

Internet Use Patterns and Their Relationship with Internet Addiction in Patients with Borderline Personality Disorder

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ABSTRACT

Background: Borderline personality disorder (BPD) is characterized by emotional dysregulation, impulsivity, and interpersonal difficulties that may influence patterns of internet engagement. Understanding problematic internet-use behaviors may help identify individuals at greater risk of internet addiction. **Methods & Materials:** To assess internet-use patterns and determine their relationship with internet addiction among patients with BPD. Methods: This prospective observational study enrolled 82 consecutively selected adults with BPD in the Department of Psychiatry of a hospital in Bangladesh. Sociodemographic characteristics and internet-use patterns were collected through structured face-to-face interviews. Internet addiction was assessed using the Internet Addiction Test (IAT), with participants categorized by addiction severity. Associations were examined using Pearson's χ^2 test, with $P < 0.05$ considered statistically significant. **Result:** The most common age group was 26–35 years (39.02%), while females comprised 53.66% of participants. Smartphones were the predominant internet-access device (73.17%), and mean daily internet use was 5.18 ± 2.41 hours. Internet use after midnight was reported by 74.39%, while social networking was the most common online activity (36.59%). Moderate addiction was the predominant IAT category (37.80%), followed by mild (29.27%) and severe addiction (18.29%). Daily internet-use duration was significantly associated with addiction status ($\chi^2 = 17.15$, $P < 0.001$) and addiction severity ($\chi^2 = 31.88$, $P < 0.001$). After-midnight use, repeated checking of social media/messages, difficulty controlling internet use, and reduced sleep were also significantly

associated with addiction. **Conclusion:** Prolonged internet use and specific maladaptive usage behaviors were significantly associated with internet addiction and greater addiction severity among patients with BPD. Systematic assessment of internet-use behaviors may support early identification and targeted management of problematic internet use in this population.

Keywords: Borderline personality disorder; Internet addiction; Internet-use patterns; Internet Addiction Test; Problematic internet use

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INTRODUCTION

Borderline personality disorder (BPD) is a severe mental disorder characterized by pervasive instability in emotional regulation, self-image, interpersonal relationships, and impulse control. Individuals with BPD may also experience marked sensitivity to rejection, identity disturbance, impulsivity, and recurrent maladaptive behaviors [1]. Globally, BPD has an estimated point prevalence of approximately 1% in community populations, although prevalence estimates vary according to sampling methods and diagnostic assessment procedures [2]. Management of BPD primarily involves structured psychological treatment, including dialectical behavior therapy, mentalization-based therapy, and other structured psychotherapeutic programmes targeting emotional dysregulation, impulsivity, and interpersonal difficulties [3]. Treatment approaches are generally individualized according to symptom severity, functional impairment, comorbidities, treatment engagement, and patient preferences [3]. Problematic internet use may be particularly relevant in BPD because emotional dysregulation, impulsivity, maladaptive coping, and the

psychological functions of internet engagement can influence online behavior [4]. BPD can adversely affect interpersonal functioning, psychological well-being, and everyday social and occupational functioning, while emotional instability and impulsivity may increase vulnerability to maladaptive coping behaviors [5]. Internet use can provide communication, social connection, information, entertainment, and perceived emotional support, making online environments potentially meaningful for individuals experiencing interpersonal difficulties [6]. However, excessive or poorly controlled internet engagement may become maladaptive when it is repeatedly used for tension reduction, disinhibition, avoidance, or emotional regulation [4]. Internet-use expectancies related to tension reduction and disinhibition have also been associated with the relationship between BPD features and internet addiction over time [4]. Patterns of internet use may therefore provide important information beyond the total duration of online activity. Assessment of specific online activities can help characterize how individuals engage with digital environments and identify behaviors that may be associated with

