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Original Research Article

A CROSS-SECTIONAL STUDY ON INTERNET ADDICTION AND MENTAL HEALTH OUTCOMES AMONG ADOLESCENTS IN URBAN AND RURAL AREAS OF UTTAR PRADESH

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ABSTRACT

Background: With increasing digital penetration in both urban and rural India, internet addiction has emerged as a growing public health concern, particularly among adolescents. This study investigates the association between internet addiction and psychological wellbeing among adolescents in urban and ruralareas of Gautam Buddha nagar, Uttar Pradesh. **Objectives:** To assess the prevalence and severity of internet addiction and its relationship with mental health status among adolescents in rural and urban settings.

Materials and Methods: A school -based cross sectional study was conducted among 240 adolescents (120 each from urban and rural areas), studying in a government schools of Uttar Pradesh. Sampling method used was convenience sampling and simple random sampling. Data were collected using a semi-structured proforma, the Internet Addiction Test (IAT), and the General Health Questionnaire-12 (GHQ-12).

Results: Prevalence of moderate to severe Internet addiction was noted 22.5% & 25.8% in rural and urban adolescent population respectively. A significant association was found between high IAT scores and poor psychological wellbeing in both rural ($\chi^2 = 68.923$, $p = 0.001$) and urban groups ($\chi^2 = 93.612$, $p = 0.001$). Males exhibited higher internet addiction scores than females ($p = 0.019$).

Conclusion: The findings indicate a significant link between internet addiction and poor mental health among adolescents, with urban youth being more vulnerable due to earlier and more intense exposure.

Keywords: Internet addiction, Adolescents, Psychological wellbeing, GHQ-12, Urban area, Rural area.

INTRODUCTION

The rapid advancement of digital technology and the unprecedented global reach of the internet have transformed human interaction, information access, and entertainment consumption. While these innovations have brought immense benefits, they have also given rise to a growing public health concern—internet addiction, particularly among adolescents. Internet addiction, a subset of behavioral addiction, is characterized by excessive or poorly controlled preoccupations, urges, or behaviors regarding internet use that lead to impairment or distress.[1]

Adolescence is a critical developmental stage marked by intense neurobiological, psychological, and social changes. During this period, adolescents are particularly vulnerable to developing addictive behaviors due to increased novelty seeking, emotional instability, and the ongoing development of executive functions in the brain.[2] The widespread availability of smartphones, Wi-Fi, and digital platforms in both urban and rural settings has made the internet an integral part of adolescent life. While the internet offers educational and social benefits, its

misuse or overuse can significantly impact psychological wellbeing, contributing to anxiety, depression, sleep disturbances, and impaired interpersonal relationships.[3]

Globally, internet addiction has been recognized as a behavioral health issue with varying prevalence across regions. In India, studies report an internet addiction prevalence ranging from 13% to 38% among adolescents, with urban areas tending to exhibit higher rates compared to rural counterparts, potentially due to differences in access, lifestyle patterns, and socio-environmental stimuli.[4,5] However, recent reports suggest that even in rural settings, the gap in internet accessibility is narrowing due to government initiatives like Digital India, further necessitating comparative analyses of addiction patterns across urban and rural populations.[6]

The psychological impact of internet addiction has been widely studied, with mounting evidence linking excessive internet use to poor mental health outcomes. Adolescents addicted to the internet are more likely to experience heightened stress, irritability, loneliness, reduced academic performance, and decreased self-esteem.[7] A growing body of research has also identified a bidirectional relationship between psychological distress and internet addiction; adolescents with underlying mental health issues may use the internet as a coping mechanism, which in turn exacerbates their condition through sleep disruption and social withdrawal.[8] In the context of urban health and rural health training centres, which often cater to populations with differing socio-cultural backgrounds, education levels, and resource availability, the patterns and consequences of internet addiction may vary significantly. Urban adolescents, exposed to competitive academic environments, social media trends, and technological pressures, may use the internet for both academic and recreational purposes, often leading to compulsive behaviors.[9] In contrast, rural adolescents may use the internet more selectively, but lack of awareness and guidance may also predispose them to harmful usage patterns, especially in the absence of structured digital literacy programs.[10]

