

ORIGINAL ARTICLE

## ADOLESCENTS SLEEP QUALITY AND INTERNET ADDICTION

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### ABSTRACT

**Aim:** To determine the prevalence of internet addiction and its effect on the quality of sleep amongst Indian adolescents.

**Methods and Material:** A population of 450 adolescent students aged between 9-18 yrs were randomly selected from urban schools of Lucknow for a cross sectional survey. Internet Addiction Test (IAT) was applied to know the internet addiction. Sleep quality was assessed by using Pittsburgh Sleep Quality In-dex (PSQI).

**Results:** Out of 450 children, internet usage was seen in 351 (78%) students. Male : female ratio was 252:198. Mild, moderate and severe addicts were 124 (53.31%), 102 (43.77%) and 7 (3%) respectively. Disturbed sleep was found in 127 (36.18%) and 58 (16.80%) students whose global PSQI score was 5 and >5 respectively. Overall 172 (73.81%) children with internet addiction faced bad quality of sleep. Trouble in sleep, bad dreams, took medicine for sleep and low enthusiasm to get things done was reported by 180 (96.77%), 137 (73.65%), 33 (17.74%) and 63 (33.87%) students respectively. Total 193 (82.83%) students used the screen after going to bed.

**Conclusion:** Severe internet addiction is not common in Indian adolescents. Bad quality of sleep was seen in most children with internet addiction. There is high nighttime internet use by adolescents which may cause a state of high arousal and interfere with the soothing process of sleep.

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### Introduction

The initial idea of the internet was credited to Leonard Kleinrock on May 31, 1961.<sup>1</sup> There is a growing body of literature on internet-related problems, including Internet Addiction (IA). The term "internet addiction" was proposed by Goldberg et al in 1996 for pathological compulsive internet use.<sup>2</sup> No standardized definition has been provided despite that the phenomenon has received extensive public and scholar recognition.<sup>3,4</sup> In 1998, Kandell et al defined internet addiction as "a psychological dependence on the internet, regardless of the type of activity once logged on."<sup>5</sup> Griffiths et al (1998) conceived internet addiction as a subtype of broader technology addiction, and also a subtype of behavioral addictions.<sup>6</sup> Over the last couple of years, internet addiction has become a global concern to the public and can be classified as a health issue. There is even a proposal to include internet addiction in the

next revision of the Diagnostic and Statistical Manual of Mental Disorder.<sup>7</sup> Most teenagers today have never lived in a world without the internet. They are often more tech-savvy than adults and they embrace new technology that develops. This interest in the internet and technology can evolve into an obsession. Teenagers are known for extremes in moods and behaviors, but extreme internet use can cause everyday living to take a back seat to online time. The technology is a double-edged sword. Internet addiction disorder may bring some pathological problems to the addicts in some ways or other.<sup>8</sup>

Sound sleep is a core component of pink health. Good sleep is commonly associated with good health and a sense of well-being. Sleep is well known to be easily disturbed by mood and psychological state. Sleep is clearly disturbed by anxiety.<sup>9</sup> Sleep architecture refers to the pattern of sleep cycles that one completes in a night's time. Sleep is prompted by natural cycles of brain activity and consists of two basic states: rapid eye movement (REM) sleep and non-rapid eye movement sleep, which consists of stages 1 through 4. Each cycle lasts about 90 minutes. When these cycles are completed several times in a night, it makes a good night's sleep. The quantity and quality of sleep is measured with polysomnographic recordings. At least

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three major processes are involved in the regulation of normal sleep. According to the Two-Process-Model of sleep regulation, sleep and wakefulness are influenced by both a homeostatic and a circadian process. Anything that interrupts the pattern will decrease the quality of sleep.<sup>10</sup>

Literature suggests that excessive use of internet affects negatively on adolescent's health in many ways including sleep disturbances.<sup>11,12,13,14,15</sup> Sleep disturbances were defined according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, and assessed 5 domains: difficulty initiating sleep (DIS), difficulty maintaining sleep, early morning awakening, nonrestorative sleep, and daytime functional impairment resulting from poor sleep quality.<sup>16</sup>

This study was undertaken to determine the prevalence of internet addiction and its effect on the quality of sleep amongst Indian adolescents.

