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Original Article

Prevalence of internet addiction and its associated factors among adolescents in private education institutes in Sargodha, Pakistan

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Abstract

As digital connectivity has become an integral part of daily life, internet addiction has emerged as a significant concern, particularly among adolescents. Therefore, this study aims to estimate the prevalence of internet addiction among adolescents, assess its severity, investigate the associations between sociodemographic factors and internet addiction levels, and examine the correlation between adolescents' age and the severity of internet addiction. This descriptive cross-sectional study involved 200 adolescents from private education institutes in Sargodha, Pakistan. A structured questionnaire was developed to collect data on sociodemographic indicators, and the validated Internet Addiction Test (IAT) questionnaire was adopted to assess the occurrence and severity of internet addiction. The data were analyzed using IBM® SPSS® software. The results revealed that among the 200 participants, 42% were male and 58% female, with nearly half (47.5%) being aged 13–15 years. Most (57.00%) owned a personal mobile device, whereas 47.5% had a laptop. Furthermore, 39.5% of the participants used the internet for one hour or less per day, whereas 30% reported using it for 2–4 hours daily. Only 8 participants stated that they did not use any social media applications. The study highlights significant internet addiction patterns. Many participants stayed online longer than intended (12.5% always, 16.5% often), whereas 34.5% neglected household chores. Internet dependency was evident, with 14.5% preferring online excitement over intimacy and 26.0% receiving complaints about excessive internet use. Sleep disturbances affected 25.0% of the study participants, whereas academic impacts were reported by 14.5% of the participants. The IAT results revealed that 8.5% of the participants had full control, 54.0% had mild, 36.0% had moderate, and 1.5% had severe addiction. Chi-square analysis revealed no significant associations between addiction severity and sex, age, or device ownership ($p > 0.05$), but the duration of internet use per day was significantly associated with addiction severity ($p = 0.030$). Age was weakly but significantly correlated with internet addiction ($p = 0.04$). The study concluded that a significant proportion of adolescents experienced moderate to severe internet addiction. These findings highlight the urgent need to implement measures to promote healthy digital practices among adolescents.

Keywords

Adolescents; Internet addiction; Internet use; Pakistan; Social media; Youth

1. Introduction

The internet has become an integral part of modern life and serves as a rapid gateway to information, a tool for communication, a medium for education, a means to so-

cialize, and a source of entertainment through electronic devices such as mobile phones [1,2]. With over 5 billion users globally, including 111 million in Pakistan, internet usage is particularly high among younger generations, who often begin using it as early as 8 years of age [3,4,5,6]. While the internet supports various educational and social activities, still excessive use can lead to problematic internet use, also known as internet addiction, which is characterized by less focus on other domains of life [7,8]. Globally, the prevalence of internet addiction varies between 3.7% and 26.8%, with even higher rates reported across Asia [9].

Currently, adolescents use the internet to express themselves, build skills, and stay connected with others. The digital world provides them with a sense of inclusion that is not limited to digital engagement, such as exploring hobbies and celebrating gaming achievements but also encompasses seeking approval on social media [10]. For many, internet use transitions from a casual habit to a coping mechanism for handling real-world struggles such as low self-esteem and social anxiety [11]. Moreover, a lack of support in offline environments pushes them toward online spaces as a last resort for validation, social interaction, and identity exploration, making it harder to disconnect later. Furthermore, peer influence further reinforces this confidence, as teenagers often mimic the online habits of their friends [12].

Several studies have reported the excessive use of the internet among adolescents across different regions globally. For example, a study in Bhutan revealed that 34% of adolescents were addicted to the internet, often relying on it to cope with boredom, peer pressure and stress while experiencing high levels of anxiety and depression [13]. In Nigeria, approximately 45% of adolescents exhibit signs of internet addiction, predominantly using Facebook [14]. A Malaysian study reported a 47.9% prevalence, with an average daily smartphone usage of more than three hours, primarily for internet-based activities [15]. In Pakistan, the situation is not very different, and approximately 34% of youth are addicted to moderate or severe internet addiction, with a higher prevalence among males, whereas age does not appear to be a significant determinant [16].