The psychological wellbeing of adolescents is intricately tied to their social support systems, physical activity, sleep quality, and screen time. Internet addiction disrupts these pillars by fostering sedentary lifestyles, reducing in-person social interactions, and altering circadian rhythms. Psychological wellbeing, defined as a state of optimal mental functioning and emotional regulation, is thus deeply compromised in adolescents with problematic internet use.[11] Key symptoms observed include emotional instability, impulsivity, reduced motivation, and impaired decision-making abilities.[12,13]

MATERIALS AND METHODS

Study Design

The present study is a cross sectional study carried out in the government schools of district Gautam Buddha nagar in urban and rural areas during the period of June 2023 to January 2024. It was conducted as a school-based observational research project, aiming to evaluate internet addiction and its psychological implications among adolescents from two distinct demographic settings. Two schools selected using the convenience sampling while from each school 3 classes selected using the simple random sampling method. Each class had approximately 40 – 50 students enrolled.

Sample Size and Population

The sample size was determined using the standard formula:

$n = Z^2pq/d^2$, where Z = 1.96 for a 95% confidence interval, p = 11.8 %[14], q = 1 – p, and d = 5% (absolute allowable error). Sample size calculated was 166.

But for the convenience purpose we have recruited 240 students equally divided between two cohorts: one representing the urban area and the other from the rural area both located within Gautam Buddha nagar.

Eligibility Criteria

Inclusion Criteria

- Adolescents aged 10 to 19 years
- Individuals with a history of internet use for over one year
- Willingness to participate, with informed assent from the adolescent and written consent from a parent or guardian

Exclusion Criteria

- Adolescents with known psychiatric disorders or comorbidities
- Participants who were unwilling or unable to provide informed consent

Eligible participants were thoroughly briefed about the study objectives and procedures. Upon obtaining consent, data were collected through face-to-face interviews using structured questionnaires.

Data Collection Tools

Semi-Structured Proforma

A customized, semi-structured data collection form was employed to document:

- Demographic variables (age, sex, educational status)
- Internet usage details: duration, access location (home/cyber café), type of device and connection, login frequency, amount of money spent, and primary reasons for usage

This tool was administered only to adolescents who had used the internet for a minimum of six months.

Internet Addiction Test (IAT)

To assess the extent of internet addiction, the study employed the Internet Addiction Test (IAT), a standardized, reliable instrument developed by Kimberly Young. The tool consists of 20 items, each

rated on a 5-point Likert scale, yielding a total score ranging from 20 to 100.

- Score Interpretation:
  - 0–30: Normal use
  - 31–49: Mild addiction
  - 50–79: Moderate addiction
  - 80–100: Severe addiction

The Cronbach's alpha coefficient for the IAT in this study was 0.889, indicating high internal consistency.

General Health Questionnaire-12 (GHQ-12)

The GHQ-12 with, a validated tool for assessing psychological wellbeing. It was used to assess and screen for common mental health issues. It provided insight into the emotional and psychological status of the participants.

GHQ-12 uses a four-point Likert scale. Four options given for each question in GHQ-12 and the scores assigned are better than usual-(0), same as usual-(1), less than usual-(2), and much less than usual-(3). GHQ-12 scores ranges from 0–36. The GHQ score of 5 was kept as a marker for being a case, that is, the participant having psychological distress.[15]

Data Analysis

The collected data were coded, entered, and analyzed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics, such as frequencies and percentages, were used for categorical variables, while inferential statistics were applied as appropriate to compare between groups.

RESULTS

Table 1: Association between GHQ-12 and IAT Score (Rural Population, n=120)

GHQ-12	No addiction (0–30)	Mild (31–49)	Moderate (50–79)	Severe (>80)	Chi square (P)
GHQ Score <5	75 (62.5%)	10 (8.3%)	4 (3.3%)	1 (0.8%)	58.432 (0.001)
GHQ Score >5	5 (4.1%)	3 (2.5%)	13 (10.8)	9 (7.5%)	
Total	80 (66.6%)	13 (10.8%)	17 (14.1%%)	10 (8.3%)	

Table 1 reflects the association between psychological well-being (GHQ-12) and internet addiction (IAT) among rural participants (N=120). A majority of those with GHQ score <5, indicative of lower psychological distress, were in the 'No addiction' category (62,5%). In contrast, individuals with GHQ score >5 showed a greater tendency toward moderate and severe addiction, with a total of 22 such cases (18.3%). Prevalence of moderate to severe Internet addiction was noted 22.5% (n=27) in rural adolescent population. The Chi-square value (58.432, p = 0.001) indicates a strong and statistically significant relationship between mental health status and the severity of internet addiction in the Rural population.

