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Impact of Internet Addiction Disorder on Cognitive Functions Among University Students

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ABSTRACT

Background: Today, internet addiction disorder (IAD) is a serious crisis for students, which is a tremendous challenge in their personal social lifestyle and academic performance. It is associated with various diseases, such as depression and anxiety, as well as psychosocial risk factors, such as aggressive behavior, impulsive behavior, social isolation, and cognitive functions (decision-making, time management, problem-solving). Cognitive functions associated with IAD.

Aim of the study: This study's main aim is to see the impact of internet addiction impact on cognitive functions in university students.

Methodology: The sample size of this study was 63 Central University students from Delhi, India.

Tools: Consent form, socio-demographic details, young internet addiction test, and Wisconsin Card Sorting Test were used to see the impact of IAD on cognitive functions.

Statistical method: Chi-square, one sample t-test was used for data.

Result: This study suggested that students with IAD are negatively associated with cognitive functions and have a negative impact on cognitive functions. the IAD means 45.60, WCST error M=73.76, perseverative response M=76.77, perseverative error M=83.65, non-perseverative M= 89.39, and conceptual level M=76.93. effect size was 2.53 to 4.70.

Conclusion: This study's primary aim is to see the association between IAD and cognitive functions (decision-making) that can make effective prevention strategies.

Keywords: Internet addiction disorder, Cognitive functions, Mental health, Neuropsychological problems

Abbreviation: IAD: Internet Addiction Disorder; WCST: Wisconsin Card Sorting Test

INTRODUCTION

Internet Addiction Disorder (IAD) is a global concern for our society. Internet extremely is being used by people in numerous forms, such as online shopping, online transaction, games, porn, and social media (Facebook, WhatsApp, Instagram). Excessive use of the internet leads to an internet addiction disorder. It is known as problematic internet use, and people tend to use the internet excessively. Using the internet is an unhealthy behavior pattern that directly impacts people's life functions in several domains over a prolonged period. They are spending more time despite family relationships and other social functioning, which leads to social isolation, online chatting with the opposite sex and friends, pornography, and gambling, which

easily threatens them. People with IAD may suffer from mental disorders, anxiety, depression as well as physical problems. Today, it is a huge concern for our society because IAD does not affect only people who are using the

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internet; it also affects other people, such as scams, pornography, gambling, and other illegal behavior, especially in youth. The prevalence found by Greenfield was about 6% among the general population, while Scherer found it to be 14% among the college-based population. The previous research also suggests that internet addiction disorder is found to be 78.7%, with a significantly higher prevalence seen among students in males compared to females [1]. Some study shows a 30-40% high risk of IAD. More than three billion people use the internet daily, and the most common people are youth. Today, internet addiction disorder is a serious behavior addiction disorder, especially for youth, which badly impacts life satisfaction and daily life functioning. It directly impacts academic performance and daily functioning. The relationship between today's generation and the internet is insuperable because of the availability of time, ease of availability, no extra responsibilities, and many friends. The IAD represents cognitive disturbances. Cognitive functions are the ability to regulate and organize one's own behavior and manifest as flexibility, decision-making, adaptation, and selection of information [2]. Excessive use of the Internet is commonly considered response inhibition, switching between tasks, impaired attention, and information processing. This is a huge challenge for youth, especially university students. The present study explores the IAD impact of IAD on cognitive functions among university students and also sees the problems of day-to-day life in it.

HYPOTHESIS (H₀)

There was no significant impact of internet addiction disorder on the cognitive functions of students with internet addiction.

OBJECTIVE

- The present study's aim was to see the impact of IAD on cognitive functions

- The present study's aim was to explore cognitive function components among students with Internet addiction disorder.

MATERIALS AND METHOD

The one-time assessment was conducted among university students between 18 and 30 years old in Delhi, India. A total of 148 samples were collected. Out of 148 students, 63 were addicted to the internet. The simple random sampling technique was used for data collection.

