Clinical Epidemiology and Global Health 15 (2022) 101036

Contents lists available at ScienceDirect

Clinical Epidemiology and Global Health

journal homepage: www.elsevier.com/locate/cegh

Predictors of 'problematic internet use' among adolescents and adults amid the pandemic in India

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ARTICLE INFO

Keywords:
Problematic internet use
Adolescents
Young adults
Middle age adults
COVID-19 pandemic

ABSTRACT

Background: Globally, problematic internet use (PIU) is acknowledged as a significant behavioural problem in adolescents and youth. It is being researched for further clarity as an independent behavioural disorder. It is crucial to explore predictors of PIU to understand the high-risk psychosocial indicators of problematic internet use, particularly amid the COVID-19 pandemic in India.

Aim: The present study aimed at studying age, gender, mental health, coping strategies and lifestyle indicators as predictors for PIU in adolescents, young adults and middle-aged adults.

Methods: The study used a cross-sectional design, and the data was collected using Perceived Stress Scale, Internet Gaming Disorders-9, DSM-5 Self-Rated Level-1, and Brief-COPE scale. Multiple regression analysis was employed to find the predictors of PIU in a sample of 1027 i.e., adolescents (13–19 years), young adults (20–39 years), and middle-aged adults (40–60 years). Separate regression analyses were carried out for the three subgroups as well.

Results: Results showed that the age, perceived stress, maladaptive coping strategies (substance use, self-blaming, self-distraction, behavioural disengagement), repetitive thoughts and actions, and impact of COVID-19 were significant independent predictors of PIU. Furthermore, differences in independent predictors were found in different sub-groups of age.

Discussion: This study indicated that adolescents and youth are more susceptible to PIU. In addition, maladaptive coping strategies predicted PIU significantly, which indicates that PIU is not an effective coping strategy but can be understood as maladaptive behaviour involving escapism. Furthermore, only repetitive thoughts and actions predicted PIU, which clarifies PIU as an independent pathology.

Conclusion: This study found specific predictors for the three sub-groups – adolescents, young adults, and middle-aged adults - that would further aid management plans for problematic internet use. Moreover, the role of the COVID-19 pandemic on PIU is also critical.

1. Introduction

The internet is lauded for being an exceptional discovery in information, communication, entertainment. With easy accessibility to internet facilities, cyberspace has grown exponentially in India to 560 million.[1] India has become the second-largest base of internet globally and saw a rapid surge in the time spent online from an average of 15 minutes to an hour in 2019 to an average of 6 and a half hours in 2020.[2] Prior research has shown that an optimal use internet by adolescents and young adults is healthy and promotes positive subjective well-being.[3,4] However, recently, researchers have shown that spending too much time in internet activities can be unhealthy and lead to problematic internet use (PIU) like symptoms.[3,5] There are high-risk behaviours reported in adolescents and adults in terms of activities, such as social networking, using smartphones or inappropriate internet use, surfing, shopping, and gambling.[6,7]

The literature on coping with stress by focusing on internet use has received conflicting results. Some researchers see it as a dysfunctional mechanism leading to further dependence. Others argued that the nature of content viewed on PIU could make social networking sites and online platforms a healthy coping mechanism for stress.[8] It has been interesting that increased environmental stressors can lead to frequent PIU. At the same time, individuals who have inappropriate internet use are more stressed than others.[9]

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https://doi.org/10.1016/j.cegh.2022.101036
Received 29 December 2021; Received in revised form 10 February 2022; Accepted 21 March 2022
Available online 27 March 2022

According to Griffiths (2000), the internet seems to provide a medium for this kind of behaviour that particular teenagers develop due to online activities to counteract other psychological or physical deficiencies or as a 'pseudo-coping strategy'. Coping literature favouring internet use proposes that internet can be used with a problem-focused approach to consume more nutritional information online and navigate stress.[10] However, the behaviour pattern that emerges from PIU is of sufficient severity to result in significant impairment in personal and occupational aspects of life and mental health.[11] Moreover, PIU was also positively correlated with neuroticism, loneliness, and negative affect, while it was negatively correlated with extraversion and positive affect.[12]