In Pakistan, the rapid proliferation of affordable mobile phones and the widespread use of social media have intensified internet addiction, with many adolescents seeking refuge online from social, familial, and academic pressures. This overdependence can adversely impact their psychosocial development, increasing the risk of anxiety, depression, and declining academic performance [17,18]. Despite these risks, awareness remains low, and support systems for managing internet use are largely insufficient. Addressing this growing issue requires a deeper understanding of adolescent behavior to develop effective interventions. Therefore, this study aims to estimate the prevalence of internet addiction among adolescents in private educational institutes in Sargodha, Pakistan; assess its severity; investigate the associations between sociodemographic factors and internet addiction levels; and examine the correlation between adolescents' age and the severity of internet addiction.

2. Methods

2.1. Study design

This study utilized a descriptive cross-sectional study design and was carried out over a three-month period from April to June 2024.

2.2. Study setting

This study was conducted in private education institutes in Sargodha, a district with a population of 1,537,866 and a literacy rate of 63% [19]. Moreover, the district has 1,923

formal public schools and 12 colleges, reflecting a structured educational environment that supports adolescent learning and development.

2.3. Ethical considerations

The study received approval from the Ethical Committee of Niazi Medical and Dental College, Sargodha, Pakistan (No. NMDC/DRC/07-79/24-ERB). Additionally, permission was obtained from the administration of private education institutes before data collection. Informed consent was obtained from all participants, and for those younger than 18 years of age, consent was provided by their parents or guardians before the interview.

2.4. Inclusion and exclusion criteria

The study included students aged 10–18 years who were enrolled in formal private secondary schools, higher secondary schools, and intermediate colleges and were studying any combination of subjects. However, individuals with cognitive disabilities or those who did not provide informed consent (or whose parents or guardians did not consent in the case of minors) were excluded from the study.

2.5. Sample size and sampling technique

The sample size of 154 was calculated using the OpenEpi calculator (version 3.01) on the basis of a 95% confidence interval, a 5% margin of error, and a reported internet addiction prevalence of 11.3% [20]. However, the sample size was further increased to 200 to improve the statistical power of the study and to cater to potential study dropouts. A nonprobability convenience sampling method was employed to recruit participants from various education institutes, which may limit the generalizability of the findings due to potential sampling bias, a limitation that has been acknowledged to guide cautious interpretation and encourage future studies using probabilistic sampling methods.

2.6. Study questionnaire development

A structured questionnaire was developed to collect data on sociodemographic indicators, and the validated Internet Addiction Test (IAT) was adopted to assess the occurrence and severity of internet addiction among adolescents [21].

2.7. Study measures

The sociodemographic and internet usage patterns section collected information on gender, age, personal ownership of a mobile phone or laptop, duration of internet use per day, purposes of using the internet, and social media applications used by adolescents. The IAT is a 20-item self-report instrument designed to assess internet addiction via a 5-point Likert scale, with response options ranging from 1 (rarely) to 5 (always). The total IAT score is obtained by adding up responses across all 20 items, yielding a final score ranging from 20–100. Scores of 20–30 indicate ‘normal internet usage’, whereas scores of 31–49, 50–79, and 80–100 indicate ‘mild’, ‘moderate’, and ‘severe internet addiction’, respectively. The IAT tool has strong psychometric properties, with a study reporting a Cronbach’s alpha value of 0.91, indicating high internal consistency [21].

2.8. Data collection procedure

Face-to-face interviews were conducted to collect data from the study participants, with each interview lasting between 10 and 12 minutes. For minor participants, a consent form was provided for completion by their parents or guardians. Only those who success-

fully submitted the signed consent form were included in the study, after which the interview was conducted.

2.9. Data analysis

The data collected were analyzed via IBM® SPSS® software (version 25.0). Descriptive statistics, including frequencies and percentages, medians, and interquartile ranges (IQRs), were calculated. Moreover, chi-square tests and Spearman's correlation coefficient were applied, with results considered significant at $p \leq 0.05$.

3. Results

3.1. Sociodemographic characteristics and internet usage patterns of the adolescents

Among the 200 participants, 42% were males and 58% were females. Nearly half of the adolescents (47.5%) were between 13 and 15 years of age (Table 1). A total of 57% of the participants owned a mobile phone, whereas 47.5% had a personal laptop. Furthermore, 39.5% of the participants used the internet for one hour or less per day, whereas 30% reported using it for 2–4 hours daily. In response to the question regarding social media usage, 8% (n = 16) stated that they did not use any social media applications.