TOOLS DESCRIPTION

Socio-demographic and clinical data sheet: This data sheet will be developed for the present study by the researcher to obtain socio-demographic details of the participants. A brief clinical history concerning the onset of internet use, frequency of use, amount of use, abstinence period, treatment history, family history, and personal history will be assessed.

Young adult internet addiction disorder tests (Dr Kimberly Young): This scale was developed by Dr. Kimberly Young. It has 20 items that measure internet addiction behavior, including compulsivity, escapism, and dependency. Items also assess problems related to personal, occupational, and social functioning stemming from Internet use. Subjects respond to each statement with a number between 1 and 5, representing a Likert scale continuum, indicating the extent to which they endorse that particular behavior [3].

Wisconsin Card Sorting Test: The Wisconsin Card Sorting Test (WCST: Heaton, 1981) measures the ability to identify abstract categories and shift cognitive sets. Initially, several stimulus cards are presented to the participant. The shapes on the cards are different in color, quantity, and design. The person administering the test decides whether the cards are to be matched by color, design or quantity. The participant is then given a stack of additional cards and asked to match each to one of the stimulus cards for each. The participant is not told how to match the cards but is reassured whether a particular match is right or wrong. During the course of the test, the matching rules are changed, and the time taken for the participant to learn the new rules and the mistakes made during this learning process are analyzed to arrive at a score.

Table 1 shows socio-demographic details among students with IAD. Socio-demographics of central students have been taken based on characteristics: gender, education, marital status, residence, socio-economic status, family type, and religion. In the present study, a total of 63 data have been collected. Of these, 54.55% and females were 44.44% students with IAD. The data showed that males were using more Internet than females. Regarding marital status, 3.17% of students were married, and 96.82% were unmarried students with IAD. In education, 41.26% of students were undergraduate, 50.79% of students were under PG, and 7.93% of students were doing PhD who were internet addicted, which clearly showed that early age 18-24 years students were more affected by IAD. In terms of residence students with internet addiction, 19.04%% of students were from rural and 80.96% of students were from urban areas. In terms of socioeconomic status (SES), of students with an internet addiction disorder, 31.74% of students were low SES, 66.66% of students were from the middle class, in terms of family-type students with internet addiction, 15.87% of students were living in their joint family, 80.95.% of students were in their nuclear family, and 3.17% of students were in a broken family, in terms of religion, Hindu, 79.36% of students, Muslim, 15.87% of students, and 4.76% of students were Christian.

Table 1. Socio-demographic details of university students with IAD.

Variables		Group	Percentage
		Students with IAD; N=63	
Sex	Male	35	55.55%
	Female	28	44.44%
Marital Status	Married	2	3.17%
	Unmarried	61	96.82%
Education	UG	26	41.26%
	PG	32	50.79%
	Ph. D; PG and others	5	7.93%
Residence	Rural	12	19.04%
	Urban	51	80.95%
SES	Low status	20	31.74%
	Middle	42	66.66%
	High	1	1.58%
Family Type	Joint	10	15.87%
	Nuclear	51	80.95%
	Broken (separated)	2	3.17%
Religion	Hindu	50	79.36%
	Muslim	10	15.87%
	Sikh	-	-
	Christian	3	4.76%

RESULTS

Table 2 showed results of internet addiction severity on young adult addiction disorder test. The mean was found to be 46.25 and SD 12.96, which indicates that students with IAD have mild to moderate levels of addiction to the internet. It is also categorized into mild, moderate, and severe groups.

Table 2. Young Internet Addiction Disorder scale among university students with internet addiction.

| Variables	Groups		t-test value	df	p-value	Effect size
	Internet Addiction; N=63					Cohen's d
	Mean	SD				Point estimate
Internet addiction disorder scale	45.60	11.36	31.85	62	<.001	4.01

The significant found at <.001; Cohen's d 4.01 indicates a strong effect.