**Methods & Materials**

A population of 450 adolescent students aged between 9-18 years were randomly selected from urban schools of Lucknow after taking permission for a cross sectional survey and after institutional ethics committee approval. Internet Addiction Test (IAT) developed by Kimberly Young was applied to know the Internet addiction.<sup>17</sup> The IAT views internet addiction as an impulse-control disorder and the term inter-net refers to all types of online activity. As per the 5-point IAT, the internet addiction is divided into mild, moderate, and severe addicts. Mild-score 3-frequently, Moderate-score 4-often, Severe-score 5-always.<sup>18</sup>

Sleep quality was assessed by using Pittsburgh Sleep Quality Index (PSQI). Sleep habits were explored during the past one-month period. The completion of PSQI proforma was done between 5 to 10 minutes.<sup>19,20</sup> in

the presence of a pediatrician and psychologist. A Global PSQI score of 5 or more than 5 indicates the bad quality of sleep. Before the process of assessment, interrogator tried to develop a confident and faithful relationship with the student. The process was done in a non-play situation.

**Statistical analysis:** Data was entered in Microsoft Office Excel 2007 and analysis done using SPSS (version 16) windows. inferential statistical method used for calculating percentages at various value. P value <0.05 was taken as significant.

**Observations**

Out of 450 children, internet usage was seen in 351 (78%) students of which 71 (20.22%) were in age group of 9-12 years, 117 (33.33%) were between 12-15 years and 163 (46.43%) were between 15-18 years. Male : female ratio was 252:198. Internet addiction was found in 233 (66.38%) students. Mild, moderate and severe addiction was seen in 124 (53.31%), 102 (43.77%) and 7 (3%) respectively. Table 1 depicts severity of internet addiction in different age groups and gender. Total 193 (82.83%) students used the screen after going to bed. Total 202 (86.69%) students responded to the screen at night time. The manner in which they respond is depicted in table 2. Disturbed sleep was found in 127 (36.18%) and 59 (16.80%) students with internet addiction as compared to 14 (3.98%) and none children without internet addition where global PSQI score was 5 and >5 respectively (p=0.0018) (Table 3). Sleep was not affected in 104 (96.6%) children without internet addiction as compared to 61 (26.18%) children with internet addiction. Global PSQI score in children with different type of internet addiction is depicted in table 3. Trouble in sleep, bad dreams, took medicine for sleep and low enthusiasm to get things done was reported by 180 (96.77%), 137 (73.65%), 33 (17.74%), and 63 (33.87%) students respectively (table 4).

**Table 1.** Severity of internet addiction in different age groups and gender

	<b>Mild addic- tion(n=124)</b>	<b>Moderate addic- tion(n=102)</b>	<b>Severe Addic- tion(n=7)</b>
<b>Age group</b>			
9-12 years	20 (8.58%)	20 (8.58%)	Nil
12-15 years	43 (18.45%)	32 (13.73%)	3 (1.28%)
15-18 years	61 (26.18%)	50 (21.45%)	4 (1.71%)
<b>Gender</b>			
<b>Male (n= 207)</b>			
9-12 years	12 (5.79%)	10 (4.83%)	Nil
12-15 years	27 (13.04%)	19 (9.17%)	1 (0.48%)
15-18 years	36 (17.39%)	27 (13.04%)	2 (0.96%)
<b>Female (n=144)</b>			
9-12 years	8 (5.55%)	10 (6.94%)	Nil
12-15 years	25 (17.36%)	13 (9.02%)	2 (1.38%)
15-18 years	16 (11.11%)	23 (15.97%)	2 (1.38%)
<b>Use screen after going to bed</b>			
9-12 years	31 (13.30%)		
12-15 years	69 (29.61%)		
15-18 years	102 (43.77%)		

**Table 2.** Response to the screen after bedtime

Age	No response	Response to the screen				Total
		Chat	Academic	Shopping	Others	
9-12 yrs	9	27	4	0	0	31 (13.30%)
12-15 yrs	9	54	6	3	6	69 (29.61%)
15-18 yrs	13	81	8	5	8	102 (43.77%)
	31 (13.30%)	162 (69.52%)	18 (7.72%)	8 (3.43%)	14 (6%)	

**Table 3.** Global PSQI Score of Internet Users N=351.

S No	Score	Normal Internet Users (Rarely & occasionally) n=118	Severity of Internet Addiction			
			Mild n=124	Moderate n=102	Severe n=7	Total
1	<5	104	45	16	-	165 (47%)
5	14	54	61	49	3	127 (36.18%)
3	>5	-	18	37	4	59 (16.80%)
			124 (53.21%)	102 (43.77%)	7 (3.0%)	
		<b>118</b>	<b>Total. 233</b>			<b>351</b>

