



## Original Article

# The pattern of problematic internet use and mental health-related internet use among psychiatric outpatients at a tertiary care center

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## ABSTRACT

**Objective:** There is scarce literature available on the pattern of problematic internet use (PIU) and use of internet for mental health help-seeking among adult patients with psychiatric disorders in South-East Asian countries. The present study aimed to understand the pattern of PIU among adult patients attending the outpatient psychiatry services at a tertiary care center in India. Further, it aimed to explore the use of internet for seeking mental health-related information or services among them. **Materials and Methods:** This cross-sectional study recruited adult outpatients attending the outpatient psychiatry services following purposive sampling between June 2018 and December 2018. A semi-structured questionnaire was used to collect information regarding sociodemographic characteristics and internet use pattern of participants, including use of internet for various mental health-related purposes. The Generalized Problematic Internet Use Scale 2 (GPIUS-2) was used to assess the PIU. Statistical analysis was performed using SPSS version 23.0 software. **Results:** Among 155 study participants, 45 (29.03%) scored above 60 on GPIUS-2. Those with PIU were significantly younger, reported higher duration of daily internet use, and spent greater proportion of time online on activities related to social networking or social media than those with and without PIU. More than half of the participants reported internet use for seeking mental health-related information at least once in the past 1 month. There was no significant difference in the mental health-related internet use among adult patients with different psychiatric diagnoses, except for two situations. There was lesser use of internet for seeking information related to the symptoms of illness and various treatment modalities available among participants diagnosed with psychotic disorder. On the other hand, a greater use of internet for seeking information related to the symptoms of illness was reported by participants diagnosed with anxiety disorder. **Conclusion:** This study suggested that PIU is a frequently cooccurring condition among adult patients with primary psychiatric disorder. The importance of internet as a medium for seeking mental health information and services was observed among most of the study participants.

**KEYWORDS:** *Digital health, Information seeking, Internet use, Mental health, Psychiatric disorders*

Submission : 22-Feb-2019  
Revision : 29-Apr-2019  
Acceptance : 23-May-2019  
Web Publication : 14-Aug-2019

## INTRODUCTION

There has been a rapid rise in the use and ease of access to internet worldwide including South-East Asian countries like India. According to a recent web report, of the 3.9 billion internet users reported worldwide, India is ranked as the country with second largest number of internet users [1]. The report by Internet and Mobile Association of India, estimated an overall internet penetration of about 35% for the Indian population (about 500 million internet users) in 2018 [2]. It also projected that the number of internet users will rise to about 730 million by 2020 [3].

The use of world wide web since its introduction in 1989 as a medium to share information globally, has evolved across a wide array of purposes ranging from academic related activities such as teaching, learning, and research; work-related activities such as monetary/document exchanges, or business meetings via videoconferencing; leisure/pleasurable

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Quick Response Code:	Website: <a href="http://www.tcmjmed.com">www.tcmjmed.com</a>
	DOI: 10.4103/tcmj.tcmj_50_19

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**How to cite this article:** Balhara YP, Singh S, Bhargava R. The pattern of problematic internet use and mental health-related internet use among psychiatric outpatients at a tertiary care center. *Tzu Chi Med J* 2020;32(2):198-204.

activities such as online gaming, gambling, or pornography; and as a means of social networking through online texting, calling, social networking applications, chat applications, or e-mails [4]. However, apart from providing a world of exciting opportunities, ample evidence exists about the harms associated with excessive or maladaptive use of internet in a significant proportion of internet users [5].

The use of internet for achieving a desired goal within an appropriate period of time without experiencing any intellectual or behavioral discomfort might be understood as a healthy pattern of internet use [6]. However, excessive or poorly controlled preoccupations, urges, or behaviors regarding internet access that lead to impairment or distress in an individual could be considered as problematic internet use (PIU) [7]. The unprecedented pace of digital revolution with ever changing and increasing utilization of internet-based technologies for various different purposes has underscored the need to study the pattern of internet usage among various different population groups.

A multinational meta-analysis including 31 countries from different world regions such as North America, South America, Europe, Middle East, and Asia reported a pooled prevalence of 6.0% (95% confidence interval: 5.1–6.9) for internet addiction or PIU. Further, studies have suggested that the problem of PIU is generally more common and severe in Asian countries [8]. However, the bulk of available literature regarding PIU has been generated from studies conducted among apparently healthy adolescent population. Further, a number of these studies have reported a significant correlation between PIU and psychiatric disorders such as depression, attention-deficit hyperactivity disorder, and anxiety disorders [9]. However, there is paucity of research on the extent and pattern of PIU among adult patients with psychiatric disorders.

