BMC Psychiatry

RESEARCH Open Access

The association of cyberbullying with major depressive disorders among Bangladeshi female adolescents: findings from the Bangladesh adolescent health and wellbeing survey 2019-20

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Abstract

Background Cyberbullying refers to the act of using digital technology to engage in bullying. It involves the intentional use of the internet to demean or denigrate individuals, and it has been linked to substantial psychological distress globally. Despite its increasing prevalence, there remains a gap in nationwide research on its association with the mental well-being of female adolescents in Bangladesh.

Objective The main objective of this study was to understand the association of cyberbullying with major depressive disorder (MDD) among female adolescents in Bangladesh.

Methods We used secondary data from the 2019–20 Bangladesh Adolescent Health and Wellbeing Survey (BAHWS), a nationally representative survey. A multiple logistic regression model was used to identify the possible association between cyberbullying and MDD.

Findings Among the 4,984 female adolescents surveyed, 8% (95% CI: 7–9) reported experiencing cyberbullying within the past 12 months, and 12% (95% CI: 11–14) were found to have MDD. Among those who had experienced cyberbullying, the prevalence of MDD was 31%. Additionally, a dose–response relationship was observed, where the burden of MDD increases with the frequency of cyberbullying experiences. Compared with those who did not experience cyberbullying, adolescents who faced any form of cyberbullying in the past 12 months were almost four times more likely (AOR: 3.97, 95% CI: 3.12–5.05) to have MDD.

Conclusion Cyberbullying is a significant issue among female adolescents in Bangladesh, with a higher risk of MDD linked to increased exposure. Accessible reporting mechanisms and timely counselling through teachers or healthcare providers can help reduce the long-term mental health impact of cyberbullying.

Clinical trial number Not applicable.

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Keywords Cyberbullying, Major depressive disorder, Female adolescents, Bangladesh, Mental health

Introduction

Cyberbullying is the use of digital technology, including words, images, or videos, to intentionally harm others, most often through social media, messaging platforms, apps, or blogs [1, 2]. Globally, cyberbullying is recognised as a growing public health concern, and it is often accomplished via apps, blogs, instant messaging, chat rooms, and social media platforms such as Facebook, Instagram, and Twitter [3, 4]. Females, particularly adolescents, are more likely to experience cyberbullying than males are [5, 6]. This vulnerability is partly due to their increased social media use, greater exposure to relational aggression, and societal pressures on appearance, which can lead to body shame and unrealistic beauty standards [7–9].

Studies have shown that cyberbullying has severe psychological and physical consequences, with female adolescents being disproportionately affected [5, 10, 11]. A review of 57 studies across 17 countries revealed that females experience higher rates of cyberbullying victimisation and its negative effects, such as major depressive disorder (MDD), than males do [12]. Persistent sadness, negativity, and boredom in once-enjoyable activities are signs of MDD [13]. Common symptoms include difficulty concentrating, changes in appetite and sleep patterns, low energy, feelings of worthlessness, and, in severe cases, suicidal thoughts. Adolescents with MDD are at heightened risk for long-term academic, social, and emotional difficulties, as well as poor physical health outcomes [14, 15]. The consequences of untreated MDD during adolescence often persist into adulthood, affecting overall quality of life and productivity [16]. Owing to heightened emotional sensitivity during this developmental stage, females, especially adolescents, are more likely to be emotionally impacted by negative online interactions, increasing their vulnerability to the psychological consequences of cyberbullying [4, 17].

Adolescents, who make up one-third of internet users globally [18], are particularly vulnerable to the growing issue of cyberbullying. As online interactions become more prevalent, so do the risks associated with cyberbullying, which has emerged as a significant concern [19]. In Europe, one in six school-aged students has experienced cyberbullying [20], and in the UK, one in three students report being bullied on various online platforms [21]. The problem extends across Asia, with countries such as China (70%), Singapore (58%), India (53%), Malaysia (33%), and Pakistan (26%) reporting high rates of cyberbullying [22]. The consequences are severe, as studies have shown that 93% of victims experience negative mental health effects, including sadness, hopelessness, stress, and emotional distress [23–25].

According to a study conducted in Bangladesh, at least 32% of adolescents between the ages of 10- and 17-years' experience cyberbullying, online abuse, and digital harassment [26]. Another study reported that 64% of women aged 15–35 years experienced online violence, predominantly on Facebook (48%) and Messenger (35%) (Action Aid Bangladesh, 2022) (Action Aid Bangladesh, 2022). Furthermore, among those who had experienced cyberbullying, 27% had some form of psychiatric disorder [27]. According to research conducted on school-aged teenagers during the COVID-19 epidemic, 40% of individuals who were victims of cyberbullying also experienced MDD [28].

There is increasing concern about the impact of cyberbullying on MDD, especially among female adolescents. While existing studies in Bangladesh have provided valuable insights, they have focused predominantly on localised samples from specific schools and colleges [27, 29, 30]. As a result, there is a lack of nationally representative research exploring the relationship between cyberbullying and female adolescent mental health. These smaller-scale studies may not fully capture regional variations or the broader experiences of adolescents across diverse sociocultural and economic backgrounds. Recent evidence highlights that Bangladeshi women and girls are disproportionately targeted by cyberbullying, with the rapid expansion of internet access intensifying their vulnerability. According to ActionAid (2022), up to 76% of Bangladeshi women who experienced online harassment reported mental health issues as a consequence [31]. The complex interplay of social, cultural, and technological factors in Bangladesh creates unique risks for female adolescents in digital spaces, underscoring the urgent need for robust, nationally representative research to inform policy and intervention [32]. Also, national policy, such as the National Strategy for Adolescent Health 2017–2030, explicitly recognizes adolescent girls as a particularly vulnerable group and prioritizes their protection from violence, harassment, and mental health risks [33].

