



## A CROSS-SECTIONAL STUDY OF IMPACT OF INTERNET USE ON AGGRESSION AMONG ADOLESCENTS

### Psychiatry

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### ABSTRACT

**Background:** The recent years have seen a major upsurge in Problematic Internet Use. This rise is because of easy access to internet more so among adolescents. Problematic internet use can lead to diverse effects in individuals. Aggression is one of the psychiatric co-morbidity seen in Problematic Internet users. **Aims:** We aimed to determine the relationship between Problematic internet use and aggression among adolescents. **Methods:** We conducted a cross-sectional study using convenience sampling. A total of 200 high school and intermediate college students completed the structured questionnaire. The severity of Problematic Internet Use was assessed using Young's Internet Addiction Test (IAT) and aggression was measured using IIP Aggression Scale. **Results:** Among 200 participants, 91(45.5%) were male and 109(54.5%) were female with mean age of 16.37±1.45 years. Mean duration of Internet use was 3.6±1.82 years. 45%, 17% and 2% subjects had mild, moderate and severe dependence respectively based on IAT scores. Pearson correlation showed a significant positive correlation between Problematic Internet Use and aggression ( $r: 0.61, p \text{ value} < 0.001$ ). Chi square revealed statistically significant association between duration of internet use and aggression scores. **Conclusion:** Problematic Internet Use is strongly associated with aggression among adolescents. Awareness regarding Problematic Internet Use by educating the adolescents would prevent forthcoming negative consequences.

### KEYWORDS

internet, aggression, adolescent

### INTRODUCTION:

Digital revolution in the late 20<sup>th</sup> century is a major milestone which made internet the part and parcel of modern-day life. In the current era of technology, internet use has increased globally. India has the second-largest internet user population in the world in 2022 with over 900 million users<sup>[1]</sup>. Adolescence, a critical period characterized by neurobiological and physical maturation results in high-risk taking behaviour.<sup>[2]</sup> Emergence of COVID made everyone accessible to internet and adolescents turned vulnerable. Quarantine and isolation curtailed social interaction making each one to explore innovative ways for recreation, alleviate stress and anxiety and amplify feelings of loneliness and insecurity.<sup>[3]</sup> Adolescence is a transitional period that favours the emergence of different addictions<sup>[4]</sup>. Though adolescents started using internet for academic purpose, playing online games, binge watching web series, social media, gambling, watching pornographic videos became the leisure activities. Furthermore, increase in internet use resulted in numerous negative consequences.

Internet addiction which is the sequela of excessive internet use has increased rampantly. The words 'Internet addiction', 'Problematic Internet use (PIU)' and 'Pathological Internet use' are used interchangeably.<sup>[5]</sup> Problematic Internet use is defined as having at least five of the following signs and symptoms: (1) preoccupation with the Internet, (2) increasing amount of time spent online, (3) failure to cut back use with concomitant restlessness, (4) moodiness or depression, (5) staying online longer than originally intended, (6) running the risk of losing a job, relationship, or other opportunity because of Internet use, and (7) lying to conceal the extent of Internet use and/or using the Internet to escape negative feelings.<sup>[2]</sup> Few studies have found that there is increased risk of depression, anxiety, sleep disturbances, substance use, aggression and ADHD among people with PIU.<sup>[6-10]</sup> Certain personality traits may contribute to the initiation, and maintenance of PIU.<sup>[9]</sup> PIU was also associated with reduced academic performance.<sup>[11]</sup> In systemic review and meta-analysis of 20 studies Carli et al.<sup>[12]</sup> reported that among people with Pathological Internet use, 75% showed depressive symptoms, 57% showed anxiety symptoms, 100% showed ADHD symptoms, 60% showed OCD symptoms and 66% showed aggressive behaviour. Lim et al.<sup>[13]</sup> in his study reported that adolescents with Internet addiction disorder are more prone to aggression.

India being a developing country has larger subpopulation of adolescents. Growing internet use is increasing the chances of Internet addiction and developing negative consequences. In India, there are few studies done in the field of Problematic internet use and psychiatric co-morbidities associated with it. Iyer M et al.<sup>[9]</sup> reported that Internet

addiction has an association with aggression and psychological well being. As per the authors knowledge, this is one of the novel study aimed to understand the relationship between internet use and aggression among the adolescents who are more vulnerable to develop aggression in their adulthood. Moreover, we are using new assessment tool to measure aggression which is more appropriate for local population.

### AIMS AND OBJECTIVES:

In this study, we aimed to determine the relationship between Problematic Internet Use and aggression among adolescents. Our objectives were to study the factors related to Problematic Internet Use and to determine the association between Problematic internet use and aggression among Adolescents.