The role of internet in the health-care sector has also gained importance in recent times, with a large proportion of internet users reporting use of online resources for various health-related purposes. This includes search for information related to mental health condition or exploring possible treatment options for mental health problems [10]. The use of internet for seeking mental health-related information and/or services offers a unique opportunity to provide mental health care in an affordable and easily accessible manner and help in bridging the existing mental health-care gap. However, patients with psychiatric disorders have also reported getting overwhelmed with the large amount of information available on internet, often not being able to get the desired information. Further, the quality of mental health information available online is another area of concern, especially since some patients with psychiatric disorders might have poor judgment secondary to psychopathology and may end up using such information in a detrimental way [11]. There is a dearth of available literature on internet use for mental health-related purposes among Indian setting. Moreover, there is lack of sufficient knowledge about the relationship between PIU and internet use for mental health-related purposes in adult patients with psychiatric disorders.

Thus, the present study attempted to address these important lacunae in the available literature. It aimed to understand

the pattern of PIU among adult psychiatric patients attending the outpatient services at a tertiary care center in India. Further, it aimed to explore the use of internet for seeking mental health-related information or services among outpatients with various psychiatric disorders.

## **MATERIALS AND METHODS**

### **Study participants and procedure**

This study used survey data collected from patients with psychiatric disorder, attending the psychiatry outpatient department of a tertiary care center in India. The psychiatry outpatient department runs the first Behavioral Addictions Clinic of the country [12]. The survey questionnaire was applied during their routine outpatient visits by a researcher in a single setting. The information related to their psychiatric diagnoses was obtained from their medical records after taking an informed consent from all the participants. The psychiatric diagnoses were made by the treating psychiatrists according to the International Statistical Classification of Diseases and Related Health Conditions-10 criteria (ICD-10). The inclusion criteria were age between 18 and 60 years, presence of an ICD-10 psychiatric diagnosis, and access to the internet for the past 1 year. The participants were excluded if the treating psychiatrist preferred them not to be enrolled in the present study due to their current clinical condition. Patients who were not able to adequately understand and coherently reply to the questions asked in the clinical interview conducted by their psychiatrist were not referred. This could be due to the severity of underlying psychopathology in them leading to significant disturbances in the thought, mood, or perception of these patients. It could also be due to agitation or uncooperativeness on the part of patients secondary to the symptoms of their psychiatric illness. Further, participants who refused to give informed written consent were also excluded. They were explained about the purpose of the study and the voluntary nature of participation in the survey. They were also assured regarding the maintenance of confidentiality and anonymity of the information provided by them during the study. The study was conducted in accordance with the Declaration of Helsinki and was approved by the local ethics committee of the institute before the commencement of data collection. Informed written consent was obtained from all participants before their enrolment in this study. The present study utilized data collected from participants recruited following purposive sampling between June and December 2018.

### **Instruments**

The study questionnaire consisted of three sections: a semi-structured questionnaire to assess the sociodemographic profile (age, gender, educational qualification, marital status, employment status, family type, place of residence, and current living arrangement); a semi-structured questionnaire to assess internet use pattern (number hours spent online in a typical day, proportion of time spent online/day for various different activities, frequency of internet use for seeking information related to different aspects of their mental health over the past 1 month); and the Generalized Problematic Internet Use Scale-2 (GPIUS-2).

The GPIUS-2 comprises of 15 items, each rated on a Likert scale ranging from a score of 1 (strongly disagree) to 7 (strongly agree). It has an excellent internal consistency ( $\alpha = 0.91$ ) and has been widely used to assess PIU in various different settings previously [13]. The 15 items of this scale represent five different subscales comprising of three items each: preference for online social interaction (POSI) ( $\alpha = 0.83$ ), mood regulation (MR) ( $\alpha = 0.85$ ), cognitive preoccupation (CP) ( $\alpha = 0.72$ ), compulsive internet use (CIU) ( $\alpha = 0.87$ ), and negative outcomes (NO) ( $\alpha = 0.87$ ) [13]. Thus, the possible total and subscale score ranges between 15–105 and 3–21, respectively, with higher scores associated with greater severity of PIU. Since answering neutrally to each item (scored as 3 on Likert scale) would yield a total score of 60, a GPIUS-2 score value of above 60 was used to classify participants as PIUs (probable or definitive) in the present study. Similarly, a subscale of higher than 12 was indicative of significant problem in the area represented by that particular subscale. This method of classifying PIUs has been described in the available literature [14].