As the years following 2019 have seen humanity braving coping with the highly contagious Coronavirus Disease 2019 (COVID-19), social distancing and home confinement were used as measures to suppress the further spread of the disease. Many turned to the internet in the backdrop of this increased stress and disruption of daily lives.[13] Daily functioning was compromised, leading to many adverse "psychological and physiological outcomes".[14] With increasing stressors, uncertainty, and isolation, people turned to online media and activities as they could be easily indulged at home, which became a "prolific avenue" for stress reduction, thereby aiding coping.[14,15] Further researchers found that feelings of anxiety mediated the relationship between perceived stress during COVID times and problematic internet, fear and loneliness. Perceived stress leads to increased worrying and fear of infection, with social isolation perpetuating feelings of loneliness, leading to using the internet as a gateway from the COVID crisis.[16,17]

In India, a study found that students with PIU had poor physical and mental health,[18] and sleep deprivation was reported in up to 31.53% of college students.[19] Insomnia (26.8%), daytime sleepiness (20%), and eye strain (19%) were also reported.[20] The addictive nature of internet use is being observed worldwide. Despite literature showing personality and mental health correlates of problematic internet use, only few studies have focused on coping, mental health domains, age, and gender as predictors for PIU. The current research was set out to explore predictors of PIU to understand the high-risk psychosocial indicators of problematic internet use, particularly during the backdrop of the 'new normal' phase of COVID-19 in India. Hence, our study aimed [a] to study the association of PIU with age, gender, coping, lifestyle, and mental health [b] to study the role of age, gender, lifestyle, coping, and mental health domains, as predictors of PIU.

2. Methodology

2.1. Sample

The study sample included individuals between 13 and 60 years of age, categorized as [a] adolescents (13–19 years), [b] young adults (>19–39 years), and [c] middle-age adults (>39–60 years). Inclusion criteria for the participants were aged 13 years–60 years, any gender, access to the device and the internet to fill questionnaires (online); able to read and comprehend Hindi or English language; willing to participate in the survey. In addition, the exclusion criteria were not residing in India having a chronic medical, neurological, or psychiatric condition requiring priority medical management and not able to complete assessment.

Sampling was done at three stages. At the first stage, schools/colleges were randomly selected from the Department of Higher Secondary Education and the Department of Higher Education. The consenting students, parents, teaching/nonteaching staff participated in the second stage. Finally, at the third stage, the participants shared the forms with their spouses, relatives, and acquaintances to receive a response from various segments of the society comprising of homemakers and employees of other professional bodies to increase the generalizability of findings.

Total sample size (N) was estimated to be at least 1000 with the precision of 5.00%, infinite population size, 95% confidence interval with specified limits of 13%–23 and 95% binomial confidence interval. Authors aimed to gather responses with 95% confidence level and 0.05 confidence interval for the subgroups. 1027 participants comprised of 456 adolescents (M = 200; F = 256; CI = 4.54); 347 adults (M = 124; F = 223; CI = 5.22) and 224 mid adults (M = 103; F = 121; CI = 6.51); with a 95% confidence level the margin of error was 4.54%, 5.22% and 6.51% respectively.

2.2. Ethical procedures

This cross-sectional study was a part of an institutional project on mental health aspects during the COVID-19 pandemic.[21] The approval for the study was taken from Institutional Ethics Committee [ref code: 11th ECM COVID-19 1B/P7]. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional ethics committee.

2.3. Data collection tools

This study was conducted on an online forum via Google forms. A web-based proforma with a unique web link was created, which contained the following information - (a) informed consent form for adults (or parents)/an assent form for adolescents, (b) sociodemographic proforma which asked information about age, gender, education, domicile, marital status, occupation, and socioeconomic status, and (c) standardized tools for the assessment of study variables in the form of questionnaires were used.

2.3.1. Tool 1: Internet Gaming Disorder Scale (IGDS-9)[22]

PIU was assessed using nine DSM-5 based criteria of IGD, i.e., preoccupation, withdrawal, tolerance, persistence, displacement, problem, conflict, deception, and escape used in the Internet Gaming Disorder Scale.[23] It is a short (9-item) dichotomous (yes/no) scale. Internationally, researchers refer to nine IGD criteria of DSM- 5 for constructing diagnostic tools and assessing internet use and internet addiction.[23] Hence, the term 'internet applications' was used to evaluate general internet use instead of merely gaming for the present study. This scale is highly reliable, with a Cronbach's alpha of .83[24], making it a psychometrically sound instrument. The tool was used in both English and Hindi, wherein the translation was done by the standard WHO based back-translation method.