To the best of our knowledge, no prior study in Bangladesh has examined the association between cyberbullying and MDD among female adolescents using nationally representative data. Therefore, this study aimed to examine the association between cyberbullying and MDD among female adolescents in Bangladesh, using nationally representative data from the Bangladesh Adolescent Health and Wellbeing Survey (BAHWS) 2019-20.

Methods

Data source, sampling technique, and study population

In this study, we used secondary data from the Bangladesh Adolescent Health and Wellbeing Survey (BAHWS) 2019-20, a nationally representative cross-sectional survey carried out between July 25, 2019, and January 10, 2020.

The sampling strategy for the BAHWS was based on a two-stage stratified sample of households. The first stage involved the selection of primary sampling units (PSUs) from the prepared lists, whereas the second stage involved the selection of households from these PSUs. The adolescents were subsequently selected from each stratum. This sampling technique ensured the representativeness and reliability of the survey data. Further details on the survey's sampling methodology and power considerations can be found in the BAHWS 2019–20 Final Report (Sect. 1.5.1) [34].

The survey utilised a sample consisting of 72,800 households, from which 67,093 households (98%) were successfully interviewed. The participants included 4,926 ever-married female adolescents (97% response rate), 7,800 unmarried female adolescents (94% response rate), and 5,523 unmarried male adolescents (85% response rate) aged 15–19 years. These adolescents were interviewed via three distinct individual questionnaires. The sampling strategy and sample size were determined by the National Institute of Population Research and Training (NIPORT) in collaboration with technical partners, ensuring sufficient power to detect meaningful differences for a wide range of outcomes across subgroups. Finally, 4984 (weighted) female adolescents, 2962 unmarried and 2022 married, who participated in the cyberbullying question (Fig. 1), were included in our analysis.

This study focused on female adolescents, as previous research consistently shows that cyberbullying and its psychological consequences, including depression, are more prevalent and severe among females compared to males [35–37]. Additionally, the BAHWS survey included both ever-married and unmarried females but only unmarried males, which could introduce bias and limit comparability if both sexes were analysed together. Therefore, restricting the analysis to female adolescents allows for a more accurate and nuanced understanding of the association between cyberbullying and major depressive disorder in this particularly vulnerable group.

Study variables and measurements

Outcome variables

The assessment of MDD in adolescents was conducted via the Patient Health Questionnaire (PHQ-9). It is a widely used, self-reported screening tool consisting of nine items assessing the presence or absence of depressive symptoms over the past two weeks [38]. Higher scores indicate more severe symptoms. The cumulative score, ranging from 0 to 27, delineates the following severity levels: no depression (scores 0–4), mild (scores 5–9), moderate (scores 10–14), moderately severe (scores 15–19), and severe (scores 20–27) [39]. In this study, a score of 10 or above indicated MDD (coded as 1), whereas a score of less than 10 denoted the absence of MDD (coded as 0) [40]. The Cronbach's alpha value of the PHQ-9 scale in our study was 0.80, indicating good internal consistency. The frequency distributions for the PHQ-9 items are given in Appendix Table 1.

Exposure variable

The exposure variable of this study was the experience of cyberbullying among adolescents. This was measured in the survey asking participants, "Has anyone used mobile/internet to bother/harass you at least once in the last 12 months?" If the respondents answered "yes" to this initial question, they were further asked, "How often did this bother you via mobile phone/internet?" This two-tiered approach allowed for the identification of adolescents who had experienced cyberbullying and provided insight into the frequency of such incidents [34].

Confounders

This study used several confounding variables, including socioeconomic and demographic factors and regional-level characteristics. With respect to socioeconomic and demographic factors, we considered the age of the respondents (15–19), marital status (never married, ever married), and current employment status (no, yes). Education level was categorised into years of schooling (≥ 5, 6–9 years, 10+). Furthermore, socioeconomic status was assessed through the wealth index (poor, middle, rich) and ownership of a mobile phone (no, yes). Social media use was included when Facebook usage was considered (no, yes). Regional-level characteristics included the area of residence (rural, urban) and the division of residence, covering Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Rangpur, Sylhet, and Mymensingh [41, 42].

Statistical analysis

In this study, Stata version 17.0 (StataCorp LP, College Station, Texas) and R version (4.3.0) were used to clean, recode and analyse the data. To ensure the survey's representativeness, we used sample weights for weighting [43]. Additionally, we followed the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) cross-sectional reporting guidelines [44].

Exploratory data analysis was conducted with a 95% confidence intervals (CIs) to examine the characteristics of the dataset. This involved reporting frequencies and percentages for the study variables. Additionally, we used bar charts and maps for graphical representation to