### MATERIALS AND METHODS:

This was a population based, cross-sectional study carried out in the high school and intermediate students in urban area of Visakhapatnam, in the months of June and July, 2022. Permission was obtained from the authorities of Institutions where the study was being employed. Students aged between 14 and 18 years who use internet were included. Students with known Psychiatric illness were not eligible. The study was approved by the Institutional Ethics committee, Andhra Medical College. Assent and written informed consent were taken from participants and parents before starting the study. A total of 222 adolescents from School and Intermediate college were enrolled in the study through convenient sampling.

A semi-structured, self-administered questionnaire was prepared in English language and needed 5-10 minutes for completion. Students were asked to fill the questionnaires anonymously in the class room to prevent pressure from parents and teachers. Socio-demographic details such as gender, age, socio-economic status and the class studying were obtained. Socio-economic status was calculated using modified Kuppu Swamy scale. Other variables like duration of Internet use, daily internet usage duration, channel and place of internet use, internet activities and frequently used app for recreation were taken into account.

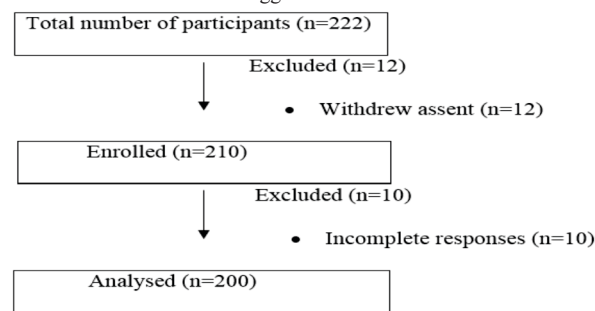
Internet Addiction Test (IAT) (Young, 1998)<sup>[14]</sup>: Young's Internet Addiction test was used to measure the presence and severity of Internet addiction. The scale was adapted from DSM-IV criteria for pathological gambling. It is modified version of 8 item scale, Young's Internet Addiction Diagnostic Questionnaire (IADQ). It is a 20 item self-reported questionnaire with scoring on a Likert scale ranging from 0 (less extreme) to 5 (most extreme). The overall score of 0 to 30

reflects normal level of internet usage, 31 to 49 indicate the presence of mild internet addiction, 50 to 79 reflects the presence of a moderate internet addiction and 80 to 100 indicates a severe internet addiction. This scale has been validated in Indian population with internal consistency of 0.92.<sup>[15]</sup>

IIP Aggression Scale (K.K. Srivastava)<sup>[16]</sup>:

This scale was used to measure the level of aggression. It is a 30 item self-rated scale, each item is scored on a Likert scale with 0 being dislike extremely to 5 being like extremely. The total scores of ≤ 50, 51-89, 90-104, ≥ 105 are considered low, average, high and severe aggression respectively. This scale has a correlation coefficient of 0.71, reliability coefficient of 0.78, split half reliability of 0.79 for males and 0.82 for females.

Statistical analysis was performed using SPSS version 25. Socio-demographic and other study variables were analysed using number and percentage for categorical variables, mean and standard deviation for continuous variables. Pearson product correlation was used to determine the association between Internet Addiction Test scores and IIP aggression scores. Chi-square test was used to find the relationship between study variables and Problematic Internet use and aggression. Bivariate linear regression was applied to predict relationship between Internet addiction scores and aggression scores.



Flowchart 1: Diagram showing flow of participants

**RESULTS:**

Descriptive statistics were used to assess socio-demographic and other study variables. The socio-demographic characteristics of the sample population is as shown in Table 1. Of the total 200 participants, 45.5% were male and 54.5% were female. Mean age of the sample was 16.37 years with standard deviation of 1.45 years. Many of the study participants belonged to Lower middle socio-economic status (33%) and few were from Upper socio-economic status (6%). 14.5%, 18.5%, 23.5% and 43.5% were studying in 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> standard respectively.

Table 2 depicts the study variables in the sample population. You tube was the most frequently used app (29%) and Netflix was used least frequently (3.5%) among internet users. You tube (n=26) and Instagram (n=37) were the most frequently used apps among males and females respectively. Many of them use Smart phone (99%) at home (100%) to access internet. All of the them used internet for multiple purposes. Of which 82% use social media, 72% chatting, 71.5% watch videos, 67% for education, 45.5% play online games, 31% visit adult sites. Males were using internet to visit adult sites (49.45%), watching videos (85.7%) and playing online games (63.7%) than females (15.5%, 59.6%, 28.4%). Females used social media (85.3%) for chatting (74.3%) frequently than males (78%, 69.2%). Use of internet for educational purpose was 67% among both males and females. Mean of daily internet usage was found to be 2.33±1.12 hours. Substance use was 0% in the study population.