2.3.2. Tool 2: Brief COPE[24]

Coping was assessed using Brief COPE inventory.[25] It is a self-report form that explores the primary coping methods to stressful life situations and comprises 28 items. The coping mechanisms were further divided into two groups considering specific situational constraints during the COVID-19 pandemic – Adaptive (emotional support, instrumental support, positive reframing, planning, self-distraction, acceptance, and religion) and Maladaptive (active coping, behavioural disengagement, venting, denial, substance and self-blame). Responses are given on a four-point Likert scale (1 = I haven't been doing this at all, 2 = I have been doing this a little bit, 3 = I have been doing this a medium amount, 4 = I've been doing this a lot). The scores were added to get two significant sub-scale scores (Adaptive and Maladaptive total sub-scale score), and individual scores of each coping mechanism were also calculated. Research indicates that the scale has strong Cronbach's alpha values ranging from 0.69 to 0.8[25].

2.3.3. Tool 3: Perceived Stress Scale (PSS)[26]

Stress was assessed by the Perceived Stress Scale (PSS).[27] This scale measures how individuals appraise a situation as stressful quantitatively. It has 10 items and employs a 5-point Likert scale to record the responses (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often). The scale has been found useful for community study

where participants have a minimum high school grade education, and it has a good reliability and validity strong Cronbach's alpha = 0.84 as well as satisfactory test-retest reliability (ICC after three weeks to be 0.935) and Kappa's Coefficient ranging from 0.74 to 0.89[27].

2.3.4. Tool 4: DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure – 9[28]

Mental Health Symptoms were assessed by administering the DSM-5 Level 1 Cross-Cutting Symptom Measure.[29] This self-rated questionnaire addresses mental health symptoms about various psychiatric problems in about 13 psychiatric domains. In this study, we excluded Psychosis and Mania during the analysis. The respondents are asked about the severity (how much) and frequency (how often) of the specific symptom during the past two weeks. This screens "Mild" or "Greater" risk of symptoms which can be further assessed on Level-2 Cross-Cutting Questionnaire and evaluated. The DSM-5 Field Trials of clinical adult samples across the United States and Canada has shown good test-retest reliability.[29]

2.3.5. Tool 5: Semi-Structures proforma for lifestyle indicators

Lifestyle changes were assessed using a self-explanatory Semi-Structured Proforma developed by the authors, which included items on the adversity of effects that COVID-19 pandemic had in various areas - routine, appetite, academics, work, financial condition, sexual area, physical exercise, yoga, and relationship with family, friends and spouse. The items were rated on a 5-point Likert scale.

2.4. Procedure

For the sample collection, five higher secondary co-education schools [two public and three private schools], and five undergraduate/postgraduate co-education colleges [two public and three private colleges], were randomly selected from the Department of Higher Secondary Education and Department of Higher Education respectively. Among these, three schools [two private and one public], and four colleges [two private and two public] consented to participate. The consenting school and college authorities provided voluntary informed consent and were permitted to conduct the study in their institute and implement data collection. The data collection was initiated on December 1 (2020) at 12:00 IST and concluded on December 31 (2020) at 12:00 IST.

For recruitment of the adolescent population (aged 13–18 years old), consent from their parents was taken by sharing an assent form with them through e-mail. This assent form provided complete information about the study, its purpose, anonymity, and confidentiality of the participants and their response. After that, the entirely convinced parents gave consent and allowed their adolescent ward(s) to participate in the study. Parents were free to accept or decline their ward's/wards' recruitment in the study. Once their parents' consent was obtained, the assent form and analysis proforma were e-mailed to the adolescents.

Regarding the adult population, the web link of the study proforma was sent through e-mail to students of the colleges, parents, and staff of schools/colleges. They were further requested to forward and share the link to other eligible adults from their known contacts. The link opened a Google form containing an easy-to-follow and straightforward set of questions sequentially. The participants could give the desired responses by clicking on the given choices.

2.5. Data analysis

The results were analysed using SPSS version 23.0 (SPSS Inc., Chicago, IL, USA). Categorical data were summarized as proportions and percentages (%) and discrete or continuous data as mean and standard deviations (SD). Associations were established using Pearson's Coefficient of Correlations, and a multiple linear regression analysis was performed to analyse the predictors of problematic internet use after checking the data for relevant assumptions. The p-value was taken significantly when less than 0.05 ($p < .05$).