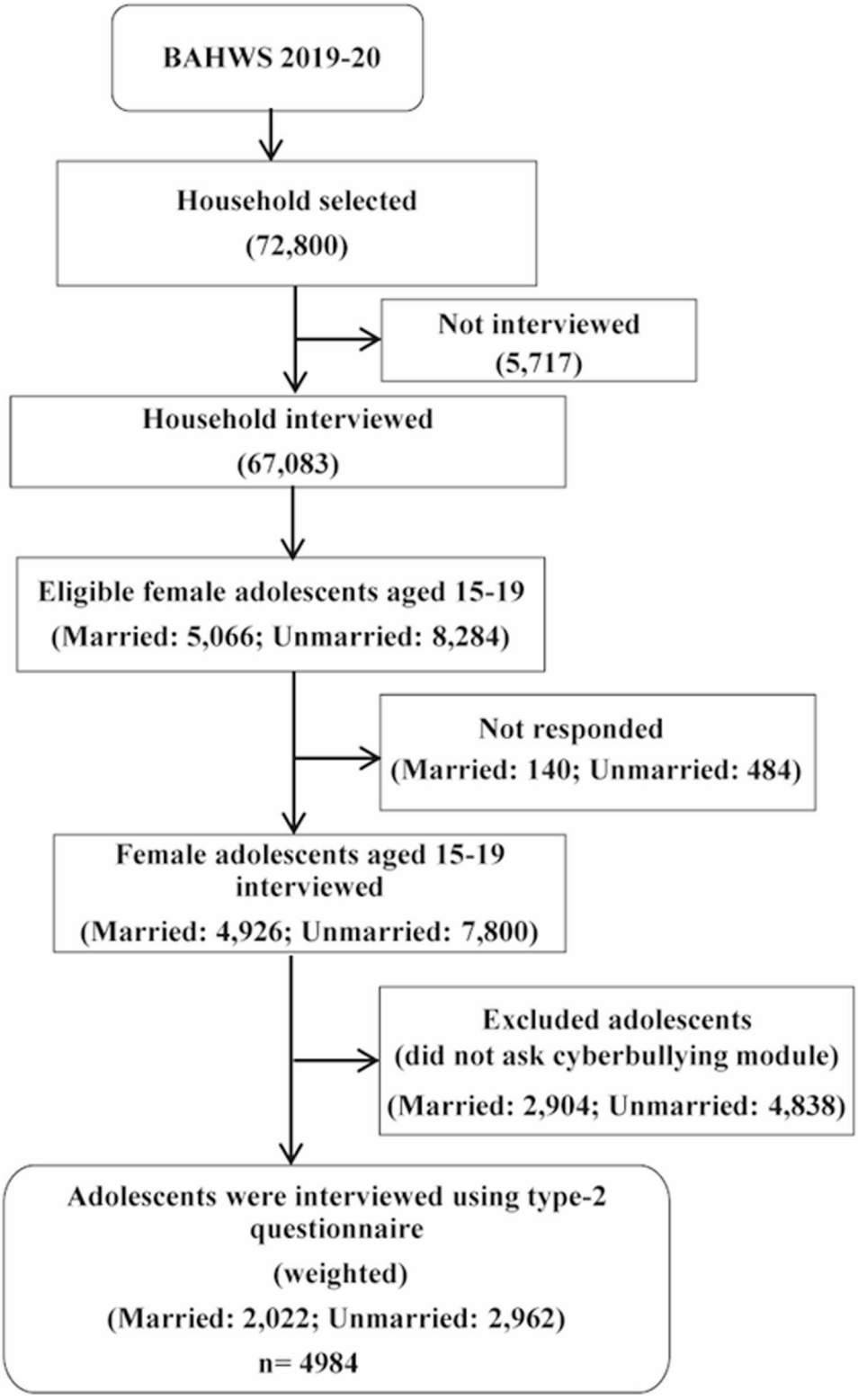

Fig. 1 STROBE flowchart of the analytical study sample

visualise the data. Additionally, the chi-square test was performed to identify the bivariate relationship between the study variables and MDD. For multivariable analysis, variables with a p-value less than 0.20 in the bivariate analyses were considered for inclusion in a logistic regression model to identify factors associated with MDD [45]. We used complete case analysis and did not impute missing values. Multicollinearity among independent variables was assessed using the variance inflation factor (VIF). The strength of associations was reported as adjusted odds ratios (AORs) with 95% Cis.

Table 1 Descriptive statistics of the study variables among female adolescents in Bangladesh ($n = 4,984$)

Variable	Weighted frequency (*n*)	Weighted percentage (%)
Total	4984	100
Age of respondents		
15	1014	20.3
16	1105	22.2
17	1032	20.7
18	1041	20.9
19	792	15.9
Marital status		
Never Married	2962	59.4
Ever married	2022	40.6
Currently Working		
No	4548	91.2
Yes	437	8.8
Years of schooling		
≤ 5 years	709	14.2
6 to 9 years	2698	54.2
10 + years	1575	31.6
Wealth index		
Poor	2128	42.7
Middle	1087	21.8
Rich	1768	35.5
Own personal mobile phone		
No	3267	65.5
Yes	1717	34.5
Used Facebook on the mobile phone		
No	4155	83.4
Yes	829	16.6
Experienced cyberbullying in the last 12 months		
No	4366	87.6
Yes	618	12.4
Area of residence		
Rural	3512	70.5
Urban	1472	29.5
Division		
Barisal	332	6.7
Chittagong	963	19.3
Dhaka	1222	24.5
Khulna	543	10.9
Rajshahi	649	13
Rangpur	589	11.8
Sylhet	300	6
Mymensingh	386	7.7

Ethics approval

As this study utilised publicly available secondary data, formal Ethics Committee or Institutional Review Board approval was not required. However, the original survey protocols were approved by the icddr, b Ethical Review Committee, and written informed consent was obtained from all participants or their legal guardians.

Results

Sociodemographic characteristics

In this study, among the 4984 respondents, approximately 59% of the adolescents were unmarried, whereas 41% were married, with an equal distribution across age groups ranging from 15 to 19 years. Most respondents were not currently working (91%), and the highest proportion (54%) had between 6 and 9 years of schooling. The wealth index revealed that approximately 43% of the respondents were categorised as poor, 22% as middle, and 36% as rich. Mobile phone ownership was reported by 35% of the respondents; 17% used Facebook, and 8.0% of the respondents had experienced any form of cyberbullying in the last 12 months. Most respondents resided in rural areas (70.5%), with the remainder residing in urban areas (29.5%). The regional distribution indicated that the highest percentages of respondents were from Dhaka (24.5%) and Chittagong (19.3%) (Table 1).