**Table 4.** Main Sleep disturbance Factors

S No	Factors	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)	Total 1+2+3
1	During the past month, how often have you had trouble sleeping be-cause you Cannot get to sleep within 30 minutes	6	39	96	45	180 (96.77%)
2	Have bad dreams	49	63	56	18	137 (73.65%)
3	During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?	153	20	9	4	33 (17.74%)
4	During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?	123	34	24	5	63 (33.87%)
5	During the past month, how would you rate your sleep quality overall? n=186	Very good (0) 26	Fairly good (1) 117	Fairly bad (2) 39	Very bad (3) 4	

## Discussion

In our study the prevalence of internet users was found to be 78% which is lower than Europe (85.2%) and higher than Africa (36.1%), Australia (68.9%) and Middle East (64.5%). The age group using internet the most confirms the previous reports.<sup>21,22</sup> The enhancement in penetration is because of its easily available to all. The International Telecommunication Union reports broadband is currently affordable in 111 countries, with a basic fixed or mobile plan costing less than 5% of Gross National Income (GNI) per capita.<sup>23,24</sup> India consists 481 million internet users in December 2017. Among them youngsters (46% urban and 57% rural) below the age of 25 yrs are predominant.<sup>25</sup> In our study maximum users are aged 15-18 years with male predominance confirming the previous reports.

According to the family technology education non-profit group, teens are spending more than one-third of their days using media - nearly nine hours on average.<sup>26</sup> Estimates posit that over 210 million people worldwide suffer from Internet and social media addiction.<sup>27</sup> The prevalence of internet addiction among high school students was 3.9% in an Italian study. Males were more likely to be classified as addicted to the internet compared to females.<sup>28</sup> In present study 53.31%, 43.77% and 3% had mild, moderate, and severe internet addiction, respectively. When compared to Finnish teens who suffer 24% severe addiction and 61% moderate addition, Indian teens were not affected much with severe form of addiction.<sup>29</sup> Our data coincides with the Italian data.<sup>28</sup> Moderate addiction is seen in 74.1% and severe addiction in 2% Iranian teens, which also almost same as our study.<sup>30</sup>

Our findings also show that the problem has reached up to such extent that it is a significant public health concern which often has negative health consequences.<sup>31</sup>

Addiction occurs when the brain recognizes substances or behaviors that create pleasure by releasing dopamine, a chemical that passes information from one neuron to the next signals, that the brain associates with anticipation of a reward. Being repeatedly exposed to the substance or behavior can make a person want more. Eventually, the person builds up tolerance, needing more of the substance or activity to feel the pleasurable effect.<sup>32</sup> In our study maximum students aged 15-18 years (81) started chatting while they were at sleep, followed by 12-15 years (54) which proves what Larry Rosen believed. He believed technology can affect the brain. With addiction, the brain releases, besides dopamine, the mood-affecting neurotransmitter serotonin. With anxiety, the brain releases hormones that react to stress by producing a surge of energy and heightened mental focus. People can feel compelled to do an activity, such as check Facebook and other social sites to reduce their anxiety.<sup>33</sup>

In our study there was significant relationship between internet addiction and bad quality of sleep. Lung Chen et al also reported increased incidence of bad quality sleep and sleep disorders among internet addicts than normal internet users.<sup>34</sup> Trouble in sleep, bad dreams, took medicine for sleep and low enthusiasm to get

things done were seen in our study respectively which confirms the finding of different researchers.<sup>35</sup> In our study 82.83% used screen in bed after going to sleep. The immature mental and emotional acumen of adolescents push them to respond the screen interaction immediately. They are highly inclined towards the virtual friends. That may be the result of their loneliness. This is a vicious cycle of IA and loneliness.<sup>36</sup> The exposure to blue light emitted from the screens delays melatonin production and disrupt the sleep-wake cycle. Poor quality of sleep also results in growth deprivation because on growth hormone secretion. As per one psychophysical mechanism, the nighttime computer use causes a state of high arousal, therefore, interfering with the soothing procedures that are essential for sleep clarifies the negative influence of IA on sleeping habits.<sup>37</sup>

## Conclusion

Over the last couple of years, internet addiction has become a global public health concern. Teenagers are known for extremes in moods and behaviors, but extreme internet use can cause everyday living to take a back seat to online time. Literature suggests that excessive use of internet affects negatively on adolescent health in many ways including sleep disturbances. Our study confirms the findings of previous researchers. Thus, this is high time to intercept the negative attitude of our adolescents towards internet use by periodic screening at school level and a "student guidebook for healthy internet use" may perhaps be more meaningful to revert the damaging equation.

## Compliance with Ethical Standards

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**Conflict of Interest:** None

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