

# The Risk on Musculoskeletal System and Psychosocial Functions among Adolescents with Problematic Internet Use in Selected Schools of Udaipur District, Rajasthan, India

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## ABSTRACT

**Background:** The use of the Internet has brought a variety of convenience to our modern life. Nonetheless, the negative impact is also created by addictive behaviours to the Internet pervasively on one is academic and working performance, family life, social relationships, physical health, and psychological well-being.

**Aim:** The survey aimed to assess the level of Problematic Internet Use (PIU) and associated risk on the musculoskeletal system and psychosocial functions among adolescents.

**Setting:** The study was conducted in a selected school in Udaipur, Rajasthan, India.

**Method:** The study with a cross-sectional design was conducted on 100 subjects. The participants were selected using a non-probability, convenient sampling technique.

**Result:** The subjects had PIU ranging from mild to severe, with 100% subjects reporting moderate to severe musculoskeletal symptoms and mild to moderate psychosocial problems.

**Implications:** These findings will help the professionals to identify the physical and psychosocial problems in adolescents due to excess of internet use.

**Conclusion:** The result of this study also reinforces the fact of the harmful effects of extreme use of the Internet not only for physical and musculoskeletal but also for psychosocial well-beings.

**Keywords:** Problematic internet use; Adolescents; Musculoskeletal symptoms; Psychosocial problem

**Abbreviation:** PIU: Problematic Internet Use; MSS: Musculoskeletal Symptoms

## INTRODUCTION

The Internet is a fundamental part of modern society and provides a quick and easy way for communication, socialization, entertainment, information exchange, and education, regardless of time and place limitations. The Internet is playing a substantial role in our existence as a means of communication, information exchange, entertainment, and social interaction. It is simple, available, and affordable to all ages and socio-economical levels. The essential services that the Internet presents to the youth are email, chatting, discussion group, social recreation (games, songs, videos), shopping, and search for a kind of knowledge [1].

The rapid expansion of Communication over the Internet and its ability to change the way one could communicate and collect information has brought both positive and negative consequences. So the positive influence of Internet uses involve any information reaching very fast to any part of the world, individuals from worldwide could communicate without distinctions of nationality, race, gender, class; the variety of information is available on the Internet helps other fields' research effectively. On the negative side, one can access all kinds of information, including self-distraction, faulty socialization, risk-taking behaviours, loneliness [2-4].

Internet use has grown worldwide to nearly 2 billion users belonging to all age groups, and the trend is generally apparent

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among youth. The average age of first Internet use has progressively decreased to 8 years of age in several in the last two decades, and there has been a significant transformation regarding the use of new technologies [5].

There has been unpredictable growth of Internet usage globally, and it is likely to continue with its use as an integral component of everyday life [6]. According to a report published on 30<sup>th</sup> June 2014, the world's Internet user base was around 3 billion, of which approx. 1.4 billion users are from Asia. The prevalence of PIU among adolescents has been reported in both developed and developing countries, but the gravity varies. In developed countries the prevalence was found to be 1.5% in Greece, 1.6% in Finnish, 4% in the U.S., 3.7% in the U.K., 3.9% in Italy as well as the number is much higher in developing countries: 8% in China, 10.7% in South Korea, 8.5% in Jordan [7]. India, being one of the developing countries, has been confronting the unpredictable use of the Internet as well. Indians are the highest users in Asia.

The Internet has turned out to be a place of comfort for adolescents, a psychological way to relieve their misery, and entails getting rid of disturbed mood and stress or to play and exchange weird messages and jokes [8]. Adolescents are more susceptible than adults to the harmful effects of different kinds of addiction, such as drugs and internet addicts [9]. The problem of PIU is frequently observed in young people, i.e., the adolescents or millennial generation in the age group of 18-29 years. Furthermore, they are more vulnerable to internet addiction or PIU.

Internet is used by all segments of society, especially adolescents, who are the most frequent users and thus more vulnerable to PIU. Most of these are fascinated is due to their growth phase, and they have less ability to control their passion for Internet activities. Adolescence is also a period of the lifecycle when individuals are managing multiple and complex developmental tasks. These involve significant changes in biological, physical, social, psychological, emotional, and community-relatedness domains. It is also the most unpredictable and unstructured and the most mouldable phase in which they look for and experience different identities, social and emotional relationships, academic and working careers, and entertainment outlets. Also, the availability of the Internet on the mobiles and the computer/laptops makes them access the Internet very quickly; thus, there is a chance of PIU [10,11].