Table 1. Sociodemographic characteristics and internet usage patterns of the adolescents.

Variables		Frequency (%)
Gender	Male	84 (42.00)
	Female	116 (58.00)
Age (in years)	10 – 12	17 (8.50)
	13 – 15	95 (47.50)
	16 – 19	88 (44.00)
Mobile phone ownership	Yes	114 (57.00)
	No	86 (43.00)
Laptop ownership	Yes	95 (47.50)
	No	105 (52.50)
Duration of internet use per day (in hours)	≤ 1	79 (39.50)
	2 – 4	60 (30.00)
	5 – 7	44 (22.00)
	8 – 10	10 (5.00)
	≥ 10	7 (3.50)
Purposes of using internet	Gaming	80 (40.00)
	Web browsing	86 (43.00)
	Completing homework	76 (38.00)
	Watching educational videos	73 (36.50)
	Watching YouTube content	111 (55.50)
	Streaming movies/TV shows	84 (42.00)
	Watching sports	37 (18.50)
	Freelancing work	10 (5.00)
	Content creation (making videos)	20 (10.00)
Social media applications used by adolescents	Facebook	60 (30.00)
	Instagram	88 (44.00)
	Twitter	29 (14.50)
	WhatsApp	151 (75.50)
	Snapchat	79 (39.50)
	TikTok	67 (33.50)
	YouTube	11 (5.50)

Variables		Frequency (%)
	Others	18 (9.00)
	Don't use social media	8 (4.00)

3.2. Assessment of internet addiction tendencies among adolescents

Table 2 shows the degree to which the study participants struggled with internet addiction. Many reported staying online longer than intended, with 12.5% always, 16.5% often, and 15.0% frequently engaging in this behavior. Similarly, nearly one-third (34.5%) of the respondents found themselves neglecting household chores due to internet use, with 7.5% always, 15.5% often, and 11.5% frequently prioritizing their online activities over responsibilities. The impact on relationships was also evident, as 14.5% of participants always preferred online excitement over intimacy with their partners, whereas 10.0% often and 12.0% frequently felt the same way. However, forming new relationships online was uncommon, with 76.0% rarely engaging in this behavior. Despite this, more than a quarter of the respondents (14.0% always, 12.0% often) reported that people in their lives complained about their excessive internet use.

The impact on academic performance and work productivity was limited but noticeable, with 3.5% of participants always and 11.0% often admitting that their schoolwork suffered owing to internet use. Similarly, 7.5% always and 14.5% often reported declining productivity, consequently spending much of their time using the internet. Signs of internet dependence were prominent. A total of 12.5% of the participants always used the internet as a way to block out disturbing thoughts about life, whereas more than one-third (21.5% always, 12.5% often) felt that life without the internet would be boring, empty, or joyless. Preoccupation with the internet was also evident, with 13.5% always and 14.0% often anticipating when they could go online again.

Many participants struggled with self-control, with 28.0% always and 19.0% often catching themselves saying, "Just a few more minutes." Similarly, 20.5% always and 16.0% often had unsuccessful attempts to reduce their screen time. Sleep disturbances were another major consequence, as 7.0% always and 18.0% often reported losing sleep due to prolonged internet use. Additionally, 16.0% always and 12.5% often admitted to hiding how long they had been online, possibly due to guilt or fear of judgment.

Table 2. Frequency distribution of Internet Addiction Test responses among adolescents.