3. Results

3.1. Sociodemographic characteristics

This cross-sectional study is an augmentation to an institutional project on various mental health facets in the COVID-19 pandemic.[21] Although 1043 individuals responded to the questionnaire, due to incomplete data, 16 responses were excluded. Final sample comprised of 1027 participants with 456 adolescents (Male = 200; Female = 256); 347 young-adults (Male = 124; Female = 223) and 224 middle-aged adults (Male = 103; Female = 121). The mean age was 15.10 years for adolescent males (SD = 1.81), and 15.18 years (SD = 1.68) for adolescent females. The mean age was 28.93 years (SD = 5.62) for young adult males and 27.59 years (SD = 5.37) for young adult females. The mean age was 48.40 years (SD = 6.58) for mid-adult males and 48.19 years (SD = 6.23) for mid-adult females, comparable across gender.

Most adolescent participants had at least 10 or 10–12 years of education. Most of the young adult and mid-adult participants had received more than 15 years of education and were employed. Individuals who were unemployed, including homemakers, were also included in the sample.

3.2. Correlational analysis

Our study found that PIU was positively correlated at moderate levels with stress ($r = 0.43^{***}$) and the impact of COVID ($r = 0.278^{**}$). PIU was negatively correlated with age ($r = -0.216^{**}$). It was found that self-blaming and behavioural disengagement were positively correlated at moderate levels amongst coping strategies. In contrast, self-distraction, denial, substance, instrumental support and venting showed low positive correlations. As a form of coping, religious practices were negatively correlated with problematic internet use, although at a low level. PIU was significantly positively correlated at a low level with the difficulties in lifestyle-related domains. Also, significant moderate levels of positive correlation were found between PIU and mental health domains, except substance use which showed low correlation (Table 1).

3.3. Predictors analysis

The regression results on our study (Table 2) showed that the mental health domains, coping strategies, lifestyle indicators, age, and gender was a significant predictor for PIU for the total sample as well as for categories of adolescents, young adults and middle-aged adults.

Furthermore, substance as coping, repetitive thoughts and actions, and self-blaming were significant positive predictors in adolescents, while active coping was a significant negative predictor for problematic internet use. Substance as coping, repetitive thoughts and actions, perceived stress, somatic concern, and routine were significant independent predictors for young adults.

Interestingly, in middle-aged adults, work, the impact of COVID-19, and substance as coping were positive predictors for problematic internet use. However, 'problematic substance; according to DSM-5 Cross-Cutting symptom was a negative predictor.

4. Discussion

This study assessed predictors of PIU to understand the broader maladaptive aspect of using the internet, particularly in India's backdrop of the new normal phase of COVID-19. Assessing the independent predictors provides further clarity on PIU as a behavioural disorder. Age was the strongest predictor for PIU in our sample and was associated

Table 1
Correlations between mental health, coping strategies, lifestyle and Internet use [Correlations-Spearman].

Mental Health Domains	r	Coping Strategies	r	Lifestyle Domains	r
Depression	.299**	Self-Distraction	.242**	Appetite	.174**
Anger	.318**	Active Coping	.025	Routine	.266**
Anxiety	.325**	Denial	.193**	Academics	.256**
Somatic Concern	.316**	Substance Use	.176**	Work	.125**
Suicidal Ideation	.297**	Emotional Support	-.005	Financial Condition	.160**
Dissociation	.347**	Behavioural Disengagement	.302**	Sexual Interest	.106**
Sleep Problem	.313**	Instrumental Support	.130**	Physical Exercise	.187**
Memory	.347**	Acceptance	.037	Yoga/Meditation	.163**
Repetitive Thoughts/Actions	.406**	Venting	.162**	Relations with Family	.208**
Personality Disturbance	.358**	Self-Blaming	.374**	Relations with Partner	.166**
Substance Use	.139**	Positive Reframing	.007	Relationship with Friends	.202**
		Religion	-.066*	Impact of COVID	.278**
		Denial	.173**		

Note: ** = p < .01; * = p < .05.

Table 2
Mental health, coping strategies and lifestyle indicators as predictors of problematic internet use **[Regression Analysis]**.