Relationships between the incidence of MDD and other factors

In this study, the overall prevalence of MDD among female adolescents was 12.4% (95% CI: 11.3–13.6%). In terms of age, the highest prevalence of MDD was observed among 19-year-olds (17.2%). Marital status indicated that ever-married individuals had a greater prevalence of MDD (14.3%) than never-married individuals did (11.1%). In terms of employment status, those currently working had a greater prevalence of MDD (16.1%) than did those not working (12%). With respect to education, respondents with less than 5 years of schooling had the highest prevalence of MDD (18%). Mobile phone ownership and Facebook use were associated with a higher MDD prevalence, with mobile phone owners at 13.7% and Facebook users at 16.1%. Urban residents also reported a greater prevalence of MDD (14%) than did rural residents (11.7%). Regionally, the highest MDD incidence was observed in Mymensingh (17.7%), whereas the lowest was in Rajshahi (7.4%) (Table 2).

Table 2 Distribution of MDD by sociodemographic and behavioral characteristics among female adolescents in Bangladesh ($n = 4,984$)

Variables	Major depressive symptoms (MDD)		*p* value
	No	Yes	
	n (row %)	*n* (row %)	
Total	**87.6 (86.4, 88.7)**	**12.4 (11.3, 13.6)**	
Age of respondents			
15	89.7 (87.5, 91.6)	10.3 (8.4, 12.5)	0.001
16	89.4 (86.4, 91.8)	10.6 (8.2, 13.6)	
17	86.4 (83.8, 88.7)	13.6 (11.3, 16.2)	
18	88.4 (86.0, 90.4)	11.6 (9.6, 14.0)	
19	82.8 (79.7, 85.5)	17.2 (14.5, 20.3)	
Marital status			
Never Married	88.9 (87.3, 90.2)	11.1 (9.8, 12.7)	0.002
Ever married	85.7 (84.0, 87.3)	14.3 (12.7, 16.0)	
Currently Working			
No	88 (86.7, 89.1)	12 (10.9, 13.3)	0.028
Yes	83.9 (79.8, 87.4)	16.1 (12.6, 20.2)	
Years of schooling			
≤ 5 years	82 (79.0, 84.6)	18 (15.4, 21.0)	< 0.001
6 to 9 years	88.7 (87.0, 90.1)	11.3 (9.9, 13.0)	
10 + years	88.3 (86.4, 90.0)	11.7 (10.0, 13.6)	
Wealth index			
Poor	86.1 (84.0, 87.9)	13.9 (12.1, 16.0)	0.073
Middle	88.7 (86.5, 90.7)	11.3 (9.3, 13.5)	
Rich	88.8 (86.7, 90.6)	11.2 (9.4, 13.3)	
Own personal mobile phone			
No	88.3 (86.8, 89.6)	11.7 (10.4, 13.2)	0.068
Yes	86.3 (84.4, 88.0)	13.7 (12.0, 15.6)	
Used Facebook on the mobile phone			
No	88.3 (87.1, 89.5)	11.7 (10.5, 12.9)	< 0.001
Yes	83.9 (80.9, 86.4)	16.1 (13.6, 19.1)	
Area of residence			
Rural	88.3 (87.0, 89.4)	11.7 (10.6, 13.0)	0.118
Urban	86 (82.9, 88.6)	14 (11.4, 17.1)	
Division			
Barisal	85.6 (81.0, 89.2)	14.4 (10.8, 19.0)	0.004
Chittagong	85.9 (81.6, 89.4)	14.1 (10.6, 18.4)	
Dhaka	88.8 (86.6, 90.7)	11.2 (9.3, 13.4)	
Khulna	87.2 (83.7, 90.0)	12.8 (10.0, 16.3)	
Rajshahi	92.6 (90.2, 94.4)	7.4 (5.6, 9.8)	
Rangpur	87.9 (84.3, 90.7)	12.1 (9.3, 15.7)	
Sylhet	86.4 (83.0, 89.2)	13.6 (10.8, 17.0)	
Mymensingh	82.3 (77.8, 86.0)	17.7 (14.0, 22.2)	

Association of experiencing cyberbullying with MDD

Figure 2 illustrates the relationship between cyberbullying and the prevalence of MDD. Compared with those who did not experience any form of cyberbullying (10.7%), those who experienced cyberbullying in the last 12 months had a significantly greater prevalence of MDD (31.6%). The figure further reveals a dose–response relationship between the frequency of experiencing cyberbullying and MDD. The prevalence of MDD increases with the frequency of cyberbullying encounters. Those who faced cyberbullying once or twice represented 23.2% of the participants with MDD, 29.3% with 2–4 cases, and 38.2% with five or more cases.

The logistic regression model revealed a significant association between cyberbullying and MDD in both the crude and adjusted models (Table 3). Compared with those who did not experience cyberbullying, individuals who experienced cyberbullying were 3.85 times more likely to have MDD (COR: 3.85, 95% CI: 2.96, 5.01). After adjusting for various demographic and socioeconomic variables, the associations remained significant. The adjusted model revealed that individuals who experienced cyberbullying are nearly four times more likely to have MDD than those who did not experience cyberbullying (AOR: 3.97, 95% CI: 3.12, 5.05). The values and interpretations for all other covariates included in the model are presented in Supplementary **Table S1**.

Prevalence and Perpetrator Profiles of Cyberbullying by Marital Status

In this study, cyberbullying was slightly more prevalent among unmarried individuals (8.5%) than among those who were ever married (7.3%). The perpetrator profiles revealed that friends/classmates were more common perpetrators among never-married individuals (14.1%) than among ever-married individuals (6.6%). In contrast, unknown persons are the predominant perpetrators for both groups, with 81.1% among never-married individuals and 79.2% among ever-married individuals. Another notable perpetrator group was neighbours, where 8.4% of never-married and 7.7% of ever-married adolescents experienced cyberbullying by neighbours. Moreover, 6.6% of the ever-married adolescents had experienced cyberbullying by their husbands/in-laws in the past twelve months (Fig. 3).

Regional variation in the prevalence of cyberbullying

The experience of cyberbullying also varies by division, as shown in Fig. 4. Barisal reported the highest percentage of cyberbullying, at 12.9%, followed by Rangpur, at 10.7%, and Mymensingh, at 9.6%. In contrast, Sylhet had the lowest reported percentage at 3.7%.