We classified primary psychiatric diagnoses of the study participants into the following ICD-10 categories for the purpose of current study: F10–19 (mental and behavioral disorders due to psychoactive substance use disorder [SUD]), F20–29 (schizophrenia, schizotypal, and delusional disorders [psychoses]), F30–39 (affective [mood] disorders), F40–49 (neurotic, stress-related, and somatoform [anxiety] disorders), and others (F0–9, F50–99). However, of 155 participants, only ten were diagnosed with either SUD (one) or other ICD-10 diagnoses (nine). Thus, the study participants were divided based on the presence or absence of psychoses, mood, or anxiety disorders only for the purpose of inferential statistical analysis.

### Statistical analysis

The statistical analysis was conducted using SPSS version 23.0 (Armonk, NY, USA, IBM Corp). Descriptive statistics including mean (standard deviation) or median (interquartile range) for continuous variables and numbers with percentages for categorical variables were used to describe the sample characteristics, internet use patterns, and GPIUS-2 scores. Pearson's correlation was used to determine the level of agreement between the five subscale and total GPIUS-2 score. The study sample was divided into two groups of PIUs and non-PIUs based on the cutoff score of 60 on GPIUS-2, and inferential statistics was applied to find statistically significant differences in the characteristics of participants between these two groups. The categorical variables were compared between two groups using the Chi-square test, while Fisher's exact test was performed whenever the expected frequency in any of the cell was less than five. The continuous variables were compared using the independent sample *t*-test or Mann-Whitney U-test depending on whether the variables followed a normal or nonnormal distribution, respectively. Similarly, to examine the statistically significant differences in the characteristics of participants with varying degree of internet use for various mental health-related activities, the study sample was divided into two groups of users ("very rarely," "rarely," "at times," "regularly," and "often") and nonusers ("never").  $P <$

0.05 was considered as statistically significant, and all the tests were two tailed. Missing value imputation was not conducted.

## RESULTS

A total of 157 patients attending the psychiatric outpatient department were recruited, of which two were excluded due to missing data. Thus, the final study sample comprised of 155 participants. About three-fourth of the participants were male ( $n = 119$ , 76.8%), and the average age of study participants was 25.51 years (range: 18–45 years). The detailed sociodemographic, internet use pattern and clinical profile of patients are described in Table 1.

**Table 1: Sociodemographic, internet use pattern and clinical profile of study participants (n=155)**

Variable	Mean±SD/median (range) or frequency (%)
Age (years)	25.51±4.86
Gender	
Male	119 (76.8)
Female	36 (23.2)
Marital status	
Never married	113 (72.9)
Married	34 (21.9)
Divorced	3 (1.9)
Separated	5 (3.2)
Education	
Up to 12 <sup>th</sup> standard	53 (34.2)
Graduation	76 (49.0)
Postgraduation and above	26 (16.8)
Employment status	
Employed	68 (43.9)
Not employed	87 (56.1)
Place of Residence	
Urban	122 (78.7)
Rural	33 (21.3)
Family type	
Nuclear	128 (82.6)
Extended/joint	27 (17.4)
Current living arrangement	
Alone	22 (14.2)
With family member (s)/friend(s)	133 (85.8)
Primary psychiatric diagnosis	
Mood disorders (F30-F39)	36 (23.2)
Anxiety spectrum (F40-F49)	82 (52.9)
Psychoses (F20-F29)	28 (18.1)
SUD	1 (0.6)
Others	8 (5.2)
Average time spent online/day (h)	3.67±2.60/3.00 (1.00-16.00)
Proportion (%) of time spent online/day on following activities	
Academic/work related	22.16±24.73/10.00 (0.00-90.00)
Gaming	4.03±12.88/0.00 (0.00-80.00)
Shopping	1.58±4.58/0.00 (0.00-40.00)
Social networking/social media	22.58±21.61/15.00 (0.00-100.00)
Other	0.38±1.75/0.00 (0.00-10.00)
GPIUS-2 score	52.60±13.39