In the emerging era, adolescents have been exposed more than ever to the Internet. Psychiatrists say they receive more than five to six cases of psychological problems caused by the overuse of the Internet almost every day. The problems include a lack of attention or focus, difficulty in real-time processing information, anxiety, and mood swings. Apart from this; internet users have been linked with issues such as academic procrastination, a decrease in school performance, lack of sleep, psychiatric disorders, psychological issues, behavioural problems, psychological well-being, and interaction problems with peers [7].

Adverse consequences of spending on the Internet are linked to numerous health problems such as knuckles, pain, sleeplessness, outweigh, or underweight. Also, heavy users face long hours of social and family issues represented in the disorder of social relations, the development of seclusion, and social adaptation problems.

Despite growing recognition concerning the different activities and functions of digital technologies, there is still a lack of knowledge of how technology misuse could harm both physical and psychosocial well-being [12].

It brings up the concern of the parents and educators about the use of the internet by their adolescents, especially that many of them spend several hours using it with the absence of the direct control that may shield them from wrong and harmful sites. Therefore, therapists and educationalists cared for discussing the "healthy" and "unhealthy" use of the Internet.

While researchers have begun to explore the meaning and the consequences of excessive internet use in non-clinical populations of children and adolescents, some of the surveys probed the level of PIU and factors associated with PIU. Few studies evaluated the impacts of PIU on daily lives. The associations of PIU to socio-educational characteristics, demographic characteristics, and internet usage patterns and adolescents behaviours have also been assessed. However, there is still little consistent expertise on the topic, PIU, and its impact on Physical and Psychosocial problems in adolescence, so the researcher sensed the necessity to evaluate PIU and its impact on the two variables.

## AIM

This study also aimed to assess the effect of internet addiction on Musculoskeletal Symptoms (MSS) and the psychosocial problem of internet addiction among adolescents.

## Objectives of the study

- To assess the level of PIU, physical, and psychosocial problems among adolescents studying in selected high schools
- To find out the correlation between the PIU, physical, and Psychosocial problems among adolescents studying in selected high schools
- To find out the association between levels of I.A. among adolescents studying in selected high schools and their selected demographic variables

## Hypothesis

**H1:** There is a significant relation between problematic internet use of adolescents and musculoskeletal symptoms and psychosocial problems.

**H2:** There is a significant association of PIU with selected socio-demographic variables.

## METHODOLOGY

### Research design and approach

The research design used for the present study was a descriptive comparative cross-sectional survey design.

### Sampling technique and sample size calculation

One hundred subjects each were recruited from selected schools in Udaipur district, Rajasthan using a convenient sampling technique. Power analysis was done to calculate the sample size.

## Inclusion and exclusion criteria

The students were recruited according to pre-specified inclusion and exclusion criteria. Inclusion criteria specified that students who had mild to severe PIU, from grades 8<sup>th</sup>, 9<sup>th</sup>, and 11<sup>th</sup>, were willing to participate in this study, and whose parents signed the informed consent form were eligible for this study. Exclusion criteria were withdrawal from the study for any reason, suffering from any condition that impaired communication, such as physical illness or comorbid psychiatric illness.

## MEASURES

### Tool 1

#### Socio-demographic performance

To assess the socio-demographic characteristics of the study subjects. Socio-demographic performance was used to collect demographic characteristics of study subjects, and it consisted of items related to age, gender, religion, grade, residency, socio-economic status, no of siblings, type of family, relationship with parents, parenting style.

#### Internet usage pattern

Beginning age, source of internet access, place of internet access, the purpose of internet use, mostly used website, privacy, login status, time of the day when the internet is accessed, the average duration of access: daily and weekly.

### Tool 2

#### PIU questionnaire

It is a self-report, 18-items survey constructed; permission to use the tool from the author was obtained. The tool consists of 18 items with three domains: Obsession, neglect, and control disorder. The overall scoring for PIU was: 18-90, scoring for No PIU was  $\geq 18$ , for 18-36 Mild PIU, 36-54 for Moderate PIU, and a score of 55-90 for severe internet use.

#### Musculoskeletal symptoms questionnaire

The researcher developed ten items that were used to assess the discomfort caused in the musculoskeletal system due to excessive internet use. The scale was a 3-point rating scale, and the scoring was less than 10-Mild, 11-20 Moderate, 21-30 Severe.

#### Psychosocial problem scale

Consists of 25 items to assess the psychological and social distress among adolescents due to internet use. It is evaluated using a four-point Likert scale ranging from 1-4. Scoring and grading were done as follows: Mild Psychosocial problems: 25, Moderate Psychosocial problems: 26-50, Severe Psychosocial problems: 51-75, Extreme Psychosocial problems: 76-100.

## ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

The Institutional Ethics committee of Saveetha University approved the study. A permission letter to conduct the study was obtained from the Administrator of the School before the conduct of the study. Informed consent was obtained from parents after

explaining the study in brief, as the subjects were minor and from the subjects also to ensure the participation of the subject. It was additionally ensured to the subjects that participated in the study was voluntary. Confidentiality and privacy were also assured.

## PROCEDURE

In the initial phase of the study, after receiving permission from the administrative departments of the respective Principal, PTA for data collection, the researcher approached the participants directly during their class hours, explained the purpose and method of using the questionnaires, and also ensured the confidentiality of the data. One hundred subjects from the 8<sup>th</sup>, 9<sup>th</sup>, and 11<sup>th</sup> standards have been chosen using a convenient sampling technique. The subjects who met the inclusion criteria were recruited as the sample. Informed permission was taken from the participants as well as their parents. A paper-and-pencil survey was used that include sections of demographic data, internet use, internet addiction, psychosocial, musculoskeletal disorders. Overall, 20-30 minutes were needed to complete the whole questionnaire. Doubts, if any, were cleared. After completion, the questionnaire was collected back. Data was entered in excel, and Analysis was done using R software.

## PLAN FOR DATA ANALYSIS

Based on the objectives and hypothesis of the study, the following steps will be taken to analyze the data:

- Assessment of PIU will be analysed using descriptive statistics: frequency, percentage, Mean & standard deviation
- The correlation was calculated using Spearman's rho coefficient.
- Association between PIU and socio-demographic variables will be calculated using inferential statistics: Chi-square at 0.05 level of significance

## RESULTS

**Table 1** shows the frequency and percentage distribution of adolescents according to their socio-demographic characteristics. Adolescents belonged to the age group 13-18 years, with an equal no of males and females. Religion wise 64% of the subjects were Hindus, 26% Muslims, 10% Christians. Adolescents were from 8<sup>th</sup>, ninth (35% each), and 30% from 11<sup>th</sup> Grade, respectively. Seventy-six adolescents belonged to the Urban locality, 65% of the subjects hailed from the nuclear family, and half of the subjects (50%) had a monthly income of Rs. 30,000/-. Approximately half of the subjects (44%) had more than one sibling, and 76% of them described a good relationship with their parents, and 6% had reported frequent conflict. Fifty-two adolescents felt their parents were strict and 1% of the hundred reported their parents to be negligent. The highest 55% of the adolescents started using the Internet at the age of 10-12 yrs. 81% used laptops to access the Internet, with 91% accessing the Internet at home. 65% of adolescents accessed the Internet for entertainment purposes. Fifty-four subjects reported high privacy, 72 of the subjects reported continuous login status, and the highest 50 subjects preferred to access the Internet during evening hrs. Maximum subjects (30%) accessed the Internet for 2-3 hours daily and 40% between 14-28 hours every week (**Table 2**).

**Table 1:** Frequency and percentage distribution of adolescents with PIU according to the socio-demographic variable (N=100).

Variables		N	%
Age	13-15	50	50
	16-18	50	50
Gender	Male	50	50
	Female	50	50
Religion	Hindu	64	64
	Muslim	26	26
	Christian	10	10
Grade of study	8 <sup>th</sup>	35	35
	9 <sup>th</sup>	35	35
	11 <sup>th</sup>	30	30
Residency	Urban	76	76
	Rural	24	24
Type of family	Nuclear	65	65
	Joint	35	35
Family Income	>Rs. 30,000	50	50
	Rs. 20,000-30,000	27	27
	Rs. 15,000-20,000	13	13
	Rs. 10,000-15,000	10	10
Number of siblings	1	44	44
	2	23	23
	More than 2	33	33
Relationship with family	Good	71	71
	Problematic	23	23
	Frequent conflict	6	6
Parenting style	Strict	52	52
	Democratic	35	35
	Lenient	12	12
	Negligent	1	1

**Table 2:** Frequency and percentage distribution of adolescents with PIU according to internet usage pattern (N=100).

Variables		N	%
Beginning age of the Internet	Less than 10	37	37
	10-Dec	55	55
	Dec-14	8	8
Mostly used website	Google	38	38
	Yahoo	2	2
	Facebook	20	20
	YouTube	40	40
Device used	Desktop	7	7
	Laptop	81	81
	Tablet	5	5
	Smart Phone	7	7
Place of internet access	Own House	94	94
	Other Place	6	6
Purpose of the Internet used	Academic	35	35
	Entertainment	65	65
Privacy	Low	14	14
	Medium	32	32