Discussion

This study examined the association between cyberbullying and MDD among female adolescents via nationally representative data from the BAHWS 2019–20. This study highlights a significant association between experiencing cyberbullying and MDD among female adolescents in Bangladesh. The respondents who experienced cyberbullying were found to have notably greater odds of MDD than those who did not face any form of cyberbullying within 12 months. Additionally, the study revealed a

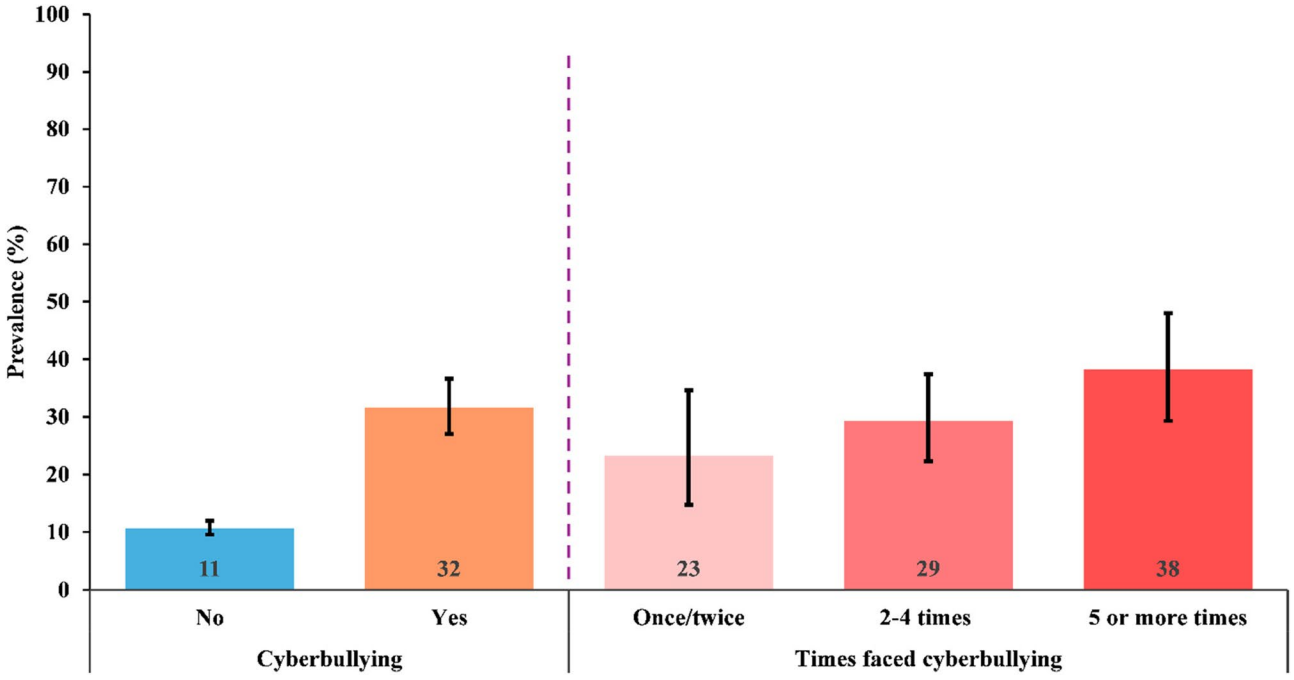

Fig. 2 Prevalence of MDD by cyberbullying experience status and frequency in the last 12 months among female adolescents in Bangladesh ($n=4,984$)

Table 3 Unadjusted and adjusted associations of MDD with experiencing cyberbullying in the last 12 months among female adolescents in Bangladesh ($n=4,984$)

Variables	COR	*p* value	AOR	*p* value
Experienced cyberbullying				
No	**ref.**		**ref.**	
Yes	3.85 (2.96 to 5.01)	< 0.001	3.97 (3.12 to 5.05)	< 0.001

Adjusted for the following variables: age, marital status, employment status, years of schooling, wealth index, mobile phone ownership, Facebook use, area of residence, and division.

dose–response relationship, where the likelihood of MDD increased with the frequency of cyberbullying incidents.

In this study, we found that a notable proportion of female adolescents in Bangladesh had MDD. This finding aligns with a previous study in Bangladesh, where a study reported a point prevalence of depressive symptoms of 15% among females aged 13–19 years [46]. Additionally, another nationwide cross-sectional study reported a slightly lower estimate, with 7% of female adolescents (10–19 years) experiencing moderate to severe depression in Bangladesh [47]. Our estimate is nationally representative, covering a diverse range of regions across Bangladesh. This broad scope provides a more generalised prevalence of MDD among female adolescents than do studies focused on specific populations or geographic areas.

The study also revealed that approximately one in every ten female adolescents experienced cyberbullying. A recent systematic review including 63 studies from different countries indicated that the prevalence of cyberbullying victimisation among adolescents ranges from 14 to 58% [4]. However, a previous study in Bangladesh, conducted among school-going adolescents in Dhaka city, reported a much higher prevalence of 34% among female adolescents [27]. This discrepancy can be explained by the specific context of previous studies [27, 28], which focused on a single school in a moderately prosperous urban area of Dhaka where internet access was widespread and where most adolescents attended school. In contrast, our study considered a broader population across various regions of Bangladesh, including areas with less access to the internet, areas surrounded by stigma, areas lacking awareness, etc., which may have led to a lower overall prevalence.