problematic use [7]. Individuals with probable BPD showed greater problematic internet use than those without probable BPD [8]. Emotional lability and impulsivity appear to be important BPD-related factors associated with problematic internet use, while identity disturbance and interpersonal dysfunction may also influence patterns of online engagement [1,9]. These characteristics may contribute to the use of online activities as a means of managing distress, seeking interpersonal connection, escaping negative emotions, or obtaining temporary emotional relief. Consequently, examining internet-use patterns alongside internet addiction may provide a broader understanding of digital behavior among individuals with BPD. Nevertheless, existing research remains heterogeneous regarding the definitions of problematic internet use, measurement instruments, study populations, and types of online activities examined [1,7]. Furthermore, relatively little research has specifically characterized internet-use patterns among clinically diagnosed patients with BPD, particularly in South Asian settings, creating an important evidence gap [8,10]. Limited characterization of the types, frequency, and purposes of

internet use may also restrict understanding of how digital engagement relates to addictive internet-use behaviors in this population. Therefore, the study aimed to assess internet-use patterns and determine their relationship with internet addiction among patients with borderline personality disorder.

METHODS & MATERIALS

This cross-sectional analytical study was conducted in the Department of Psychiatry of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, with samples collected from the Outpatient Unit, Inpatient Unit, and Dialectical Behavior Therapy (DBT) Clinic of the Department of Psychiatry, BSMMU, and the Outpatient and Inpatient Units of the National Institute of Mental Health (NIMH). The study was carried out over a period of two and a half years, from March 2022 to September 2024. A total of 82 patients diagnosed with Borderline Personality Disorder (BPD) were enrolled consecutively according to predefined inclusion and exclusion criteria.

Inclusion Criteria

- Patients aged ≥ 18 years.
- Patients diagnosed with Borderline Personality Disorder according to established diagnostic criteria.
- Patients who reported regular use of the internet through a smartphone, computer, or other digital device.
- Patients who were clinically stable and able to participate in the interview and complete the study assessments.
- Patients who provided written informed consent to participate.

Exclusion Criteria

- Patients with severe psychiatric instability requiring immediate intervention or hospitalization.
- Patients with significant cognitive impairment that could interfere with assessment.

- Patients with severe neurological or medical illness affecting their ability to participate.
- Patients unable to communicate adequately or complete the study questionnaire.
- Patients who declined participation or withdrew consent.

Ethical Considerations

The study protocol was reviewed and approved by the institutional ethics committee of the study hospital. Written informed consent was obtained from all participants before enrollment. Participants were informed about the objectives and procedures of the study, and confidentiality of sociodemographic, psychiatric, and internet-use information was maintained throughout the research process. Participation was voluntary, and participants were informed of their right to withdraw from the study at any stage without affecting their treatment or medical care.

Data Collection

Sociodemographic information was collected through face-to-face interviews using a structured data collection form. Variables included age, sex, residence, marital status, educational level, and employment status. Information regarding internet-use patterns was also obtained, including the primary device used, daily duration of internet use, frequency of daily internet access, internet use after midnight, and the main purposes or activities of internet use, such as social networking, entertainment, study/work-related activities, online communication, and gaming. Participants were also asked about internet-related behavioral patterns, including repeated checking of social media or messages, difficulty controlling internet use, and sleep reduction related to internet use.

Assessment of Internet Addiction

Internet addiction was assessed using the Internet Addiction Test (IAT), a validated

instrument for evaluating problematic internet use. Participants were categorized according to the predefined IAT scoring thresholds into normal/minimal use, mild addiction, moderate addiction, and severe addiction. For association analyses, participants were additionally classified into non-addicted and addicted groups, with the latter comprising participants with mild, moderate, or severe addiction. The assessment was administered by trained investigators using a standardized procedure.

Statistical Analysis

All collected data were checked for completeness, coded, and entered into a secure database for statistical analysis using Statistical Package for the Social Sciences (SPSS) version 26.0. Categorical variables were presented as frequencies and percentages, while continuous variables such as age and daily internet-use duration were summarized using mean $\pm$ standard deviation where appropriate. Associations between internet-use patterns and internet addiction status or severity were assessed using the Pearson's chi-square (χ^2) test. A two-sided p -value of <0.05 was considered statistically significant.