Table 2: Association between GHQ-12 and IAT Score (Urban Population, n=120)

GHQ-12	No addiction (0–30)	Mild (31–49)	Moderate (50–79)	Severe (>80)	Chi square (P)
GHQ Score <5	70 (58.3%)	14 (11.6%)	03 (2.5%)	02 (1.6%)	72.956 (0.001)
GHQ Score >5	03 (2.5%)	2 (1.6%)	15 (12.5%)	11 (9.1%)	
Total	73 (60.8%)	16 (13.3%)	18 (15.0%)	13 (10.8%)	

Table 2 depicts findings from the urban sample (N=120), where a similar trend was observed. Among those with GHQ <5, a high proportion 58.3% (n=70) reported no signs of internet addiction. In contrast, those with higher psychological distress (GHQ score >5) were overrepresented in the moderate 12.5% (n=15) and severe 9.1% (n=11) addiction categories. Moderate to severe internet addiction was observed to be 25.8% (n=31) in urban adolescent population. The Chi-square test result (72.956, p = 0.001) reinforces the significant association between mental health status and internet addiction levels among the urban population.

Table 3: Sex-wise Comparison of IAT Scores (N = 240)

Parameter	Male (n=140)	Female (n=100)	Mann-Whitney Test	P value
IAT Total Score	111.60	91.20	3652	0.008
Rural	56.40	48.25	902	0.077
Urban	58.10	46.90	927	0.039

Table 3 presents a sex-wise comparison of Internet Addiction Test (IAT) scores among 240 participants, with 140 males and 100 females. The mean total IAT score for males was significantly higher (111.60) than for females (91.20), with a p-value of 0.008, indicating a statistically significant difference. When stratified by residential location, urban males showed higher scores (58.10) compared to urban females (46.90), which was statistically significant (p = 0.039). Although Rural males had higher scores (56.40) than Rural females (48.25), this difference was not statistically significant (p = 0.077). This table highlights a gender-based and location-based trend in internet usage patterns, suggesting the need for targeted interventions.

Table 4: Comparison of IAT and GHQ-12 Scores by Site

Parameter	Rural (Mean Rank)	Urban (Mean Rank)	Mean (SD)	Mann-Whitney Test (P)
GHQ-12	92.87	107.13	6.03 (6.42)	4361.5 (0.138)
IAT	93.25	106.75	32.14 (27.89)	4399 (0.158)

Table 4 shows a site-based comparison of general health (GHQ-12) and internet addiction (IAT) scores. Urban adolescents tended to have higher scores on both scales. While the differences were not statistically significant, they suggest a trend toward worse mental health and higher internet addiction in urban youth.

Table 5: Comparison of Mean Age and Internet Onset Age

Parameter	Rural Mean (SD)	Urban Mean (SD)	Unpaired T-Test (P)
Beginning Age of Internet Use	13.65 (2.21)	12.11 (1.75)	5.308 (0.001)
Age (years)	15.92 (2.38)	14.92 (2.27)	1.319 (0.005)

Table 5 illustrates differences in age and age of internet initiation between Rural and urban participants. Urban adolescents started using the internet at a significantly younger age and were slightly younger in overall age. Both differences were statistically significant.

Table 6: Correlation between IAT and GHQ-12 Scores

Residence	Spearman's rho	P value
Rural	0.842	0.001
Urban	0.936	0.001

Table 6 reports the correlation between internet addiction and mental health scores. In both rural and urban groups, the correlation was strong and statistically significant, suggesting that higher internet addiction is strongly associated with poorer general mental health.