Internet Use in Total Sample (N = 1027)	Model			.560	.287	11.856***	.061
	Self Distraction	.071	2.313* (.017)				
	Substance Use Coping	.118	3.555** (.002)				
	Behavioural Disengagement	.075	2.257* (.028)				
	Self Blaming	.115	3.256** (.003)				
	Repetitive Thoughts/Actions	.150	3.193** (.003)				
	Perceived Stress	.085	2.525* (.025)				
	Impact of COVID	.067	2.218* (.037)				
	Age	-.140	−4.631** (.001)				
Internet Use in Adolescents (n = 456)	Model			.533	.222	4.604***	.092
	Active Coping	-.107	−2.116* (.030)				
	Substance Use Coping	.091	1.774* (.048)				
	Self Blaming	.155	2.652** (.006)				
	Repetitive Thoughts/Actions	.157	2.189* (.023)				
Internet Use in Young Adults (n = 347)	Model			.626	.319	5.384***	.116
	Substance Use as Coping	.141	2.393* (.031)				
	Somatic Concern	.191	2.512* (.012)				
	Perceived Stress	.154	2.685** (.013)				
	Repetitive Thoughts/Actions	.255	2.576* (.031)				
	Routine	.191	2.434* (.020)				
Internet Use middle age Adults (n = 224)	Model			.623	.271	3.318***	.156
	Substance Use Coping	.222	2.853* (.014)				
	Substance Use	-.230	−2.325* (.031)				
	Work	.187	2.135* (.045)				
	Impact of COVID	.182	2.518* (.034)				

Note: Model 1 = Depression, Anger, Anxiety, Somatic Concern, Suicidal Ideation, Dissociation, Sleep Problem, Memory, Repetitive Thoughts/Actions, Personality Disturbance, Substance Use, Self-Distraction, Active Coping, Denial, Substance Use as Coping, Emotional Support, Behavioural Disengagement, Instrumental Support, Acceptance, Venting, Self-Blaming, Positive Reframing, Religion, Appetite, Routine, Academics, Work, Financial Condition, Sexual Interest, Physical Exercise, Yoga/Meditation, Relations with Family, Relations with Partner, Relationship with Friends, Impact of COVID, Perceived Stress, Age, Gender.
Model 2 = Depression, Anger, Anxiety, Somatic Concern, Suicidal Ideation, Dissociation, Sleep Problem, Memory, Repetitive Thoughts/Actions, Personality Disturbance, Substance Use, Self-Distraction, Active Coping, Denial, Substance Use as Coping, Emotional Support, Behavioural Disengagement, Instrumental Support, Acceptance, Venting, Self-Blaming, Positive Reframing, Religion, Appetite, Routine, Academics, Financial Condition, Sexual Interest, Physical Exercise, Yoga/Meditation, Relations with Family, Relations with Partner, Relationship with Friends, Impact of COVID, Perceived Stress, Age, Gender.
Model 3 = Depression, Anger, Anxiety, Somatic Concern, Suicidal Ideation, Dissociation, Sleep Problem, Memory, Repetitive Thoughts/Actions, Personality Disturbance, Substance Use, Self-Distraction, Active Coping, Denial, Substance Use as Coping, Emotional Support, Behavioural Disengagement, Instrumental Support, Acceptance, Venting, Self-Blaming, Positive Reframing, Religion, Appetite, Routine, Academics, Work, Financial Condition, Sexual Interest, Physical Exercise, Yoga/Meditation, Relations with Family, Relations with Partner, Relationship with Friends, Impact of COVID, Perceived Stress, Age, Gender.
Model 4 = Depression, Anger, Anxiety, Somatic Concern, Suicidal Ideation, Dissociation, Sleep Problem, Memory, Repetitive Thoughts/Actions, Personality Disturbance, Substance Use, Self-Distraction, Active Coping, Denial, Substance Use as Coping, Emotional Support, Behavioural Disengagement, Instrumental Support, Acceptance, Venting, Self-Blaming, Positive Reframing, Religion, Appetite, Routine, Work, Financial Condition, Sexual Interest, Physical Exercise, Yoga/Meditation, Relations with Family, Relations with Partner, Relationship with Friends, Impact of COVID, Perceived Stress, Age, Gender.
*** = p = .000; ** = p < .01; * = p < .05

negatively with problematic internet use, indicating that adolescents and youth are more susceptible to problematic internet use. This can be attributed to the psychosocial proneness of problematic internet use. According to Ko et al. (2008),[30] PIU is entangled in the youth's perceived environment and social environment as it relieves them of their original identity problems by providing the anonymity and fluidity of identity and helps them cope with the lack of control over real-life situations by providing a sense of control online. Such psychosocial

facilitation is less experience by the older population. In addition, substance as coping, self-blaming, repetitive thoughts and actions, perceived stress, self-distraction, behavioural disengagement, and the impact of COVID-19 were significant independent predictors, where age was negatively associated with problematic internet use.