SD: Standard deviation, SUD: Substance use disorder, GPIUS-2: Generalized problematic internet use scale-2

A GPIUS-2 score of more than 60 was found for 45 of the 155 (29.03%). The sociodemographic, internet use pattern and clinical characteristics of the participants with and without PIU have been compared in Table 2. The mean age of participants with PIU was significantly lesser than those without PIU. Further, participants with PIU reported a significantly higher duration of daily internet use and spent significantly greater proportion of their online time on activities related to social networking/social media than those without PIU. However, the gender, educational qualification, marital status, employment status, family type, place of residence, current living arrangement, and proportion of time spent online on activities related to work, academics, gaming, or shopping were not significantly associated with PIU. Moreover, PIU did not significantly differ between participants with various psychiatric diagnoses (mood disorder, anxiety spectrum disorder, or psychosis).

The mean total and subscale scores obtained on GPIUS-2 and correlation between them is described in Table 3. There was significant positive correlation between various subscale and total scores obtained on GPIUS-2 scale ( $r = 0.66-0.74$ ;  $P < 0.01$ ). Further, the proportion of students scoring above the cutoff threshold score of 12 on Preference for online social interaction (POSI), internet use for Mood regulation (MR), Cognitive preoccupation (CP) with internet use, Compulsive internet use (CIU), and Negative outcomes (NO) subscales of GPIUS 2 were 24.5% (38/155), 66.5% (103/155), 52.3% (81/155), 16.8% (26/155), and 10.3% (16/155), respectively.

The frequency of internet use for seeking information related to various mental health-related topics and activities was described in Table 4. About 66.5% (103/155) participants reported using internet at least once in the past 1 month for seeking information related to symptom identification. About

**Table 2: Comparison of sociodemographic, internet use pattern and clinical characteristics of patients with and without problematic internet use**

Variable	Subjects with PIU (n=45) (%)	Subjects without PIU (n=110) (%)	Statistic (P)
Age (years)	24.26±4.40	26.01±4.88	$t=2.08^a$ (0.03)*
Gender			
Male	31 (26.1)	88 (73.9)	$\chi^2=2.21^b$ (0.14)
Female	14 (38.9)	22 (61.1)	
Marital status			
Never married/divorced/separated	38 (31.4)	83 (68.6)	$\chi^2=1.50^b$ (0.22)
Married	7 (20.6)	27 (79.4)	
Education			
Up to 12 <sup>th</sup> standard	19 (35.8)	34 (64.2)	$\chi^2=1.81^b$ (0.17)
Graduation and above	26 (25.5)	76 (74.5)	
Employment status			
Employed	18 (26.5)	50 (73.5)	$\chi^2=0.38^b$ (0.53)
Not employed	27 (31.0)	60 (69.0)	
Place of residence			
Urban	35 (28.7)	87 (71.3)	$\chi^2=0.03^b$ (0.83)
Rural	10 (30.3)	23 (69.7)	
Family type			
Nuclear	38 (29.7)	90 (70.3)	$\chi^2=0.15^b$ (0.69)
Extended/joint	7 (25.9)	20 (74.1)	
Current living arrangement			
Alone	6 (27.3)	16 (72.7)	$\chi^2=0.03^b$ (0.84)
With family member(s)/friend (s)	39 (29.3)	94 (70.7)	
Mood disorders (F30-F39)			
Yes	10 (27.8)	26 (72.2)	$\chi^2=0.03^b$ (0.85)
No	35 (29.4)	84 (70.6)	
Anxiety spectrum (F40-F49)			
Yes	26 (31.7)	56 (68.3)	$\chi^2=0.60^b$ (0.43)
No	19 (26.0)	54 (74.0)	
Psychoses (F20-F29)			
Yes	7 (25.0)	21 (75.0)	$\chi^2=0.27^b$ (0.60)
No	38 (29.9)	89 (70.1)	
Average time spent online/day (h)	4.04±2.33	3.51±2.70	$U=1982.0^c$ (0.04)*
Proportion (%) of time spent online/day on academic/work-related activities	16.88±19.07	24.31±26.48	$U=2131.0^c$ (0.16)
Proportion (%) of time spent online/day on gaming	6.66±17.45	2.95±10.36	$U=2285.0^c$ (0.28)
Proportion (%) of time spent online/day on shopping	0.88±2.45	1.86±5.19	$U=2300.0^c$ (0.30)
Proportion (%) of time spent online/day on Social networking/social media	30.33±22.54	19.40±20.49	$U=1586.0^c$ (<0.01)**