	n (%)	mean (SD)
Gender		
Male	91 (45.5)	
Female	109 (54.5)	
Age in years		16.37 (1.45)
14	30 (15)	
15	33 (16.5)	
16	33 (16.5)	
17	42 (21)	
18	62 (31)	

Socioeconomic status		
Lower	21 (10.5)	
Upper lower	52 (26)	
Lower middle	66 (33)	
Upper middle	49 (24.5)	
Upper	12 (6)	
Class studying		
9th standard	29 (14.5)	
10th standard	37 (18.5)	
11th standard	47 (23.5)	
12th standard	87 (43.5)	

	Frequency	Percentage (%)
Frequently used app		
Instagram	50	25
WhatsApp	39	19.5
You tube	58	29
Free fire	12	6
Snapchat	26	13
Netflix	7	3.5
Facebook	8	4
Channel of Internet use		
Smartphone	198	99
Computer	2	1
Place of Internet use		
Home	200	100
Internet Cafe	0	0
Others	0	0
Activities done using internet		
Social media	Yes 164 82	No 36 18
Playing online games	Yes 89 44.5	No 111 55.5
Chatting	Yes 144 72	No 58 29
Watching videos	Yes 143 71.5	No 57 28.5
Educational purpose	Yes 134 67	No 66 33
Visiting adult sites	Yes 62 31	No 138 69
Daily internet use duration in hours		
<2	51	25.5
2-4	70	35
4-6	57	28.5
6-8	7	3.5
>8	15	7.5
Substance use	0	0

5.5% were using internet since 1 year, 31.5% since 2 years, 19% for 3 years, 14.5% since 4 years, 12% since 5 years, 10% since 6 years, 5% since 7 years, 1.5% since 8 years, 0.5% since 9 and 10 years. Figure 1 depicts the histogram showing duration of internet use with mean of 3.6±1.82 years.

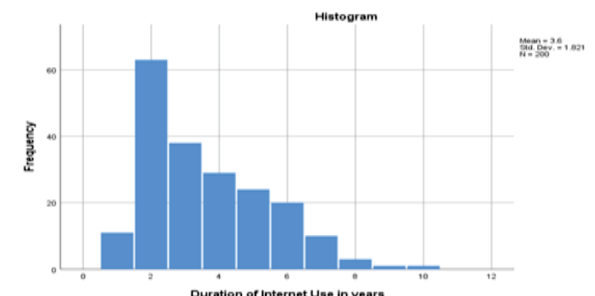


Figure 1: Histogram depicting duration of internet use in years

Out of 200 participants, 128 (64%) were having Internet dependence. Of which 70.3% males, 58.7% females were Problematic Internet users. 80% of the study population had higher IIP aggression scores. Among them, 75.8% males and 83.4% females had aggression. Table 3 shows the distribution of study population based on the level of

Internet dependence according to Youngs's Internet addiction scores and level of aggression according to IIP Aggression scale scores.

Table 4: Pearson product correlation\* between IAT and IIP aggression score

r	p value
0.61	0.000

\* 2-tailed  
IAT-Internet Addiction Test  
r- Pearson coefficient

Table 4 shows that there was good correlation between Internet addiction test and IIP aggression test score which was found to be statistically significant (p<0.001)

Table 2: Chi-square association

		2	D f	p
Gender				
Gender	IAT score	4.03	3	0.26
Gender	IIP aggression score	4.8	3	0.19
Daily internet use duration in hours				
Daily internet use	IAT score	78.33	12	0.000
Daily internet use	IIP aggression score	51.58	12	0.000
Duration of internet use in years				
Internet use duration	IAT score	43.43	27	0.24
Internet use duration	IIP aggression score	59.05	27	0.000

2 – Chi-square, d f – degree of freedom, IAT- Internet Addiction Test

Statistically significant association with 5% significant level was found between daily internet use and levels of Problematic internet use [( $\chi^2=78.33$ ) (df=12)(p=0.000)], daily internet use and levels of aggression [( $\chi^2=51.58$ )(df=12)(p=0.000)] and duration of internet use and levels of aggression [( $\chi^2=59.05$ )(df=27)(p=0.000)] as depicted in Table 5.

Table 6: Linear regression to assess association between IAT scores and IIP aggression scores

β co-efficient	R2	F	p value
0.614	0.377	119.67	0.000

IAT – Internet Addiction Test, β – regression co-efficient, F – variance

Further relationship between Problematic internet use and aggression was analysed using Linear regression. IAT scores significantly predicted IIP aggression scores (F=119.67) (p<0.05). The results clearly directed positive effect of IAT scores on IIP aggression scores (β=0.614, R<sup>2</sup>=0.377).