4.1. Coping strategies and lifestyle indicators as predictors of internet use

PIU has been contested as a disorder due to the literature suggesting that internet use can be an effective, problem-focused coping mechanism that perpetuates the consumption of healthy information online and helps individuals navigate stressful areas of life.[10] However, in our study, adaptive coping strategies did not significantly correlate with internet use, except instrumental support, which showed only low correlations. Contrarily, maladaptive coping strategies – behavioural disengagement, self-blaming, and self-distraction were moderately correlated, and denial, substance use and venting showed low correlations. Moreover, PIU was also predicted by self-blaming, behavioural disengagement, substance use and self-distraction. This form of coping is characterized by escapism, in which the individual seeks to cope with stressful situations by distracting themselves through PIU by playing games online or watching pornography.[31,32]

While disturbances in all lifestyle indicators were significantly correlated with internet use, with moderate correlations with routine, academics and relationship with friends and impact of COVID, the only effect of COVID was found as a significant independent predictor of problematic internet use. The detrimental impact of the COVID-19 pandemic has been observed in the increased addictive behaviours by various researchers, especially in PIU,[29,30] given how social distancing restrictions increased reliance on the internet. Problematic use of the internet could be understood as a 'pseudo-coping strategy'.[33] In our study, perceived stress also predicted this maladaptive form of internet use. These results can be understood in conjunction as it has been observed that during the COVID crisis, PIU was used as a means to get away because the perceived stress led to increased worry and fear of infection, with social isolation perpetuating feelings of loneliness.[16,17]

4.2. Mental health domains as a predictor of internet use

In our study, perceived stress was found to be a significant independent predictor of problematic internet use. This result is in tandem with the literature, which suggests that coping with stress is one of the major factors contributing to PIU.[34] It distracts them from other concerns.[35] Moreover, a higher level of stress is reported by individuals with PIU compared to their counterparts without this problem.[36]

Importantly, our results showed that while all the mental health domains were significantly moderately correlated with internet use, only the mental health domain of repetitive thoughts and actions was found to be a significant predictor. This is a crucial finding because it has been observed that a variety of mental disorders co-occur with PIU. There is an ongoing debate about which came first,[37] as well as whether PIU is just a symptom of predominantly existing disorders such as anxiety, depression, or impulse control disorders.[38] Therefore, the results of this study suggest that PIU is not significantly predicted by other common mental health conditions like depression and anxiety and can be understood as a primary disorder on its own.

Repetitive thoughts can be observed as rumination. The conceptualization of PIU delineates rumination as an essential cognitive characteristic. Such rumination can be observed as repetitive thoughts where the individual with PIU can prevent negative information from entering working memory repeatedly.[39] Moreover, it has been observed that more severe and longer-lasting PIU may be experienced by individuals with high rumination levels.[40]

4.3. Age-wise analysis of predictors of problematic internet use

Our age-wise analysis of predictors of PIU showed that in adolescents, self-blame was a significant independent predictor for PIU and showed a positive association. In contrast, active coping was negatively associated as a predictor. This finding is crucial for understanding PIU as a disorder and exploring adolescents' coping behaviours during times of stress. Literature corroborates with our findings as it has been observed that the type of PIU changed with whether the individual was experiencing stress or anxiety – i.e., while experiencing high anxiety, individuals reported higher levels of eudemonic media for problem-focused coping (reframing the current situation, humour and insight); higher stress turned adolescents to the media for escape and to avoid unpleasant associations with the source of their stress, which may be a maladaptive coping technique.[14]