RESULT

The majority were aged 26–35 years (39.02%), followed by 18–25 years (25.61%) and 36–45 years (24.39%). Females represented 53.66% of participants, while 57.32% were from urban areas. More than half of the participants were unmarried (58.54%), and graduate-level education was the most common educational category (34.15%). Regarding employment status, 42.68% were unemployed, followed by employed participants (35.37%) and students (21.95%) (*Table I*).

Table ISociodemographic characteristics of the study participants ($n=82$).

Variables	Frequency (n)	Percentage (%)
Age (years)		
18–25	21	25.61
26–35	32	39.02
36–45	20	24.39
>45	9	10.98
Gender		
Male	38	46.34
Female	44	53.66
Residence		
Urban	47	57.32
Rural	35	42.68
Marital status		
Unmarried	48	58.54
Married	34	41.46
Educational level		
Primary/secondary	18	21.95
Higher secondary	24	29.27
Graduate	28	34.15
Postgraduate	12	14.63
Employment status		
Employed	29	35.37
Unemployed	35	42.68
Student	18	21.95

Table II shows that smartphones were the predominant device used for internet access (73.17%). The mean daily internet-

use duration was 5.18 ± 2.41 hours, with 32.93% reporting 4–6 hours of daily use and 30.49% reporting >6 hours. Half of the

participants accessed the internet more than 10 times daily (50.00%), and 74.39% reported using the internet after midnight.

Table IIPattern of internet use among the study participants ($n=82$).

Variables	Frequency (n)	Percentage (%)
Primary device used		
Smartphone	60	73.17
Laptop/computer	8	9.76
Smartphone + laptop/computer	14	17.07
Daily duration of internet use		
Mean $\pm$ SD		5.18 ± 2.41
<2 hours	10	12.2
2–4 hours	20	24.39
4–6 hours	27	32.93
>6 hours	25	30.49
Frequency of daily internet access		
1–5 times	14	17.07
6–10 times	27	32.93
>10 times	41	50
Internet use after midnight		
Yes	61	74.39
No	21	25.61

Social networking was the most common purpose of internet use (36.59%), followed by entertainment/video streaming

(24.39%), study/work-related activities (14.63%),

communication/messaging (14.63%), and online gaming (9.76%) (Table III).

Table IIIPurpose and commonly used internet activities among the participants ($n=82$).

Variables	Frequency (n)	Percentage (%)
Social networking	30	36.59
Entertainment/video streaming	20	24.39
Study/work-related activities	12	14.63
Online communication/messaging	12	14.63
Online gaming	8	9.76

According to the Internet Addiction Test (IAT), 37.80% of participants had moderate addiction, followed by mild

addiction (29.27%), severe addiction (18.29%), and normal/minimal use (14.63%) (Table IV).

Table IVInternet addiction status according to the Internet Addiction Test (IAT) category ($n=82$).

Variables	Frequency (n)	Percentage (%)
Normal/minimal use	12	14.63
Mild addiction	24	29.27
Moderate addiction	31	37.80
Severe addiction	15	18.29

Daily internet-use duration showed a significant association with internet addiction status ($\chi^2=17.15$, $P<0.001$). Participants with lower internet exposure (<2 hours/day) demonstrated a higher proportion of non-addicted status (41.67%)

compared with addicted status (7.14%). In contrast, longer internet-use duration was predominantly observed among addicted participants. Internet use for 4–6 hours daily was reported in 35.71% compared with 16.67% of non-addicted participants,

while internet use for >6 hours was observed only among the addicted group (35.71%) (Table V).

Table VAssociation between daily internet-use duration and internet addiction status ($n=82$).

Variables	Non-addicted (n=12)		Addicted (n=70)		χ^2	p-value
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)		
<2 hours	5	41.67	5	7.14	17.15	< 0.001
2–4 hours	5	41.67	15	21.43		
4–6 hours	2	16.67	25	35.71		
>6 hours	0	0.00	25	35.71		

Several internet-use behaviors were significantly associated with addiction status. Internet use after midnight was more common among addicted participants (81.43% vs 33.33%; $\chi^2=10.04$, $P=0.002$). Repeated checking of social

media/messages was also significantly associated with addiction (75.71% vs 41.67%; $\chi^2=4.21$, $P=0.040$). Similarly, difficulty controlling internet use (74.29% vs 16.67%; $\chi^2=12.67$, $P<0.001$) and reduced sleep due to internet use (65.71%

vs 25.00%; $\chi^2=7.15$, $P=0.007$) were significantly associated with addiction (Table VI).