This study revealed a significant association between cyberbullying victimisation and MDD in female adolescents. Notably, individuals who experienced cyberbullying were more likely to have MDD. This finding was consistent with previous research showing that cyberbullying is a significant predictor of depressive symptoms among adolescents. A cohort study conducted in India revealed that cyberbullying victimisation is linked to a greater risk of depression and suicidal ideation, with victims being almost two times more likely to experience depressive symptoms [10]. Additionally, a meta-analysis utilising 57 studies from 17 countries revealed a significant positive relationship between cyberbullying victimisation and depression [12]. Another study on adolescents from Australia and Switzerland revealed that even after adjusting for the risk of traditional bullying victimisation,

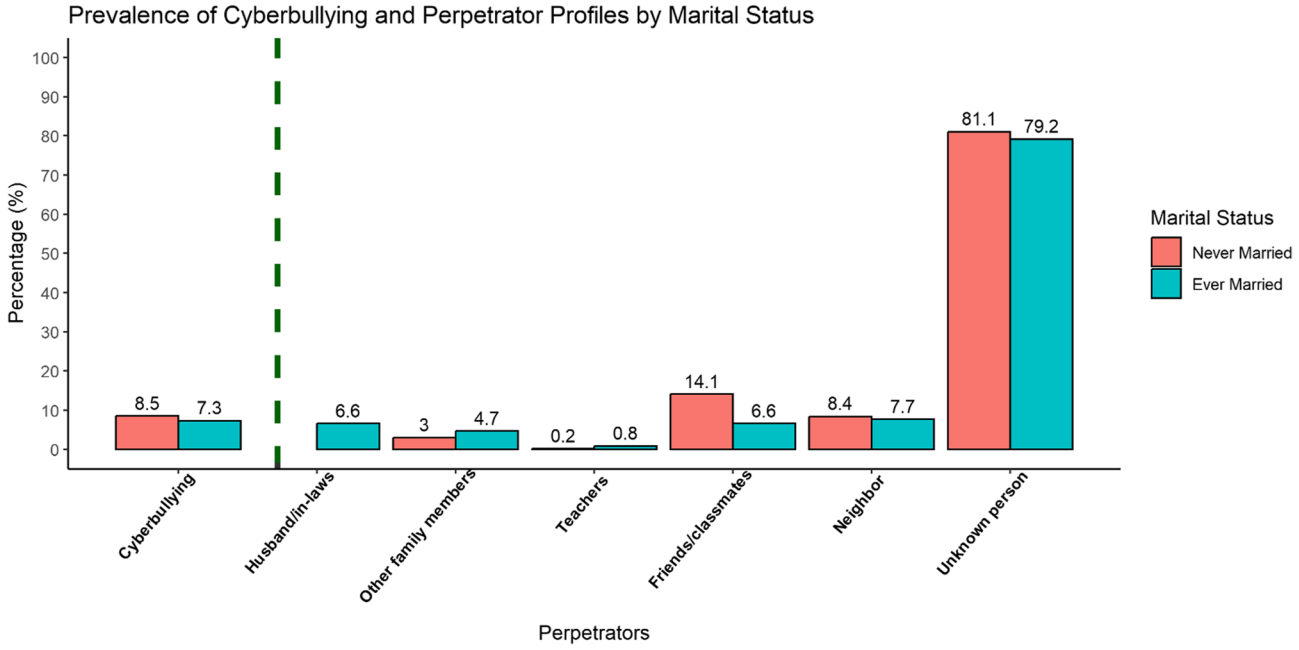

Fig. 3 Prevalence of experiencing cyberbullying and the profiles of perpetrators stratified by marital status ($n = 4,984$)

victims of cyberbullying had significantly greater levels of depressive symptoms [48]. Above all, adolescents are more vulnerable to the psychological effects of cyberbullying because of their developmental stage and reliance on peer relationships. Unlike traditional bullying, cyberbullying can affect a victim's personal life at any time, creating ongoing stress and anxiety [49]. Bauman and colleagues reported that cyberbullying often has a more severe impact than traditional bullying does because it can occur 24/7 and reach a wide audience, intensifying feelings of helplessness and humiliation [50].

Our study also revealed a dose–response relationship between the frequency of cyberbullying incidents and the prevalence of MDD among female adolescents, indicating that increased incidents of cyberbullying are correlated with a greater burden of MDD. This finding was consistent with a previous study conducted in North Carolina, USA, which revealed a dose–response relationship between increased vulnerability in mental health and increased levels of cyberbullying victimisation among adolescents [51]. Additionally, a series of prospective longitudinal studies analysing large, population-based community samples published between 1960 and 2015 confirmed the existence of this dose–response relationship [52]. Remarkably, a study using data from the British National Child Development cohort revealed that the long-term effects of the dose–response relationship between bullying victimisation and mental health persist well into adulthood, with negative psychological outcomes still evident up to 50 years of age [53]. Continuous bullying may interfere with the development of healthy coping mechanisms in adolescents, lower self-esteem, and create feelings of loneliness and worthlessness, all of which increase risk and violence [54]. Additionally, persistent bullying undermines social support networks, as bullied adolescents may struggle to trust peers and adults, reducing perceived support from parents, teachers, and friends [49]. This lack of social support can lead to feelings of rejection and loneliness, further deteriorating mental health [55].

The sociocultural context of Bangladesh further amplifies the psychological burden of cyberbullying on female adolescents. In a society where issues related to female autonomy, honour, and social reputation are deeply embedded, online harassment can have severe consequences beyond mental distress [56, 57]. Victims often face social stigma, victim blaming, and reputational harm, discouraging them from reporting incidents or seeking support [58]. Additionally, gender norms in Bangladesh dictate stricter expectations for female behaviour, making young women particularly vulnerable to harassment, blackmail, and cyber-exploitation, which can intensify feelings of depression and anxiety [59]. Limited digital literacy among parents and guardians further restricts adolescent girls from receiving the guidance and intervention needed to navigate online harassment safely [60]. These cultural factors increase the long-term consequences of cyberbullying, emphasising the urgent need for gender-sensitive interventions, stronger legal protections, and mental health support systems tailored to the Bangladeshi context.