\* $P < 0.05$ ; \*\* $P < 0.01$ . <sup>a</sup>Independent  $t$ -test, <sup>b</sup>Chi-square test, <sup>c</sup>Mann-Whitney U-test. PIU: Problematic internet use



**Table 3: Correlations between total and different subscale scores obtained on GPIUS2**

Variables	Mean±SD	GPIUS2t	POSI	MR	CP	CIU	NO
GPIUS2t	52.60±13.39						
POSI	8.69±5.37	0.69**					
MR	13.17±3.83	0.73**	0.46**				
CP	12.31±3.83	0.74**	0.25**	0.39**			
CIU	10.37±2.96	0.71**	0.17*	0.36**	0.66**		
NO	8.05±2.89	0.65**	0.21**	0.33**	0.41**	0.60**	

\* $P < 0.05$ , \*\* $P < 0.01$ . SD: Standard deviation, GPIUS2t: Global problematic internet use scale-2 total score, POSI: Preference for online social interaction, MR: Mood regulation, CP: Cognitive preoccupation, CIU: Compulsive internet use, NO: Negative outcomes

**Table 4: Frequency of mental health-related internet use in study sample (n=155)**

Information sought for/about	How often do you use internet for the following activities?					
	Never (%)	Very rarely (%)	Rarely (%)	At times (%)	Regularly (%)	Often (%)
Symptom identification	52 (33.5)	25 (16.1)	26 (16.8)	36 (23.2)	5 (3.2)	11 (7.1)
Diagnostic criteria of illness	76 (49.0)	22 (14.2)	14 (9.0)	25 (16.1)	4 (2.6)	14 (9.0)
Treatment modalities	68 (43.9)	19 (12.3)	19 (12.3)	30 (19.4)	5 (3.2)	14 (9.0)
Search of treatment facility/hospital	115 (74.2)	10 (6.5)	6 (3.9)	17 (11.0)	Zero	7 (4.5)
Medications prescribed	69 (44.5)	13 (8.4)	20 (12.9)	36 (23.2)	4 (2.6)	13 (8.4)
Side effects of medications	71 (45.8)	11 (7.1)	18 (11.6)	34 (21.9)	6 (3.9)	15 (9.7)
Purchasing online medication	139 (89.7)	3 (1.9)	4 (2.6)	6 (3.9)	1 (0.6)	2 (1.3)
Learning yoga or other nonpharmacological technique to cure illness	84 (54.2)	14 (9.0)	19 (12.3)	20 (12.9)	4 (2.6)	14 (9.0)

51.0% (79/155) participants reported using internet at least once in the past 1 month for seeking information related to diagnostic criteria of illness. About 56.1% (87/155) participants reported using internet at least once in the past 1 month for seeking information related to treatment modalities. About 25.8% (40/155) participants reported using internet at least once in the past 1 month for seeking information related to search of treatment facility/hospital. About 55.5% (86/155) participants reported using internet at least once in the past 1 month for seeking information related to medications prescribed. About 54.2% (84/155) participants reported using internet at least once in the past 1 month for seeking information related to side effects of medications. About 10.3% (16/155) participants reported using internet at least once in the past 1 month for purchasing online medications. About 55.8% (71/155) participants reported using internet at least once in the past 1 month for learning yoga or other non-pharmacological technique to cure illness.

The study sample was further divided into two groups of users and nonusers based on their reported pattern of internet use for seeking information related to mental health. The relationship between sociodemographic, internet use pattern, and clinical characteristics of the study sample with the internet use for various mental health-related activities among these two groups was explored using appropriate bivariate analysis. Those who were significantly more likely to use internet for seeking information related to symptom identification were males ( $\chi^2 = 5.69$ ;  $P = 0.017$ ), had educational qualification of graduation or above ( $\chi^2 = 9.20$ ;  $P \leq 0.001$ ), were currently employed ( $\chi^2 = 3.97$ ;  $P = 0.04$ ), and had a primary psychiatric disorder of an anxiety disorder ( $\chi^2 = 8.41$ ;  $P = 0.004$ ). Whereas, participants with primary psychotic disorder ( $\chi^2 = 6.14$ ;  $P = 0.013$ ) were significantly less likely to use internet for seeking information related to symptom identification.