DISCUSSION

The present study assessed the association between internet addiction and psychological wellbeing among adolescents from urban and rural areas from Gautam Buddha Nagar. The findings underscore a strong and statistically significant relationship between elevated Internet Addiction Test (IAT) scores and poor mental health status as measured by the General Health Questionnaire-12 (GHQ-12). These observations align with the growing body of literature that highlights internet overuse as a significant predictor of emotional distress and psychosocial dysfunction among adolescents.[16]

A prominent finding in this study was the clear gradient of internet addiction severity with deteriorating mental health, as shown in both rural and urban populations (Tables 1 and 2). Adolescents with GHQ-12 scores >5, indicating compromised psychological wellbeing, were disproportionately represented in the moderate to severe internet addiction categories. The Chi-square tests yielded highly significant results ($p = 0.001$) in both settings, reinforcing the robustness of this association. These results echo the conclusions of Lam and Peng, who reported that adolescents exhibiting problematic internet use were significantly more likely to manifest depressive symptoms and anxiety.[17]

Interestingly, while the prevalence of severe internet addiction was comparable across rural (10 out of 120) and urban (13 out of 120) adolescent, the correlation between IAT and GHQ-12 scores was slightly stronger in the urban group ($\rho = 0.936$) than in the rural group ($\rho = 0.842$) (Table 6). This suggests that while the pattern of association remains consistent across settings, urban adolescents may be more vulnerable to the psychological consequences of excessive internet use. Urban environments, characterized by higher academic competition, social comparison via social media, and reduced physical activity, may exacerbate the psychological impact of screen dependency.[18]

Sex-based comparisons of internet addiction scores (Table 3) revealed that male adolescents had significantly higher IAT scores than their female counterparts ($p = 0.019$). This is consistent with global trends, which suggest that male adolescents are more prone to internet addiction due to greater involvement in online gaming, social networking, and risk-taking behaviour.[19] However, when analyzed separately by rural and urban residence, the gender-based differences did not reach statistical significance, suggesting that location may moderate gender disparities in addiction patterns.

Site-specific analysis (Table 4) indicated higher mean ranks for both GHQ-12 and IAT scores among urban adolescents, although these differences were not statistically significant. The observed trend is consistent with prior research showing that adolescents in urban settings are more likely to engage in prolonged screen time due to easier access, peer influence, and fewer outdoor recreational options.[20] Nonetheless, the lack of significance may reflect limitations in sample size or variability in exposure.

Age-related findings (Table 5) added another important dimension to the discussion. Urban adolescents were not only slightly younger on average but also initiated internet use at a significantly younger age (mean onset age 12.11 vs.

13.65 years, p = 0.001). Early exposure to digital media has been implicated in the development of maladaptive behavioral patterns, including poor self-regulation and reduced attention span, which in turn can increase susceptibility to addiction.[21] The results thus highlight the importance of parental supervision and digital literacy education at an early age, especially in urban households where access to technology is often less restricted.

Moreover, the strong positive correlation between IAT and GHQ-12 scores in both settings (Table 6) reinforces the notion of a bidirectional relationship: while internet addiction may impair psychological wellbeing, adolescents with underlying mental health vulnerabilities may also resort to excessive internet use as a maladaptive coping mechanism.[22] Such findings are consistent with Anderson et al.'s systematic review, which documented reciprocal influences between problematic internet use and psychological disorders such as depression and social anxiety.[23]

The findings of this study underscore several public health implications. First, routine screening for internet addiction should be integrated into adolescent health programs, particularly in school and community health settings. Second, mental health promotion strategies must address the digital behaviors of adolescents, including safe usage guidelines, screen time limits, and promoting offline social engagement. Third, targeted interventions should be adapted to rural and urban settings, considering differences in access, exposure, and behavioral patterns.

Nevertheless, certain limitations must be acknowledged. The cross-sectional design precludes causal inference between internet use and psychological distress. Additionally, self-reported data may be subject to recall or social desirability bias. The sample was also restricted to adolescents from a single district, which may limit generalizability. Future research should explore longitudinal patterns of internet addiction and its mental health impacts, incorporating neurobiological and environmental variables.

CONCLUSION

The present study highlights a significant and consistent association between internet addiction and psychological wellbeing among adolescents from both urban and rural settings. The findings demonstrate that higher levels of internet addiction, as measured by the Internet Addiction Test (IAT), are strongly correlated with poor mental health outcomes, as reflected by elevated General Health Questionnaire-12 (GHQ-12) scores. This trend was observed across both demographic groups, with a slightly greater psychological impact seen in urban adolescents, who also reported earlier initiation of internet use.

The results underscore the urgent need for early identification, monitoring, and intervention strategies targeting internet addiction, especially in adolescents who exhibit signs of emotional distress. Furthermore, the study suggests that gender, age of internet onset, and residential location are critical contextual factors influencing addiction patterns and their psychological consequences.