Table 3 showed that 44 (69.04%) had mild levels of IA, 17 (27.0%) students had moderate levels of IA, and 2 (3.2%) students had severe IA [1]. The t-test value was 31.85, which is significant on <.001, and the effect size was 4. 01, which revealed a strong difference between the sample and the population **(Graph 1)**.

Table 3. Classification of University students with IAD on the Young Internet Addiction disorder scale.

Internet addiction		Students with IAD; N=63
Category	**Score**	
Mild	30-49	44 (69.04%)
Moderate	50-79	17 (27.0%)
Severe	80-100	2 (3.2%)
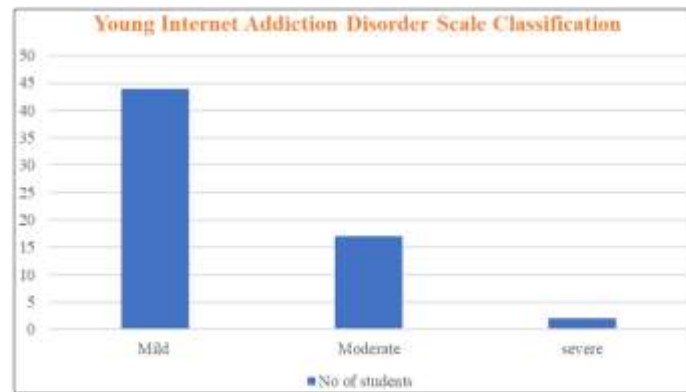
Graph 1. Young internet addiction disorder scale classification.

Table 4 shows results based on previous research on IAD associated with cognitive functions [4]. The result showed a significant impairment in cognitive functions of IAD among students with IAD. WCST was used to investigate executive functions (cognitive functions). It was seen that internet addiction has a relation with executive functioning students with IAD on WCST total error domain mean was 73.76 and SD was 13.45. The second domain was the perseverative response. The mean score was 76.10, and the SD score was 29.92, which indicates that students with IAD have task-switching and cognitive flexibility problems [5]. The third domain was perseverative error response. The mean score of students with IAD was 89.40, and SD was 32.45, indicating below-average cognitive functions. This domain measured repetition, rigidity thinking, and repeated behavior. In the fourth domain, the non-perseverative response mean was 89.40, and the SD was 21.755, which indicates that students with IAD are below the level of executive functions. It indicates students' attention and impulsivity. Other studies support this result, finding individuals with non-perseverative errors associated with cognitive control deficits that create impulsive behavior [6]. The fifth domain was the conceptual level. The mean score was 76.93, and SD was 16.15. Results showed that students with IAD have mild to moderate level of conceptual levels. This domain indicates students' understanding and insight.

Table 4. Cognitive Functions Impairment on WCST among university students with IAD.

| Variables emotional intelligence	Groups Students with IAD; N=63		t-test value	df	p-value	Effect size point estimation
	Mean	**SD**				
Total number of errors	73.76	9.02	28.82	62	<.001	3.587
Perseverative responses	76.77	30.04	20.10	62	<.001	2.53
Perseverative errors	83.65	32.55	20.39	62	<.001	2.57
Non-perseverative errors	89.39	21.84	32.48	62	<.001	4.09
Conceptual level	76.93	16.157	37.79	62	<.001	4.70

The significant level at<.001; The cognitive impairment was found at a significant level of cognitive impaired

Table 5 showed clinical classification of students with IAD on WCST score categories. The result found that 12.69% of students had below-average cognitive functions, 23.80% had mild levels, 38.09% had mild-moderate levels of cognitive deficits, 15.87% had moderate impairment, and 9.52% had moderate to severe cognitive impairment. The finding of another study suggests that IAD-associated cognitive functions. Li [7] found a negative correlation between IAT scores and the medial prefrontal cortex and dorsolateral prefrontal cortex. They suggested that this may be a decrease in cognitive control and self-control [8-10] **(Graph 2)**.

Table 5. Clinical Classification levels associated with WCST-64 T score.