Indicators	Rarely	Occasionally	Frequently	Often	Always
	N (%)	N (%)	N (%)	N (%)	N (%)
Stays online longer than intended	54 (27.00)	58 (29.00)	30 (15.00)	33 (16.50)	25 (12.50)
Neglects household chores due to internet use	74 (37.00)	57 (28.50)	23 (11.50)	31 (15.50)	15 (7.50)
Prefers internet excitement over intimacy	85 (42.50)	42 (21.00)	24 (12.00)	20 (10.00)	29 (14.50)
Making new relationships with online users	152 (76.00)	14 (7.00)	13 (6.50)	16 (8.00)	5 (2.50)
Receives complaints about excessive internet use	86 (43.00)	43 (21.50)	19 (9.50)	24 (12.00)	28 (14.00)
Schoolwork suffering due to internet use	107 (53.50)	45 (22.50)	19 (9.50)	22 (11.00)	7 (3.50)
Prioritizing checking emails over other tasks	97 (48.50)	29 (14.50)	28 (14.00)	22 (11.00)	24 (12.00)
Declines in productivity due to internet use	88 (44.00)	54 (27.00)	14 (7.00)	29 (14.50)	15 (7.50)
Becoming defensive about online activities	117 (58.50)	46 (23.00)	12 (6.00)	12 (6.00)	13 (6.50)
Uses the internet to escape disturbing thoughts	61 (30.50)	42 (21.00)	26 (13.00)	46 (23.00)	25 (12.50)
Anticipates the next opportunity to go online	67 (33.50)	54 (27.00)	24 (12.00)	28 (14.00)	27 (13.50)
Fears that life would be boring or empty without the internet	65 (32.50)	42 (21.00)	25 (12.50)	25 (12.50)	43 (21.50)
Gets annoyed when interrupted while online	82 (41.00)	47 (23.50)	19 (9.50)	25 (12.50)	27 (13.50)
Losing sleep due to internet use	73 (36.50)	58 (29.00)	19 (9.50)	36 (18.00)	14 (7.00)
Feelings preoccupied with or fantasized about being online	86 (43.00)	54 (27.00)	17 (8.50)	33 (16.50)	10 (5.00)

Indicators	Rarely	Occasionally	Frequently	Often	Always
	N (%)	N (%)	N (%)	N (%)	N (%)
Says, "Just a few more minutes" while online	45 (22.50)	38 (19.00)	23 (11.50)	38 (19.00)	56 (28.00)
Fails to reduce internet use despite attempts	54 (27.00)	52 (26.00)	21 (10.50)	32 (16.00)	41 (20.50)
Hides the amount of time spent online	83 (41.50)	46 (23.00)	14 (7.00)	25 (12.50)	32 (16.00)
Choosing internet use over social outings	81 (40.50)	47 (23.50)	24 (12.00)	27 (13.50)	21 (10.50)
Feel depressed or anxious when offline but relieved when online	84 (42.00)	50 (25.00)	31 (15.50)	16 (8.00)	19 (9.50)

3.3. Descriptive statistics and reliability analysis of the IAT categories

The IAT scores revealed that 8.5% of the respondents had full control over their internet use. In contrast, more than half of the respondents (54%) indicated mild addiction, followed by 36.00% with moderate addiction and 1.5% with severe addiction. The IAT exhibited good internal consistency, with a Cronbach's alpha value of 0.78.

Table 3. Descriptive statistics and reliability analysis of the Internet Addiction Test categories.

Scale		N (%)	Range	Median (IQR)	Cronbach's α
Internet Addiction Test	Normal	17 (8.50)	0 – 30	45.50 (16.00)	0.78
	Mild addiction	108 (54.00)	31 – 49		
	Moderate addiction	72 (36.00)	50 – 79		
	Severe addiction	3 (1.50)	80 – 100		

3.4. Association between sociodemographic characteristics and internet addiction severity

Table 4 shows that more than half of the respondents (54.0%) had mild internet addiction, with a greater proportion of females (62.0%) than males (38.0%). Moderate addiction was observed in 36.0% of the respondents, nearly half of whom were between 16 and 19 years old. Within this category, approximately 61.1% owned a personal mobile phone, whereas 43.1% owned a personal laptop. Severe internet addiction was rare, with two out of three affected participants using the internet for 5–7 hours per day, while one individual exceeded 10 hours of daily usage. The chi-square test revealed no significant associations between internet addiction severity and sex, age, or personal device ownership ($p > 0.05$). However, the duration of internet use per day was significantly associated with addiction severity ($\chi^2(12) = 22.73$, $p = 0.030$), and the strength of this relationship was moderate, as shown by the effect size ($\phi = 0.34$).

Table 4. Association between sociodemographic characteristics and internet addiction severity.