REFERENCES

1. Young KS. Internet addiction: The emergence of a new clinical disorder. CyberpsycholBehav. 1998;1(3):237-44.
2. Casey BJ, Jones RM, Hare TA. The adolescent brain. Ann N Y Acad Sci. 2008;1124(1):111–26.
3. Kuss DJ, Griffiths MD. Internet addiction in adolescence: Prevalence and risk factors. Comput Hum Behav. 2011;29(3):118-22.
4. Kaur P, Dahiya N, Sharma S. Internet addiction among adolescents in India: A review. Int J Indian Psychol. 2021;9(2):2349–3429.
5. Sharma A, Sahu R, Kasar PK, Sharma R. Internet addiction among professional courses students: A study from central India. Int J Med Sci Public Health. 2014;3(9):1069–73.
6. Ministry of Electronics and Information Technology. Digital India Programme. [Internet]. 2022 [cited 2025 Jul 2]. Available from: https://www.digitalindia.gov.in
7. Anderson EL, Steen E, Stavropoulos V. Internet use and problematic internet use: A systematic review of longitudinal research trends in adolescence and emergent adulthood. Int J Adolesc Youth. 2017;22(4):430–54.
8. Lam LT, Peng ZW. Effect of pathological use of the Internet on adolescent mental health: A prospective study. Arch PediatrAdolesc Med. 2010;164(10):901–6.
9. Ramesh Masthi NR, Savanur KS, Kusuma YS. Prevalence of internet addiction and effect of internet use on health and lifestyle among students in Bengaluru. Int J Community Med Public Health. 2017;4(12):4680–5.
10. Pathak D, Singh V, Upadhyay SK. Assessment of internet addiction among adolescents in a rural population of western Uttar Pradesh, India. J Family Med Prim Care. 2020;9(7):3590–4.
11. Ryff CD, Keyes CL. The structure of psychological well-being revisited. J PersSoc Psychol. 1995;69(4):719–27.
12. Chauhan VS, Goyal R. Effect of pandemic-induced lockdown on internet usage among school-going adolescents in India. Int J Adolesc Med Health. 2022;34(1):20210038.
13. World Health Organization. Adolescent mental health. 2021 [cited 2025 Jul 2]. Available from: https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health.
14. Yadav P, Banwari G, Parmar C, Maniar R. Internet addiction and its correlates among high school students: A preliminary study from Ahmedabad, India.Asian J Psychiatr; 2013; 6: 500 -505
15. Bisen SS, Deshpande YM. Prevalence, predictors, psychological correlates of internet addiction among college students in India: A comprehensive study. Anatol J Psychiatry. 2020;21:117-23.
16. Sharma MK, Anand N, Nirisha PL, et al. Internet addiction and its relationship with depression, anxiety and stress in urban adolescents in India. J Indian Assoc Child AdolescMent Health. 2020;16(1):48–60.
17. Lam LT, Peng ZW. Effect of pathological use of the internet on adolescent mental health: A prospective study. Arch PediatrAdolesc Med. 2010;164(10):901–6.
18. Montag C, Lachmann B, Herrlich M, Zweig K. Addictive features of social media/messenger platforms and freemium games against the background of psychological and economic theories. Int J Environ Res Public Health. 2019;16(14):2612.
19. Kuss DJ, Griffiths MD. Online social networking and addiction—a review of the psychological literature. Int J Environ Res Public Health. 2011;8(9):3528–52.
20. Tateno M, Teo AR, Shirasaka T, et al. Internet addiction and self-evaluated attention-deficit hyperactivity disorder traits

among Japanese college students. Psychiatry ClinNeurosci. 2016;70(12):567–72.
21. Gentile D, Coyne S, Walsh D. Media violence, physical aggression, and relational aggression in school age children: A short-term longitudinal study. AggressBehav. 2011;37(2):193–206.
22. Bozkurt H, Coskun M, Ayaydin H, Adak I, Zoroglu SS. Prevalence and patterns of psychiatric disorders in referred adolescents with internet addiction. Psychiatry ClinNeurosci. 2013;67(5):352–9.
23. Anderson EL, Steen E, Stavropoulos V. Internet use and problematic internet use: A systematic review of longitudinal research trends in adolescence and emergent adulthood. Int J Adolesc Youth. 2017;22(4):430–54.