Participants with male gender ( $\chi^2 = 5.83$ ;  $P = 0.016^*$ ) and educational qualification of graduation or above ( $\chi^2 = 9.32$ ;  $P = 0.002$ ) were significantly more likely to use internet for seeking information related to diagnostic criteria of illness. Participants with male gender ( $\chi^2 = 7.63$ ;  $P = 0.006$ ), educational qualification of graduation or above ( $\chi^2 = 11.06$ ;  $P = 0.001$ ), and with primary psychiatric disorder of a nonpsychotic disorder type ( $\chi^2 = 5.78$ ;  $P = 0.016$ ) were significantly more likely to use internet for seeking information related to treatment modalities. Participants living alone at the time of study ( $\chi^2 = 5.17$ ;  $P = 0.02$ ) were significantly more likely to use internet for seeking information related to search of treatment facility/hospital. Participants with educational qualification of graduation or above ( $\chi^2 = 24.09$ ;  $P < 0.01$ ), an urban place of residence ( $\chi^2 = 4.39$ ;  $P = 0.03$ ), and living alone ( $\chi^2 = 7.19$ ;  $P = 0.007$ ) were significantly more likely to use internet for seeking information related to medications prescribed. Participants with educational qualification of graduation or above ( $\chi^2 = 21.75$ ;  $P < 0.01$ ) and living alone ( $\chi^2 = 7.88$ ;  $P = 0.005$ ) were significantly more likely to use internet for seeking information related to side effects of medications. Participants with younger age ( $t = 2.38$ ;  $P = 0.018$ ), currently employed status ( $\chi^2 = 4.48$ ;  $P = 0.03$ ), and living alone ( $\chi^2 = 7.95$ ;  $P = 0.013$ ) were significantly more likely to use internet for purchasing online medications. Participants with male gender ( $\chi^2 = 4.39$ ;  $P = 0.03$ ) and educational qualification of graduation or above ( $\chi^2 = 12.20$ ;  $P \leq 0.01$ ) were significantly more likely to use internet for learning yoga or other nonpharmacological technique to cure illness.

## DISCUSSION

To the best of our knowledge, this is the first study which has described the pattern of PIU and internet use for mental health information or services among adult patients with

comorbid psychiatric disorder from Southeast Asian setting. Most study participants were males, stayed at an urban residence, and had educational qualification of graduation or above. Almost one-third of the adult patients with psychiatric disorder were found to have GPIUS-2 scores suggestive of PIU in the present study sample. A meta-analysis comprising of nine Indian studies assessing the prevalence of internet addiction among apparently healthy adolescents, reported the prevalence ranging between 0.2% and 66.0%, with a pooled prevalence of 22.0% [15]. This review further suggested that this wide range in the observed prevalence estimates was likely due to the use different scales and cutoff scores used to classify PIU, making it difficult to have meaningful comparison across different studies. However, the prevalence obtained in the present study was much higher than 19% reported in another recent study conducted among 4600 healthy students from India using the GPIUS-2 and similar assessment methodology as in the present study [14]. This is in line with the available literature on association of psychopathology with PIU. Since the present study sample comprised exclusively of patients with at least one psychiatric disorder, they are more likely to suffer from greater levels of psychological distress than the general population [16,17]. Further, this might also be due to the differences in the sociodemographic characteristics of the two study populations.

The present study showed that younger age and greater time spent online per day were significantly associated with PIU among study participants. The use of internet for social networking was significantly greater in patients with PIU. However, there were no significant differences in the amount of time spent online for work-related/academic activities, gaming, shopping, or other online activities between patients with and without PIU. This is in line with findings obtained from previous studies conducted at different geographical locations [18]. Thus, patients with psychiatric disorder and cooccurring PIU should not be advised to completely avoid internet use, and rather be educated to use internet in a healthy pattern restricting their excessive internet use for particular activities such as social networking. There is a need to ensure safe and healthy internet use by such population. Further, no significant variation in the proportion of PIU was observed among patients with different primary psychiatric disorder diagnoses. This might be due to the nonspecific association between the psychopathology and PIU as suggested by previous studies [9,19]. Thus, patients with both common and severe mental illnesses (like depression or schizophrenia) and having internet access, should be screened for the presence of PIU by mental health professionals.