WCST Categories	T score	S score	Students with IAD; N= 63	Percentage
Above average	55+	107+	0	0
Average	45-54	92-106	0	0
Below average	40-44	85-91	8	12.69%
Mild Impairment	35-39	77-84	15	23.80%
Mild to moderate Impairment	30-34	70-76	24	38.09%
Moderate Impairment	25-29	62-69	10	15.87%
Moderate to severe impairment	20-24	55-61	6	9.52%
Severe Impairment	Below 20	Below 55	0	0
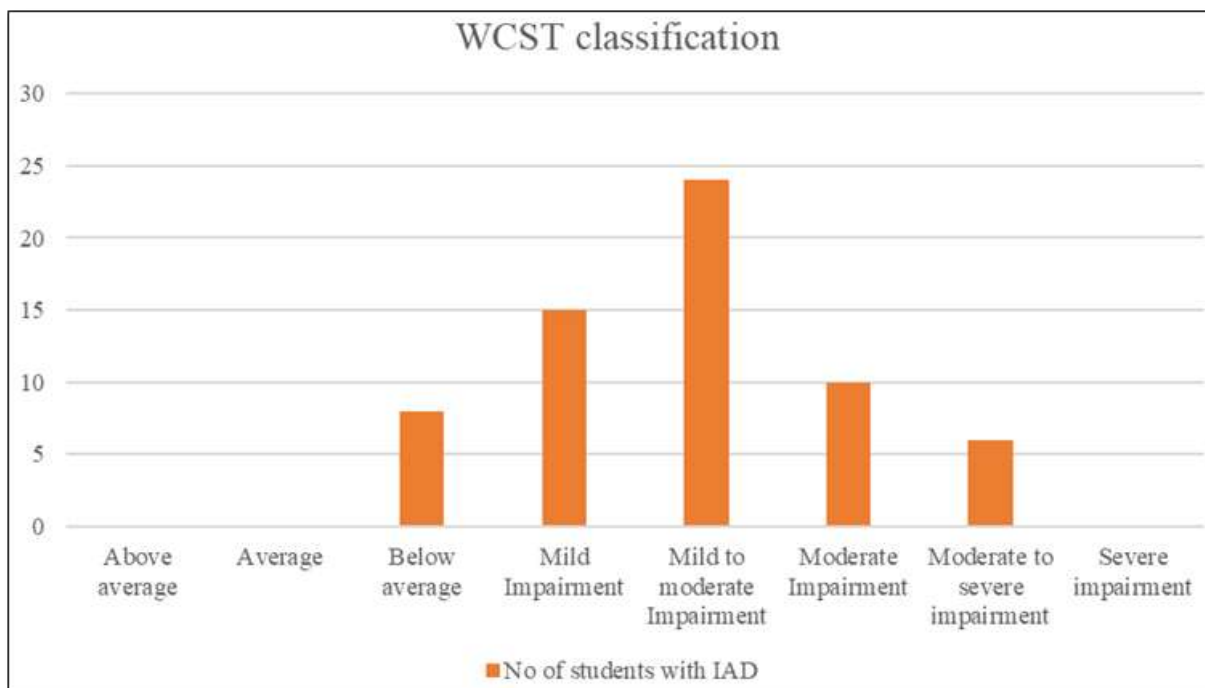
Graph 2. WCST classification.

DISCUSSION

Descriptive statistics were used to describe the basic features of the data collected in the study, which include summaries about the sample and measures- percentages, frequency distributions, and central tendencies that describe the data collected.

CONCLUSION

The present study sees the impact of IAD on cognitive functions among university students with IAD. This research concluded that IAD impacts on cognitive functions of university students. They suffer from impaired attention, rigid thinking, poor problem-solving, impulsive behavior, and poor cognitive control. Students with poor cognitive function face daily personal, social, psychological, and emotional challenges. This research contributes to students with IAD's understanding of cognitive function impairments and, due to impairment, what types of problems occur in their personal and social lives.

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