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Original Research Article

Prevalence of Cyberbullying and Its Association with Internet Addiction and Internet Gaming Disorder Among Medical Students of Western Gujarat; A Cross-Sectional Study

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ABSTRACT

Background: Increasing digital technology use has introduced important behavioural health concerns in student populations, including cyberbullying, internet addiction (IA), and internet gaming disorder (IGD).
Objectives: To estimate the prevalence of cyberbullying and examine its associations with IA and IGD among undergraduate medical students in Western Gujarat.
Methods: A cross-sectional observational study was conducted over 6 months among 160 MBBS students (≥18 years). Participants completed a socio-demographic proforma, Revised Cyberbullying Inventory (RCBI-R), Young's Internet Addiction Test–Short Form (YIAT-SF), and Internet Gaming Disorder Scale–Short Form (IGDS9-SF). Data were analysed in jamovi using descriptive statistics and chi-square tests; $p<0.05$ was considered significant.
Results: Participants' mean age was 19.8 ± 0.9 years; 76 were male and 84 female. Moderate-to-severe IA prevalence was 19.4%, and nearly half had mild IA. Overall, 18.1% reported cyberbullying involvement (11.3% perpetrators; 6.9% victims). IGD prevalence was 7.5%. Cyberbullying involvement increased significantly with greater IA severity ($\chi^2=87.3$, df=6, $p<0.01$). IGD was significantly higher among students involved in cyberbullying than those never exposed ($\chi^2=47.3$, df=2, $p<0.01$). IGD prevalence also rose sharply with increasing IA severity ($\chi^2=96.73$, df=3, $p<0.01$).
Conclusions: Cyberbullying, IA, and IGD were prevalent and strongly associated in this medical student cohort, underscoring the need for screening and targeted preventive strategies. Gaming disorder is recognized in ICD-11 as impaired control, prioritization, and continuation despite negative consequences.

Keywords: Cyberbullying, Internet addiction, Internet gaming disorder, Medical students.

INTRODUCTION

The rapid proliferation of digital technology and internet accessibility has fundamentally transformed human communication and social interaction in the 21st century. While these technological advances have facilitated unprecedented connectivity and access to information, they have also given rise to concerning behavioral patterns and psychological phenomena, including cyberbullying, internet addiction, and internet gaming disorder.[1,2] Medical students, in particular, represent a vulnerable population facing unique academic pressures, social isolation, and extensive internet usage for

botheducational and recreational purposes, making them susceptible to these digital-age challenges.[3]

Cyberbullying, defined as intentional aggressive behaviour conducted through electronic means to harm others repeatedly, has emerged as a pervasive issue in educational settings worldwide.[4] A study by Deshmukh et al. found that 34% of medical students experienced cyberbullying victimization, with 72% of victims reporting lower self-esteem. The anonymity and widespread reach of digital platforms facilitate bullying behaviors, creating an environment of fear and silence that can lead to severe psychological consequences including anxiety, depression, and decreased academic performance. Academic pressure, particularly harassment related to grades or clinical performance, has been identified as a significant contributor to harmful online interactions among medical students.[3]

Internet addiction (IA), characterized by excessive and poorly controlled preoccupations, urges, or behaviors regarding internet use, has become increasingly prevalent among medical students. A meta-analysis revealed that the prevalence of internet addiction disorder among medical students is 10.9% (95% CI: 7.3% to 16.1%), which is higher than in the general population.[5] Medical students' prolonged study hours, limited opportunities for socialization and physical activities, and living arrangements away from home predispose them to excessive internet use. The considerable academic and professional stress inherent to medical education, combined with extensive online time, creates conditions conducive to developing internet addiction.[6]

Internet Gaming Disorder (IGD), recognized in the DSM-5 as a condition warranting further study, represents another emerging concern among student populations. The World Health Organization has also included gaming disorder in the 11th Revision of the International Classification of Diseases (ICD-11). ICD-11 defines it as "a pattern of gaming behavior ('digital-gaming' or 'video-gaming') characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences".[7] Studies have demonstrated that spending more time playing online games is significantly associated with higher risk of IGD, and the disorder is associated with negative consequences including physical pain and impaired routine activities.[8]

Emerging evidence suggests complex interrelationships between cyberbullying, internet addiction, and internet gaming disorder. Adolescents exposed to cyberbullying show higher probability of problematic internet use and may exhibit cyberbullying behaviors themselves, driven by anger and revenge. Recent studies have found that cyberbullying victimization significantly predicts internet gaming addiction positively, suggesting that victims may turn to gaming as a coping mechanism or escape. Furthermore, problematic internet use has been identified as an important determinant in cyberbullying attitudes, creating a potential cyclical relationship between these phenomena.[9]

Despite growing global research on these topics, there is limited data specifically examining the prevalence and associations of cyberbullying, internet addiction, and internet gaming disorder among medical students in the Indian context, particularly in regional populations such as Western Gujarat. Medical students face unique stressors including demanding academic curricula, clinical responsibilities, and concerns about future career prospects, which may influence their vulnerability to these digital-age disorders differently than other student populations. Understanding the prevalence of these conditions and their interrelationships is crucial for

developing targeted interventions and support systems within medical education institutions.