Table VIAssociation between selected internet-use behaviors and internet addiction status ($n=82$).

Variables	Non-addicted (n=12)		Addicted (n=70)		χ^2	p-value
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)		
Internet use after midnight					10.04	0.002
Yes	4	33.33	57	81.43		
No	8	66.67	13	18.57		
Repeatedly checking social media/messages					4.21	0.04
Yes	5	41.67	53	75.71		
No	7	58.33	17	24.29		
Difficulty controlling internet use					12.67	<0.001
Yes	2	16.67	52	74.29		
No	10	83.33	18	25.71		
Reduced sleep due to internet use					7.15	0.007
Yes	3	25.00	46	65.71		
No	9	75.00	24	34.29		

Internet-use duration was also significantly associated with addiction severity ($\chi^2=31.88$, $P<0.001$). Participants with minimal internet use (<2 hours/day) were predominantly categorized as normal/minimal users (41.67%), whereas

longer internet exposure demonstrated a progressive increase in moderate and severe addiction categories. Moderate addiction was most commonly observed among those using the internet for 4–6 hours daily (38.71%) and >6 hours daily

(41.94%). Severe addiction showed a marked predominance among participants with >6 hours of daily internet use (60.00%) (Table VII).

Table VIIAssociation between major internet-use patterns and internet addiction severity ($n=82$).

Variables	Normal		Mild		Moderate		Severe		χ^2	p-value
	n	%	n	%	n	%	n	%		
<2 h	5	41.67	4	16.67	1	3.23	0	0.00	31.88	<0.001
2–4 h	5	41.67	9	37.50	5	16.13	1	6.67		
4–6 h	2	16.67	8	33.33	12	38.71	5	33.33		
>6 h	0	0.00	3	12.50	13	41.94	9	60.00		

DISCUSSION

Problematic internet use may represent an important behavioral comorbidity in BPD, although the specific patterns of online engagement and mechanisms underlying this association remain incompletely characterized [8]. Most participants were aged 26–35 years (39.02%), followed by 18–25 years (25.61%), with a modest female predominance (53.66%). The predominance of younger adults is comparable with the Bangladeshi study by Hassan et al., in which internet addiction was particularly common among participants aged 19–24 years and remained substantial among those aged 25–35 years [11]. Similarly, Islam et al. reported a predominantly young sample (mean age 21.2 years) in their large study of problematic smartphone and social-media use [12]. The relatively balanced sex distribution in our sample also accords with the literature showing that problematic internet use is not restricted to one sex. Importantly, however, BPD-specific research suggests that the relationship between personality pathology and problematic internet use may be more clinically meaningful than demographic characteristics alone. Lu et al. demonstrated a direct association between BPD symptoms and internet addiction after accounting for mental-health problems [5]. Participants reported a mean daily use of 5.18±2.41 hours, 63.42% used the internet for >4 hours/day, 50.0% accessed it >10 times daily, and 74.39% used the internet after midnight. This pattern is comparable with Hosen et al., who found that approximately 70% of Bangladeshi university students used the internet for 4–6 hours/day [13]. A study by Fumero et al. found that difficulties in emotion regulation were significantly associated with problematic internet use among young adults [5]. Similarly, Larson et al. reported that individuals with difficulties in regulating emotions were more vulnerable to problematic social networking-site use, particularly when online interaction was used to compensate for unmet psychological needs [15]. Social networking was the leading internet activity (36.59%), followed by entertainment/video streaming (24.39%). This finding closely parallels Hassan et al., who identified social-media websites as the most common online activity among Bangladeshi young adults [11]. It is also consistent with Collins and Grant, who found particularly high social-media involvement among individuals with BPD; participants screening positive for BPD were more likely to meet criteria for social-media addiction than controls (25.0% vs 9.6%) [10]. In present study, 85.36% of participants had some degree of internet addiction, including 29.27% with mild, 37.80% with moderate, and 18.29% with severe addiction. This burden is