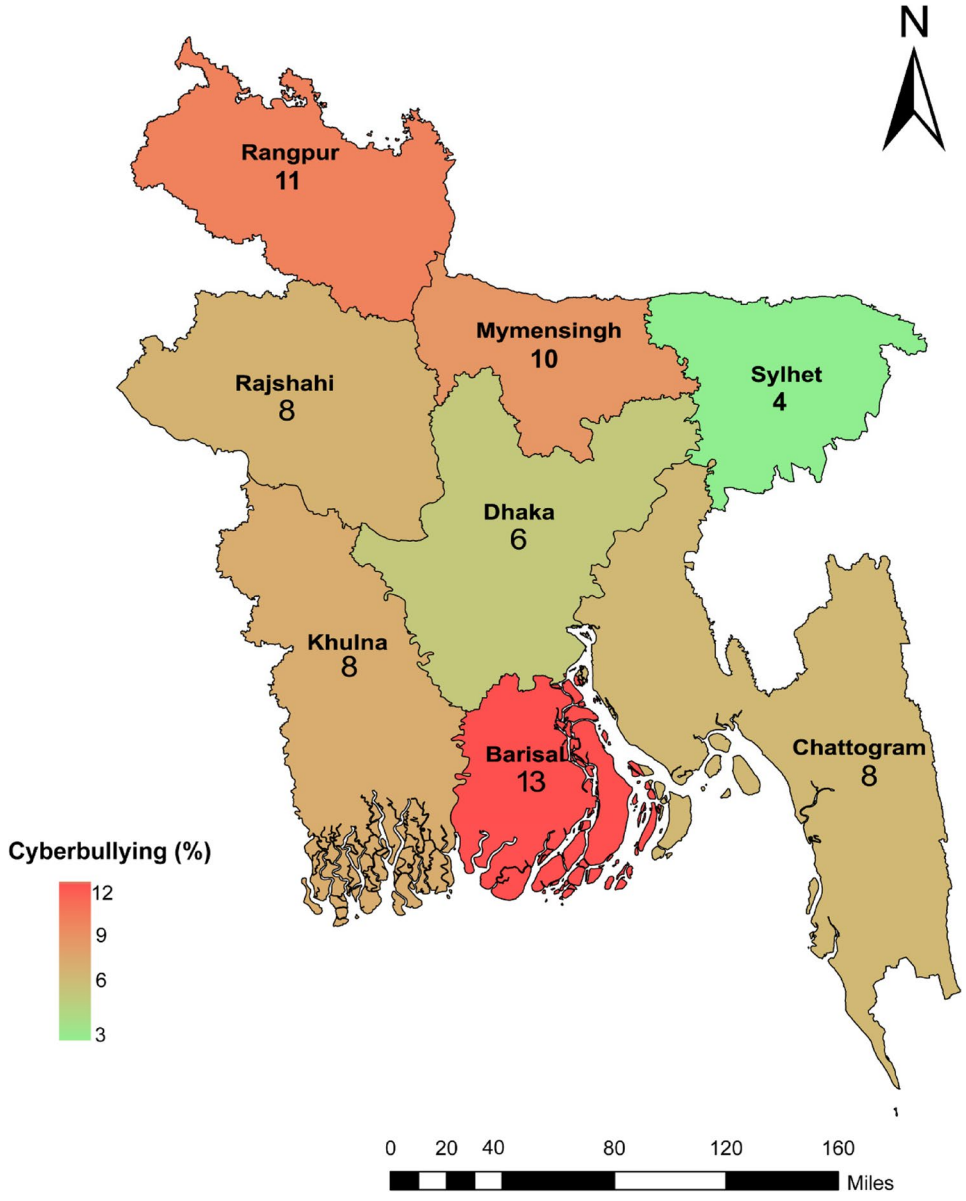

Fig. 4 Prevalence of experiencing cyberbullying by administrative division among female adolescents in Bangladesh ($n = 4,984$)

Moreover, in Bangladesh, the term "cyberbullying" is not explicitly mentioned in any existing laws. However, cyberbullying and cyber harassment are addressed under several legal frameworks, including the Information and Communication Technology (ICT) Act of 2006, the Pornography Control Act of 2012, and the Digital Security Act (DSA) of 2018 [58]. Under these laws, various forms of cyberbullying, such as identity fraud, the dissemination of harmful content, and blackmail using private material, are punishable offences [61]. Punishments can include imprisonment for up to 14 years and fines of up to 10 core BDTs or both for serious offences such as hacking and illegal data sharing [62].

While the DSA-2018 provided necessary options for addressing online threats, it faced widespread criticism for overreach and the potential for misuse, particularly regarding nonbailable offences [63]. In response to these concerns, the Cyber Security Act (CSA) of 2023 was introduced as a replacement for DSA-2018 [64]. The new Cyber Security Act of 2023 reduced the number of nonbailable offences from 14 sections under the DSA-18 to just four sections while still empowering law enforcement officials to act against crimes [65]. For example, under the CSA-2023, police inspectors are authorised to conduct searches and arrests without a warrant in specific cases, maintaining a robust legal framework for tackling cyber-related offences [65].

In terms of reporting incidents, victims of cyberbullying have several options. The Bangladesh Police Cybercrime Unit offers a hotline at +8,801,730,336,431 and allows for complaints via email at cyb@police.gov.bd [66]. In addition, the Cyber Police Centre (CID), Bangladesh Police, accepts reports via its official Facebook page. The government has also launched the National Helpline Centre for Violence Against Women and Children (109), where victims can seek assistance [65]. These mechanisms aim to ensure quick responses to complaints of online harassment, including cyberbullying [66]. However, despite the presence of these laws and reporting mechanisms, victims and their families are often reluctant to report cases of cyberbullying openly or promptly [67], and awareness of how to report cyberbullying and access protection remains limited [61]. Social stigmas, fear of backlash, and a lack of awareness of legal protections frequently deter them from seeking justice [68]. This gap suggests that educational campaigns through schools, social media, and community programs are essential for informing people about the legal protections available and the ethical use of technology. Building awareness about the psychological impacts of cyberbullying, along with teaching digital responsibility, can establish a safer online environment [69].