This cross-sectional study aims to determine the prevalence of cyberbullying and examine its association with internet addiction and internet gaming disorder among medical students in Western Gujarat. The findings may contribute to the development of evidence-based preventive strategies and mental health support programs tailored to the specific needs of medical students in this region.

MATERIAL AND METHODS

Study Design and Setting

This cross-sectional observational study was conducted among undergraduate medical students at a medical college in western Gujarat. The study was carried out over a period of 6 months. Ethical approval was obtained from the Institutional Ethics Committee prior to data collection.

Sample Size and Sampling

Sample size was calculated using formula: $n = Z^2pq/d^2$ proportion (p) 21.5% from Reference study. q: 100-p: 100-21.5 = 72.5. Absolute error was 7%. Calculated sample size was 156.3 rounded off to 160. The final sample size was l60 students.[10]

Inclusion criteria:

- Undergraduate medical students (MBBS) enrolled at the study institution.
- Student should be 18 years or older.
- Students willing to provide informed consent.
- Students present on the day of data collection.

Exclusion criteria:

- Students who did not provide consent.
- Students with incomplete questionnaire responses.
- Students on leave or absent during data collection period.

Data Collection Tools

Data were collected using self-administered, validated, structured questionnaires containing students' information, socio economic status, etc. The following standardized instruments were employed:

Revised Cyberbullying Inventory (RCBI-R): This validated tool was used to assess cyberbullying experiences among participants. The RCBI-R has demonstrated good validity and reliability with satisfactory psychometric properties for investigating the nature and extent of cyberbullying victimization and perpetration. The inventory includes items assessing various forms of cyberbullying behaviours such as receiving hurtful messages, being made fun of in chat rooms, and experiencing upsetting posts on webpages.[11]

Internet Gaming Disorder Scale - Short Form (IGDS9-SF): The 9-item IGDS9-SF was utilized to measure IGD severity. This instrument is based on the nine DSM-5 criteria for IGD, including preoccupation, withdrawal symptoms, tolerance, loss of control, loss of interest in other activities, continued use despite problems, deception, escape from negative mood, and functional impairment. The IGDS9-SF has demonstrated excellent psychometric properties with a unidimensional factor structure, adequate internal consistency, and excellent criterion validity across multiple language versions. Scores are rated on a Likert scale, with higher scores indicating greater IGD severity.[12]

Young's Internet Addiction Test - Short Form (YIAT-SF): Internet addiction was assessed using the short version of Young's Internet Addiction Test. The YIAT-SF consists of items rated on a 5-point Likert scale ranging

from 1 (rarely) to 5 (always), assessing behaviors and feelings associated with internet use. The tool has demonstrated good psychometric properties with robust reliability and validity. Based on established cut-off scores, participants were classified into categories: No addiction (score <30), Mild addiction (31-49), Moderate addiction (50-79), and Severe addiction (80-100).[13]

Socio-demographic questionnaire: A structured questionnaire was developed to collect information on age, gender, year of study, daily hours spent online, and gaming habits.

Operational Definitions

Cyberbullying: Defined as the use of electronic communication technology to intentionally engage in repeated or hostile behavior towards an individual or group to cause harm or distress.[14]

Cyber victim: A participant who reported experiencing cyberbullying as a victim.

Cyberbully: A participant who reported engaging in cyberbullying as a perpetrator.

Data Collection Procedure

After obtaining institutional ethical clearance and informed consent from participants, the questionnaires were distributed to eligible medical students. The purpose and procedure of the study were explained to all participants, and confidentiality and anonymity were assured. Participants were instructed to complete the questionnaires honestly without any identifying information. The completed questionnaires were collected on the same day.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using statistical software (jamovi 2.3.28). Descriptive statistics including frequencies, percentages, means, and standard deviations were calculated for socio-demographic variables and prevalence estimates. The prevalence of cyberbullying, internet addiction, and IGD were reported as percentages. Chi-square test was used to examine associations between categorical variables. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants after explaining the study objectives and procedures. Participation was voluntary, and participants were informed of their right to withdraw at any stage without consequences. Confidentiality and anonymity of participants were maintained throughout the study. No personally identifiable information was collected, and data were stored securely with access limited to the research team.

RESULTS

This study included medical students with mean age of 19.8 ± 0.9 years. There were 76 male and 84 female students. Prevalence of moderate to severe internet addiction among medical students was 19.4%. Almost half of the students were having mild Internet Addiction. Total 18.1% of the students experienced cyberbullying either as a perpetrator or a victim. Prevalence of internet gaming disorder was 7.5%.

Internet addiction severity was significantly associated with cyberbullying involvement, with the proportion of students reporting cyberbullying perpetration/ victimization increasing markedly from the normal/mild

categories to the moderate/severe categories; the chi-square test indicated a statistically significant association between the variables ($\chi^2 = 87.3$, df = 6, $p < 0.01$).