**DISCUSSION:**

Our study was conducted to determine the relationship between Problematic internet use and aggression among adolescents. Majority of the internet users had developed Problematic Internet use of which 45% were having mild PI. There was a statistically significant correlation between Problematic internet use and aggression. In addition, Problematic Internet Use had positive effect on aggression.

Of the total study population, 54.5% were females. These findings were similar to Dalamaria et al.<sup>[17]</sup> in which females accounted for 53.1%. In our study, few males were not willing to participate in the study, withdrew assent and gave incomplete responses. Mean age of our study population was 16.37 which was in keeping with average adolescent age similar to previous study done by Kim et al.<sup>[18]</sup> where the mean age was 16.7 years. Majority of the study participants were of Lower middle socio-economic status which can be justified as India is contributed majorly by middle class families. Smartphone was the channel of Internet use in 99% of participants as nowadays it is available in every household. All of the them were using internet at home as it is made easily accessible to all the population. These findings in our study were similar to Kim et al.<sup>[18]</sup>. In this study, males were watching You tube videos, visited adult sites and playing online games more frequently. Females were using Social media to connect and chat with others more frequently because males use more violent online content and play games<sup>24</sup>. In contrast to other studies (Kim et al. and Esen et al.)<sup>[19,20]</sup>, our study found that there was no substance use in study population. This might be because they would have been

scared of revealing the truth which resulted in bias. Mean duration of daily internet usage was found to be similar to that of Kim et al.<sup>[18]</sup> which was 2.1±1.4. Mean duration of internet use in years was 3.6±1.82 years.

Majority of the population (64%) were Problematic internet users. These findings were in contrast to an Indian study Iyer et al.<sup>[10]</sup> (24.6%) and International study Dalamaria et al.<sup>[17]</sup> (10.1%). This might be because there are various cultural differences and inconsistency in the internet access in various populations.<sup>[17]</sup> There is a significant increase of internet use compared to the times of earlier studies and this could be the reason for high problematic internet use. COVID 19 had made life sedentary with social seclusion and made social interaction virtually by internet. All the previous studies reported were pre covid times and this could be the one of the major factor for comparatively less internet use reported in their studies. Males were having higher rates of internet use when compared to females, though it was not statistically significant. This finding was similar to one Indian study Sahanapriya et al.<sup>[18]</sup> where there was no difference in internet addiction based on gender. There can be so many factors other than gender attributing to Problematic Internet Use. Many (80%) of the participants had aggression as in late adolescence. Hormonal influences, Neurophysiological changes and temperament could be the contributing factor in late adolescence for impulsive behaviour and aggression. Males showed higher levels of aggression than females. This might be because of the fact that males are more violent and aggressive when compared to females due to possible disparity between social roles and biological characteristics.<sup>[22,23]</sup> There was no statistical significance between gender and aggression in contrast to Kim et al.<sup>[20]</sup> where there was significant difference in gender for aggression. Statistically significant association was found between daily internet usage and Problematic internet use but not for internet use duration in years which was an unexpected finding.. This inconsistency might be because, pre occupation and compulsion with internet are important than internet use duration. There was an association found between daily internet usage, annual internet use and aggression.

There was good statistical correlation between Problematic internet use and aggression. Further more Problematic Internet Use predicts aggression. These results were similar to Haddad et al.<sup>[21]</sup> and Kim et al.<sup>[20]</sup> Many family factors including parental dispute and separation, Interpersonal relationship issues, temperament can result in Problematic internet use leading to aggression.

**Limitations:**

This was a cross-sectional study with voluntary participation because of which we failed to firmly establish causal relationship between Problematic internet use and aggression. As we used self-reported questionnaires in the study, bias could not be eliminated. As this study was done in two institutions of urban setting who were English speaking adolescents the results cannot be generalized. Furthermore, presence of ADHD, temperamental traits were not ruled out which might act as confounding factor.

**Strengths of the study:**

India has very few research studies on Problematic internet use and aggression. To the best of author's knowledge, this study is a novel one to determine the impact of Internet use on aggression among adolescents. We have used the assessment tools which have good validity and internet consistency and hence the results can be applied to local population.

**Future directions:**

Longitudinal study with a larger sample size would help to establish causal relationship and make the outcome better. To overcome the lacunae of our study, history regarding childhood psychiatric illnesses such as ADHD and temperament assessment can be done.

**CONCLUSION:**

This study establishes increasing trend of Problematic internet use among adolescents. There is a strong association between Problematic Internet use and aggression among adolescents. Furthermore, there is a need for clinicians to identify Problematic internet use to prevent the negative consequences in the community.

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#### Conflicts of interest:

There are no conflicts of interest.

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