along with raising awareness at the institutional level, can help mitigate the risks associated with these conditions. Parents should be informed about potential activities aimed at increasing awareness, especially about the internet and lifestyle behaviors among adolescents about the risks of IA and EDs. In conclusion, addressing IA and the risk of EDs in Bangladeshi adolescents requires a comprehensive approach that considers sociodemographic factors, internet usage patterns, and emotional health. Future research should explore these relationships further and develop targeted interventions to support adolescent health and well-being.

Author Contributions

Md. Abu Bakkar Siddik: conceptualization, investigation, writing – original draft, writing – review and editing, supervision, data curation, formal analysis, validation, methodology, software. **Md. Rajwanullha Shakil:** investigation, data curation, writing – original draft, writing – review and editing. **MD Zahid Hasan:** investigation, data curation, writing – review and editing, writing – original draft. **Jannatul Ferdos:** data curation, formal analysis, writing – review and editing, writing – original draft. **Azhar Uddin:** formal analysis, writing – review and editing, data curation, writing – original draft. **Irin Pervin:** data curation, writing – review and editing. **Al Mahmud:** data curation, writing – review and editing. **Abdulla Al Masud:** data curation, writing – review and editing. **Mujtaba Tamim Al Mahdee:** data curation, writing – review and editing. **Mahedi Hasan:** data curation, writing – review and editing. **Sumon Miah:** data curation, project administration. **Abdur Rahman Mahbub:** data curation. **Sheikh Marufa Nabila:** validation, project administration.

Conflicts of Interest

The Authors have no conflict of interest to declare. This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. No funding sources had any role in the study design, data collection, analysis, interpretation, report writing, or submission for publication.

Data Availability Statement

Due to privacy concerns by the ethical committee, data will be provided upon request. All authors have read and approved the final version of the manuscript, and the corresponding author had full access to all the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis.

Transparency Statement

The lead author Md. Abu Bakkar Siddik 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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