Regression analysis in the young adults group showed somatic concern as a significant independent predictor of problematic internet use. An association between PIU and somatic symptoms has been established by various researches where it was observed that not only is PIU significantly positively correlated with health anxiety and the extent to which PIU is used for health information, but also with escalation and persistence of health concerns.[41] Given that our study was carried out during the COVID-19 pandemic, when the level of health anxiety and cyberchondria was already elevated,[42] it is reasonable to posit that persistent somatic concern can significantly predict PIU. It can be used to seek health information, and such information-seeking behaviours can be persistent to addictive levels. Health anxiety during the pandemic was also highly related to poor mental health outcomes[43] which can explain PIU as a form of maladaptive coping with somatic concern. Higher significance of somatic concern in young adults can be understood as stemming from three types of concerns - efficacy of prevention and control measures, the threat to life and health posed by COVID-19, and daily life necessities.[44] The older population may have lesser concerns due to higher perceived self-efficacy in times of crisis.[45]

Preoccupation, persistence, and displacement are integral to the addictive behaviour of problematic internet use, which can be understood as a loss of routine activities. Therefore, it can be suggested that a decrease in following everyday activities can predict problematic internet use. This finding is also crucial in differentiating typically increased time using PIU and PIU as an effective coping strategy. The lack of active localized peer social networks, which is more important for youth involvement,[46] can increase screen time, displacing other routine activities during the pandemic for young adults.

Interestingly, while repetitive thoughts were a significant independent predictor for both adolescents and young adults in our study, it was not significant for middle-aged adults. This could be attributed to observations that, in general, older individuals report less ruminative thinking than their younger counterparts, especially when negative rumination is considered.[47]

During the pandemic, the economic anxiety was as intense as the health anxiety as the work was significantly affected by the shutdown of businesses and workplaces.[48] Middle-aged adults, who have greater responsibilities towards their families, could have been more vulnerable to economic anxiety. Therefore, as work was negatively affected, it could have predicted PIU as a maladaptive coping behaviour. The pre-pandemic era shows that in India, lower PIU and PIU among middle-aged adults compared to the youth.[49] Hence, it can be posited that the negative impact of COVID-19 on the individuals' mental health could have been a significant predictor of PIU for middle-aged adults.

Importantly, substance as coping predicted PIU in all three age groups. This further solidifies the PIU as a condition. It delineates a proclivity to seek out instant emotional gratification and attempt to suppress difficult emotions, which is common to all addictive behaviours.[50] Hence, an individual who prefers substance for coping would more likely indulge in PIU for coping at maladaptive levels.

5. Conclusion

Our study clarified PIU as an independent behavioural disorder as it was observed that the domains in DSM-5 Cross-Cutting symptoms were not significant independent predictors of problematic internet use, and neither did adaptive coping predict problematic internet use. Age was a significant predictor for PIU with negative relation, indicating that adolescents and youth are more vulnerable to problematic internet use. In addition, PIU was predicted by more maladaptive coping strategies. Since the study was set during the COVID-19 pandemic, it was observed as a significant positive predictor, emphasising its adverse effects. Moreover, this study found specific predictors for the three sub-groups – adolescents, young adults, and middle-aged adults – which would further aid management plans for problematic internet use.

6. Recommendations

Our study found predictors of PIU and further attempted to provide clarity on PIU as a disorder. An analysis of predictors in the non-COVID era would further solidify the association between PIU and coping, lifestyle and mental health problems. Longitudinal research could further help understand PIU as a disorder. Moreover, targeted interventions can be formulated based on the results from this study. Furthermore, qualitative analysis can enrich the understanding of psychological and behavioural processes.

7. Limitations

The study has some limitations. First, relevant data is captured only at a single time frame due to the cross-sectional design, especially during a pandemic like the current one. Second, while the analysis indicates PIU as a maladaptive coping strategy that can be understood as an independent disorder, this result could be confounded by certain extraneous factors. Including multiple predictors could have limited the confounds. Moreover, there is a possibility that responses could have been biased due to social desirability and self-serving bias. It is also possible that overall results may be affected by a higher proportion of respondents from Uttar Pradesh. However, the weighting ensures that results accurately reflect India's actual regional populations.

Funding information

This study was an investigator initiated and non-funded research work. Ethical approval was recevied from KGMU, Lucknow with ref code: 11th ECM COVID-19 1B/P7.

Declaration of competing interest

No potential conflict of interest was reported by the authors.

Acknowledgments

The authors would like to acknowledge the guidance of Dr. P.K. Dalal, Dr. Vivek Agarwal, Dr. Anil Nishchal, and Dr. Bandana Gupta, Department of Psychiatry, KGMU, Lucknow.

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