Variables		Internet Addiction Severity				χ^2	Sig.
		Normal	Mild	Moderate	Severe		
		N (%)	N (%)	N (%)	N (%)		
Gender	Male	4 (23.5)	41 (38.0)	37 (51.4)	2 (66.7)	6.46	0.091
	Female	13 (76.5)	67 (62.0)	35 (48.6)	1 (33.3)		
Age (in years)	10 – 12	2 (11.8)	9 (8.3)	6 (8.3)	0 (0.0)	4.29	0.637
	13 – 15	11 (64.7)	52 (48.1)	31 (43.1)	1 (33.3)		
	16 – 19	4 (23.5)	47 (43.5)	35 (48.6)	2 (66.7)		
Mobile phone ownership	Yes	10 (58.8)	59 (54.6)	44 (61.1)	1 (33.3)	1.45	0.693
	No	7 (41.2)	49 (45.4)	28 (38.9)	2 (66.7)		
Laptop ownership	Yes	8 (47.1)	54 (50.0)	31 (43.1)	2 (66.7)	1.28	0.733
	No	9 (52.9)	54 (50.0)	41 (56.9)	1 (33.3)		
Duration of internet use per day (in hours)	≤ 1	7 (41.2)	46 (42.6)	26 (36.1)	0 (0.0)	22.73	0.030 **
	2 – 4	7 (41.2)	36 (33.3)	17 (23.6)	0 (0.0)		

Variables		Internet Addiction Severity				χ^2	Sig.
		Normal	Mild	Moderate	Severe		
		N (%)	N (%)	N (%)	N (%)		
	5 – 7	1 (5.9)	20 (18.5)	21 (29.2)	2 (66.7)		
	8 – 10	1 (5.9)	5 (4.6)	4 (5.6)	0 (0.0)		
	≥ 10	1 (5.9)	1 (0.9)	4 (5.6)	1 (33.3)		

[*] Associations between variables were assessed using the chi-square test. [**] Significant value ($p \leq 0.05$).

3.5. Assessment of the correlation between the age of adolescents and internet addiction

Table 5 shows a weak positive correlation between age and internet addiction, which was statistically significant ($p = 0.04$).

Table 5. Correlations between age and internet addiction.

Variables	Median	IQR	Age	Internet Addiction
Age	15.00	3.00	-	-
Internet addiction	45.50	16.00	0.04 [*]	-

[*] Significant value ($p < 0.05$).

4. Discussion

The study findings highlight that internet addiction is prevalent among adolescents, with most participants indicating mild to moderate addiction. Many participants struggled to manage their screen time, often prioritizing online activities over household responsibilities and personal relationships. Academic and work performance also suffered for some, whereas sleep disturbances and internet dependency were common. Social media usage was prevalent, with various platforms being actively used, revealing its role in shaping adolescents' online behaviors. The study revealed that the duration of internet use per day was a significant factor in addiction severity, whereas gender, age, and device ownership showed no strong associations. However, a weak but significant association between age and addiction suggests that as adolescents grow older, their internet use patterns may shift slightly.

The study revealed that adolescents mainly use the internet for four activities: watching YouTube, internet searching, and watching movies (television shows and playing games). These findings align with previous research indicating that students use video-streaming platforms such as YouTube for entertainment. Additionally, search engines such as Google serve as valuable tools for gathering information on various topics [22]. A related study in Jordan reported that over 60% of students used the internet for gaming [23]. In the current study, WhatsApp and Instagram were the most commonly used platforms, followed by Facebook. A similar study reported that WhatsApp ranked highest, followed by YouTube, Instagram, and Facebook [24]. The internet has emerged as a primary source of entertainment because it delivers customized content in innovative ways. Social media platforms utilize advanced algorithms to provide tailored feeds that significantly enhance user engagement. Moreover, these websites and applications promote interactive communication, fostering meaningful user connections [25,26]. This fusion of personalized content and interactive entertainment is transforming the way individuals consume media in the digital landscape [27].