considerably higher than the 27.1% prevalence of internet addiction reported among Bangladeshi young adults by Hassan et al., although direct comparison should be cautious because our sample consisted specifically of patients with BPD [11]. The substantially higher burden is nevertheless consistent with Dalbudak et al., who reported mild and high internet-addiction risk in 38.7% and 19.9%, respectively, among Turkish university students and found that borderline personality features predicted greater addiction severity [16]. Similarly, Lu et al. found that BPD symptoms were directly associated with internet-addiction severity [5]. In our study, a strong association between daily internet-use duration and addiction status is showed ($\chi^2=17.15$, $p<0.001$). This dose-related pattern agrees with Hassan et al., who identified daily internet-use duration as an independent correlate of internet addiction [11]. Hosen et al. similarly found that approximately 70% of Bangladeshi university students used the internet for at least 4–6 hours daily [13]. In BPD specifically, Wu et al. provide a plausible mechanism, showing that internet-use expectancies for tension reduction and disinhibition mediated the longitudinal relationship between BPD features and later internet-addiction severity [4]. Several behavioral characteristics were significantly associated with addiction: after-midnight internet use (81.43% and 33.33%; $p=0.002$), repeated checking of social media/messages (75.71% and 41.67%; $p=0.04$), difficulty controlling internet use (74.29% and 16.67%; $p<0.001$), and reduced sleep (65.71% and 25.00%; $p=0.007$). These findings closely correspond with a study by Islam et al., who found that Bangladeshi students with problematic internet use were significantly less likely to have good sleep quality (AOR 0.28, 95% CI 0.18–0.43) [17]. Similarly, Alimoradi et al.'s meta-analysis of 23 studies involving 35,684 participants found that internet addiction was associated with more than twice the odds of sleep problems (OR 2.20, 95% CI 1.77–2.74) and shorter sleep duration [18]. Sohn et al. reported that problematic smartphone use was significantly associated with poor sleep quality, shorter sleep duration, and sleep problems [19]. In addition, Elhai et al. found that problematic smartphone use was closely related to anxiety, depression, and difficulties in emotion regulation, suggesting that compulsive checking and loss of behavioral control may be interconnected manifestations of psychological distress [20]. Moderate and severe addiction were increasingly concentrated among participants using the internet for 4–6 hours and >6 hours daily, whereas severe addiction was absent among those using it for <2 hours. The

association was highly significant ($\chi^2=31.88$, $p<0.001$). This pattern reinforces the findings of Kuss and Griffiths, who described excessive social networking as a behavioral pattern characterized by salience, mood modification, tolerance, withdrawal, conflict, and relapse, with increasing involvement potentially progressing toward clinically significant addictive behavior [21]. Similarly, Andreassen et al. demonstrated that greater social-media engagement was associated with addictive-use symptoms and impaired control, particularly among individuals with underlying psychological vulnerabilities [22].

LIMITATIONS

The prospective observational design limits inference regarding temporal or causal relationships between internet-use patterns and addiction. Internet-use behaviors were assessed through participant-reported information, which may be influenced by recall or reporting bias. In addition, the study did not incorporate longitudinal assessment of changes in internet-use behavior or IAT severity, limiting evaluation of progression over time.

CONCLUSION & RECOMMENDATIONS

Internet addiction was strongly associated with prolonged daily internet use and maladaptive patterns, particularly after-midnight use, repeated checking of social media or messages, difficulty controlling internet use, and sleep reduction. Greater daily internet exposure was also associated with increasing addiction severity. Routine assessment of internet-use patterns and IAT-based screening may help clinicians identify problematic internet use among patients with BPD and facilitate targeted behavioral interventions, particularly for those reporting prolonged or poorly controlled internet engagement.

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CONFLICT OF INTEREST

None declared

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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