Another important finding of the present study was that more than half of the study participants reported a significant (GPIUS-2 subscale score of above 12) use of internet for MR (66.5%) and CP with internet use (52.3%). This is particularly worrisome as both internet use for MR and CP with internet use have been shown to be associated with increased rates of internet addiction among adolescents [20].

A key finding of the present study was that more than half of the study participants reported using internet for

seeking mental health-related information. About 10% of the participants purchased medications online, and a quarter of participants used internet for searching mental health professionals or treatment facility. This highlights the importance of internet for promoting mental health literacy and providing other mental health-related services to adult patients with psychiatric disorder. However, the overall quality of online mental health information has been reported as low in few western studies conducted so far [21]. Another study reported that only a quarter of internet users were vigilant about checking the veracity of online information, and majority of them relied on their common sense to decide about the trustworthiness of the online health information [22]. Further, people with mental health problems might be particularly more vulnerable to the potential risks posed by the plethora of low-quality online mental health information available and their limited cognitive skills or poor judgment secondary to their mental health condition. Thus, mental healthcare providers should ideally educate their patients and/or caregivers about how to search for reliable mental health-related information online, and also how to evaluate the quality of information obtained online.

The present study also showed that participants with at least a graduate educational qualification were more likely to use internet for seeking mental health information related to symptoms and diagnostic criteria of the illness, various treatment modalities available for a particular mental condition, information related to the medications prescribed, and their possible side-effects than those with educational qualification of up to senior secondary school. This is in line with findings of previous studies, which have reported greater mental health-related internet use with higher levels of educational attainment among participants [23]. The participants with male gender were more likely than females to use internet for seeking mental health information related to symptoms and diagnostic criteria of the illness, various treatment modalities available for a particular mental condition, and purchasing medications online. This might be due to the differential pattern of internet use on the basis of gender, with greater use of internet for seeking information related to various health- and non-health-related topics among males, and greater use of internet for social networking among females [18]. The participants who were living alone were more likely to use internet for searching mental health professionals or treatment facilities, seeking mental health information related to the medications prescribed including their possible side effects, and purchasing medications online than those living with their friends or family members at the time of study. This might be because of the more collectivistic nature of our society with friends and family members often providing support and treatment-related information during times of any sickness or mental illness, and reducing the use of internet for these purposes [24]. There were no significant differences in the likelihood of internet use for mental health between patients with different primary psychiatric disorder diagnosis, except for lesser use of internet for seeking mental health information related to the symptoms of illness and various treatment modalities available among patients with psychotic disorder, and greater use of internet for seeking mental health information related

to the symptoms of illness among patients with anxiety disorder. This suggested that internet was an equally important source for seeking mental health-related information and other services among participants, irrespective of the kind of primary psychiatric disorder they were having. Further, there was no significant difference in the proportion of PIUs among participants using internet for mental health-related activities as compared those not using internet for mental health information seeking. This suggests that mental health-related use of internet was not associated with increased risk of having PIU, and no significant difference was observed in the pattern of mental health-related internet use among patients with and without PIU.

However, there are few limitations of the present study which are acknowledged here. This was an exploratory cross-sectional study with nonrandomized recruitment of adult psychiatric patients attending the psychiatry outpatient department of a single tertiary care center, thus limiting the generalizability of the present findings. The frequency and pattern of internet use and online mental health information seeking is based on the self-report by participants and is prone to recall bias and social bias. Patients with severe psychopathology or illness might not have been referred for inclusion in the present study by their treating psychiatrist, which could have led to some degree of selection bias. Further, the severity of psychiatric disorder symptoms was not assessed at the time of present study, which might have affected the findings of the present study. Finally, the study participants were not assessed using a structured interview to diagnose internet addiction.

## CONCLUSION

This study suggests that PIU among adult patients with primary psychiatric disorder was a comorbidity in our settings, with about one-third of patients with internet access reporting possible PIU. This study also highlights the importance of internet as a medium used for seeking mental health-related information and services by patients with psychiatric disorders. Thus, treating psychiatrists or clinicians should routinely assess their patients' internet access and pattern of use and recommend them online resources with reliable mental health information. The patients should be sensitized about the potential harms of excessive internet use. Furthermore, rather than advising a complete restriction of internet use even for those with PIU, there is a need to inculcate safe and healthy use of internet. Future research with a larger and more representative sample size and a longitudinal study design is needed to better assess the pattern and correlates of PIU and mental health-related internet use among patients with psychiatric disorders.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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