IGD was more common among students involved in cyberbullying: 38.9% of cyberbullies and 36.4% of cyber victims had IGD, compared with only 0.8% among those who never experienced cyberbullying. This association was statistically significant ($\chi^2 = 47.3$, df = 2, $p < 0.01$), indicating a meaningful relationship between cyberbullying involvement and IGD in this sample.

Table 1: Association between Cyberbullying and Internet addiction

Internet Addiction	Cyberbullying			Total
	Cyberbully	Cybervictim	Never experienced	
Normal	0 (0%)	2 (3.9%)	49 (96.1%)	51
Mild	4 (5.1%)	1 (1.3%)	73 (93.6%)	78
Moderate	6 (30%)	6 (30%)	8 (40%)	20
Severe	8 (72.7%)	2 (18.2%)	1 (9.1%)	11
Total	18 (11.3%)	11 (6.9%)	131 (81.9%)	160
$\chi^2 = 87.3$, df = 6, $p < 0.01$				

Table 2: Association between Cyberbullying and Internet gaming disorder

Cyberbullying	IGD		Total
	Present	Absent	
Cyberbully	7 (38.9%)	11 (61.1%)	18
Cybervictim	4 (36.4%)	7 (63.6%)	11
Never experienced	1 (0.8%)	130 (99.2%)	131
Total	12 (7.5%)	148 (92.5%)	160
$\chi^2 = 47.3$, df = 2, $p < 0.01$			

Table 3: Association between Internet Addiction and Internet Gaming disorder

Internet Addiction	IGD		Total
	Present	Absent	
Normal	0 (0%)	51 (100%)	51
Mild	1 (1.3%)	77 (98.7%)	78
Moderate	2 (10%)	19 (90%)	20
Severe	9 (81.8%)	2 (18.2%)	11
Total	12 (7.5%)	148 (92.5%)	160
$\chi^2 = 96.73$, df = 3, $p < 0.01$			

Internet gaming disorder (IGD) increased progressively with greater internet addiction severity: it was not observed in the normal group (0%), was uncommon in mild addiction (1.3%), rose in moderate addiction (10%), and was most frequent in severe addiction (81.8%). This pattern was statistically significant ($\chi^2 = 96.73$, df = 3, $p < 0.01$), indicating a clear relationship between higher internet addiction levels and higher IGD prevalence in this sample.

DISCUSSION

In this study of undergraduate medical students from Western Gujarat (mean age 19.8 years), moderate-to-severe internet addiction (IA) was common (19.4%), cyberbullying involvement (perpetration or victimization) affected 18.1%, and internet gaming disorder (IGD) was present in 7.5%. The observed IGD prevalence is broadly comparable to pooled estimates reported in medical-student samples, where IGD prevalence has been summarized around 6% in meta-analytic evidence, supporting that problematic gaming is a relevant concern in health-professional training cohorts.[15] Similar study conducted by Parmar et al in similar cohort reported 27.5% prevalence of cyberbullying.[10]

A key finding was the strong gradient between IA severity and cyberbullying involvement: cyberbullying perpetration/victimization was uncommon in normal/mild IA, but increased sharply in moderate and severe IA categories ($\chi^2 = 87.3$, $p < 0.01$). This aligns with the broader literature indicating a consistent correlation between cyberbullying and problematic internet use/internet use disorder, although much of the evidence base remains cross-sectional and therefore cannot establish directionality. [16] A plausible explanation is that excessive online engagement increases exposure to online conflict and disinhibition, while cybervictimization may also drive compensatory or avoidant online behaviour that escalates problematic use. [16] Similar study conducted by Murugan et al in similar population found 33% prevalence of Internet Addiction and 20% prevalence of Internet gaming Disorder. [17]

Similarly, IGD was substantially higher among students involved in cyberbullying (cyberbullies 38.9%, Cyber victims 36.4%) than among those never exposed (0.8%) ($\chi^2 = 47.3$, $p < 0.01$). Prior studies in youth populations have reported bidirectional links between cyberbullying and IGD, suggesting that gaming environments may both expose individuals to hostile interactions and serve as a coping avenue following victimization.[18] These findings are consistent with the WHO conceptualization of gaming disorder as impaired control and functional impairment despite negative consequences, which may be exacerbated by psychosocial stressors and maladaptive coping. [19]

Given the cross-sectional design, causality cannot be inferred; nonetheless, the strong associations observed especially the dose–response pattern between IA severity and IGD ($\chi^2 = 96.73$, $p < 0.01$)—underscore the need for early screening and integrated interventions in medical

colleges (digital well-being education, confidential reporting pathways for cyberbullying, and referral pathways for problematic internet/gaming behaviors).

CONCLUSIONS

This study demonstrates that cyberbullying, internet addiction, and internet gaming disorder are prevalent among undergraduate medical students in Western Gujarat and are strongly interrelated, with cyberbullying involvement rising sharply with increasing internet addiction severity and IGD being substantially more common among students reporting cyberbullying perpetration or victimization. These findings are consistent with published evidence linking cyberbullying with internet use disorder and support integrating routine screening, digital well-being education, and accessible counselling/referral pathways within medical colleges to reduce harms and promote healthier online behaviours.

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