Strengths and Limitations of the Study

This study has several notable strengths. It draws on data from a large, nationally representative sample of 4,984 female adolescents in Bangladesh, providing a reliable picture of cyberbullying among adolescents. Additionally, this is the first study to examine the prevalence of cyberbullying victimisation and its association with MDD among female adolescents in Bangladesh, which ensures that the findings are generalizable to a broader population. A unique aspect of this study is the identification of a dose–response relationship between the frequency of cyberbullying and MDD, a relationship that has not been explored in previous studies in Bangladesh, further adding to the study's novelty and significance. Furthermore, MDD was assessed via the PHQ-9 scale, a widely validated and accepted tool for measuring depressive symptoms, enhancing the reliability and accuracy of mental health findings.

However, this study has several limitations. The measurement of cyberbullying relied on a single, self-reported question developed by the BAHWS research team after reviewing existing tools and considering cultural context, but it was not a validated multi-item scale. Although the question was pretested during the survey's pilot phase to ensure clarity and acceptability, the use of a single-item measure may limit the precision and reliability of the assessment. Future research should consider using validated multi-item instruments for a more comprehensive assessment of cyberbullying. Additionally, the cross-sectional nature of the data prevents us from establishing a direct causal link between cyberbullying and MDD; we can demonstrate only a strong association. Also, the temporal mismatch between exposure and outcome measurements should be noted. While cyberbullying exposure was assessed over the past 12 months, MDD measured experiences during the past 2 weeks. Longitudinal studies with aligned measurement windows would better establish these temporal relationships. Furthermore, since the data rely on self-reports, there might be some recall bias, with adolescents potentially underreporting their experiences of cyberbullying owing to social desirability or forgetting details. Another limitation is that the survey considered only females aged 15–19 years, whereas the adolescent age group is generally defined as those aged 10–19 years. This creates a gap, as younger adolescents who may also have experienced cyberbullying and MDD were not included in the study.

Recommendations

On the basis of the findings of this study, interventions targeting mental health among female adolescents should focus on addressing cyberbullying and promoting healthy social media usage. It requires a multifaceted approach involving parents, schools, policymakers, and digital platforms. Effective policies and programs are needed to educate adolescents about the dangers of cyberbullying, promote positive online behaviour, and provide support for those who are affected. One critical aspect highlighted in this study is the importance of promptly reporting cyberbullying incidents. A delay in reporting can allow the psychological harm caused by cyberbullying to escalate, as observed through the dose–response relationship between the frequency of cyberbullying and MDD. Educating adolescents, parents, and educators on recognising the signs of cyberbullying and ensuring a smooth reporting process can empower victims to seek help without hesitation. Furthermore, strengthening mental health services for victims of cyberbullying can help mitigate psychological impacts, such as depression and anxiety. Collaboration among policymakers, educational institutions, and law enforcement agencies will be crucial to creating a safer digital space. Schools should implement anti-bullying policies, arrange awareness programs, and provide resources for mental health support. Parents should be encouraged to monitor their children's online activities and maintain open communication about their experiences with cyberbullying. Therefore, overall, efforts to prevent and mitigate cyberbullying should be prioritised, including education on online safety and the creation of supportive online and offline environments. Additionally, initiatives to promote positive mental health habits, such as reducing excessive social media

use and encouraging healthy lifestyle choices, should be implemented.

Conclusion

In Bangladesh, nearly one in ten female adolescents experience cyberbullying, and a substantial proportion of them suffer from MDD. This study revealed a strong association between experiencing cyberbullying and MDD among female adolescents. These findings highlight the urgent need for targeted efforts to reduce cyberbullying, increase awareness of the importance of promptly reporting incidents, and establish mental health support systems in vulnerable regions. Such measures are crucial for safeguarding the well-being of female adolescents and mitigating the long-term psychological impacts of cyberbullying. It is also important to increase awareness of Bangladesh's cyberbullying regulations, such as the Cyber Security Act of 2023.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12888-025-07234-z.

Supplementary Material 1.

Acknowledgements
icddr, b is grateful to the Government of Bangladesh and Canada for providing core/unrestricted support.

Authors' contributions
Conceptualisation, S.T.A.N., M.F.I., and S.R.; data curation, S.T.A.N. and M.F.I.; formal analysis, S.T.A.N.; investigation, R.B. and S.R.; methodology, S.T.A.N. and M.S.H.; supervision, S.R.; validation, S.R.; writing– original draft, S.T.A.N., M.S.I., and M.S.H.; writing– review and editing, R.B.I., R.B., S.M.N., S.I.S., and S.R. All authors have read and agreed to the published version of the manuscript.

Funding
This study was funded by the Department of Foreign Affairs, Trade and Development (DFATD), Canada, through Advancing Sexual and Reproduction Health and Rights (AdSEARCH), Grant number: SGDE-EDRMS-#9926532, Purchase Order 7428855, Project P007358.

Data availability
The BAHWS data are publicly available at this link: https://dataverse.unc.edu/dataset.xhtml? persistentId=doi:10.15139/S3/DVEI9A.

Declarations

Ethics approval and consent to participate
As this study used publicly available secondary data, which can be accessed upon reasonable request, no Ethics Committee or Institutional Review Board approval was needed. However, surveys involving human participants were reviewed and approved by the icddr, b ERC. Written informed consent to participate was provided by the participants' legal guardians or next of kin.

Competing interests
The authors declare no competing interests.

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Received: 21 March 2025 / Accepted: 22 July 2025
Published online: 12 August 2025

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