The analyses of the current study revealed that a significant number of adolescents were moderately or severely addicted to the internet. This aligns with a study in Bhutan, which reported a 34.4% prevalence of moderate to severe internet addiction among secondary school students [13]. In contrast, a study in Malaysia reported a prevalence of 56.4%, indicating a higher rate than that reported in our study [11]. These findings high-

light the urgent need for Pakistan to address the growing concern of internet addiction [15]. Furthermore, the present study highlighted an impact on performance at school and work, which is supported by another study that highlighted the negative impact of internet addiction on performance among Arab students [28]. Another study highlighted the negative impact of internet addiction on work performance among healthcare professionals [29]. Internet addiction represents a significant public health challenge and is predominantly observed within society because of factors such as boredom, unmet social needs, and difficulties in self-regulation of internet usage [30,31,32].

The results of the present study revealed that sex and age were not significantly correlated with internet addiction, which aligns with the findings of previous studies [33]. However, an American study reported a low prevalence of internet addiction among older adults [34]. This may be attributed to the widespread accessibility of the internet across all age groups and genders, as well as the normalization of internet usage in today's digital environment [35,36].

The results of the current study indicate a link between hours spent online and internet addiction, with longer online times correlating with increased severity of addiction, as supported by European studies conducted to determine mobile phone and internet addiction among adolescents [37,38]. Adolescents benefit from easier internet access via mobile devices, and the key concerns include the individual's personality traits, as low self-control and impulsivity are associated with internet and gaming addiction [39,40]. Kuss et al. highlighted that extroverts use the internet for socialization, whereas introverts seek social compensation. Furthermore, loneliness, shyness, and social anxiety are also connected to internet addiction [41]. Online activities can increase social acceptance and increase self-esteem in low-risk environments, helping individuals manage offline anxiety and practice social skills [42,43].

Neurological factors play a significant role in internet addiction, and this addiction stems from the brain's reaction to internet use, with quick dopamine release leading to an immediate sense of reward. This can result in compulsive behaviors and increased tolerance due to dysregulated reward processing [44]. As a result, individuals who spend excessive time online struggle to manage their usage, leading to chronic addiction, which can negatively impact their social, psychological, and physiological development. Consequently, their lifestyles, attitudes, and behaviors may deteriorate [45,46]. Environmental and technological factors, especially COVID-19, significantly increase internet exposure and addiction among young people [47,48,49]. During lockdowns, social media and the internet became vital for communication, news, and online education, potentially leading to the development of internet addiction among adolescents [50,51,52].

In the context of Pakistan, cultural factors such as strong family hierarchies, limited open communication between parents and children, and restricted recreational opportunities may contribute to the patterns of internet addiction observed among adolescents [53]. In many households, digital devices serve as both a source of entertainment and a means of social connection, particularly when parental supervision is limited or inconsistent. Additionally, academic pressure and the stigma surrounding mental health discussions may push adolescents toward online platforms as a coping mechanism. These sociocultural dynamics require further investigation to inform more contextually appropriate interventions; although not within the scope of the present study, they represent a valuable area for future research to explore deeper insights into the underlying causes of internet addiction.

The strengths of this study include its reasonably large sample size, and the use of a validated tool enhances the reliability of the findings. Additionally, this study provides a comprehensive evaluation of internet addiction by examining its impact on academic

performance, daily responsibilities, sleep patterns, emotional well-being, and social interactions, offering valuable insights into problematic internet use among adolescents. However, the study did not consider factors contributing to internet addiction, such as the family environment, personality traits, and peer influence, which could have deepened the study's insights. Furthermore, the study did not employ multivariate analysis, such as multiple regression, to control for potential confounding factors—this should be considered in future research to strengthen the interpretability of the findings. In addition, the use of a convenience sampling method may limit the generalizability of the results due to potential sampling bias.

5. Conclusions

The study concluded that a significant proportion of adolescents experienced moderate to severe internet addiction, which affected their personal relationships, household responsibilities, and academic or work performance. Sociodemographic variables were not strongly associated with addiction severity or the duration of daily internet use. The weak but significant relationship between age and addiction suggests that internet use patterns may evolve with age. These findings highlight the urgent need to implement measures to promote healthy digital practices among adolescents. Practical steps may include integrating digital literacy and self-regulation modules into school curricula and encouraging parents to set consistent screen time limits and engage in open conversations about responsible internet use.

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