Login status	High	54	54
	Continuous	72	72
	Intermittent	28	28
Preferred time of the day	Morning	12	12
	Evening	50	50
	Online throughout the day	10	10
The average duration of access Per day	Use when necessary	18	18
	>1 hr	15	15
	1-2 hrs	20	20
	2-3 hrs	35	35
	2-4 hrs	30	30
The average duration of access per week	≤ 4hr	35	35

It shows the degree and overall mean score of assessment of PIU, musculoskeletal symptoms, and psychosocial problem. PIU among adolescents varied from Normal to severe users. Seventeen of the adolescents reported no PIU, 60% had mild PIU, 22% had moderate PIU, and only 1% had severe problems. The mean score was found to be  $41.33 \pm 12.54$ . Only 16% of adolescents have been found to have a musculoskeletal symptom, whereas 84% had moderate musculoskeletal problems, with the overall mean score found to be  $17.13 \pm 3.31$ . Concerning psychosocial problems, the majority of 99% of adolescents had moderate psychosocial problems, and only 1% had mild psychosocial problems and the mean, SD found to be  $35.99 \pm 3.08$ . On assessing the correlation between PIU and musculoskeletal symptoms and psychosocial problems using Spearman's rho, no significant correlation was found between PIU and musculoskeletal symptoms (Correlation Coefficient(rs)=0.0317, Table Value (p)=0.776) and psychosocial behaviors (Correlation Coefficient (rs)=0.018, Table Vale (p)=0.8691). Based on the results, it can be inferred that with an increase in PIU, the musculoskeletal symptoms also increase. However, with an increase in PIU, a significant decrease in psychosocial problems. It can be with the use of excess Internet; the adolescent may find relief in his mood and find an upturn in his social problems. (Table 3). On associating selected socio-demographic variables with PIU a significant association was reported between PIU and family income (Chi sq-0.017, p<0.05) and parenting style (Chi-sq 0.043, p<0.05) (Table 4).

**Table 3:** Assessment of the level of Problematic Internet Usage (PIU), musculoskeletal symptoms and psychosocial problem among adolescents with PIU (N=100).

Variables	Level	Range of Score	N	%
Problematic Internet use	No	>30	17	17
	Mild	31-49	60	60
	Moderate	50-79	22	22
	Severe	<80	1	1
Musculoskeletal symptoms	Mild	>10	0	0
	Moderate	Nov-20	84	84
	Severe	21-30	16	16

Psychosocial Problems	Mild	>25	1	1
	Moderate	26-50	99	99
	Severe	51-75	0	0
	Extreme	76-100	0	0

**Table 4:** Mean Score of Problematic Internet Usage (PIU), musculoskeletal symptoms and psychosocial problem among the adolescent with PIU (N=100).

Variables	Mean	SD	Correlation coefficient
Problematic Internet use	41.33	12.54	rs=0.0317, (p =0.776)
Musculoskeletal Symptoms	17.13	3.31	
Psychosocial Problem	35.99	3.08	(rs)=0.018, (p)=0.8691

## DISCUSSION

A cross-sectional study was conducted in the selected school of Udaipur dist. Rajasthan, North India, to assess the relationship between PIU and risk of musculoskeletal pain and psychosocial problems. Overall, 22% of adolescents reported moderate PIU and 1% severe PIU, and the overall prevalence of 23% was similar or slightly higher than those reported in previous literature [13-15]. In relation with the psychosocial problem, the present study is supporting the previous studies in which PIU is related with the psychological problem [16] as well as psychological well-being [17].

At Present, the relationship between excessive use of the Internet and an increase in the risk of musculoskeletal pain is widely accepted [18-22]. Because the current study confirmed previous findings on PIU status and the use of the Internet and smartphones [23,13]. We conclude that PIU is significantly related to an increased risk of musculoskeletal pain among adolescents. The possible explanation may be associated with poor postural habits leading to strain on muscles, tendons, and disks, which may further lead to aggravating pain in the regions of the neck, shoulder, elbow, and wrist.

## STRENGTH AND LIMITATIONS

The strength of the study was the use of the widely used tool to measure PIU, and the limitation of the study was: the cross-sectional nature of the study does not allow drawing conclusions about causal relationships. Secondly, a chance of response bias was there as questions were self-reported.

### Future research

To identify the causative link between PIU, MSS with cohort or interventional studies.

### Nursing implications

- Screen any patient complaining of back or musculoskeletal pain for excessive internet use
- Play an important role in parental guidance regarding the limitation of time their adolescent can spend online for leisure activities

- Furthermore, advising parents to limit the number of devices used to connect to the internet

## CONCLUSION

Our results confirm that problematic internet users more often report health problems, even after monitoring for confounding factors. Among those, problems related to musculoskeletal disorder is the most strongly associated and seems to influence the other ones.

## DATA AVAILABILITY

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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