Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 4s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Internet Addiction Among Collegiates and Its Impact on Sleep Quality, Stress and Physical Activity: A Cross-Sectional Study

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Cite this paper as: Vinika Siwach, Pooja Bhati, M. Ejaz Hussain, (2025) Impact of Thyroid Hormone Receptor alpha Expression and PD-L1 on Progression-Free Survival of NSCLC Patients Treated with Pembrolizumab Immunotherapy. *Journal of Neonatal Surgery*, 14 (4s), 782-788.

ABSTRACT

Background: Internet usage has been rapidly increasing among the collegiate population and its prevalence rate is around 37% among Indian collegiate students. Its negative impacts are evident in university students' numerous health-related areas. Thus, the purpose of this study is to determine how internet addiction affects sleep, stress levels, and physical activity levels in collegiates.

Method: A total of 118 students, both male and female, between the ages of 18 and 26, participated in this cross-sectional study. They were divided into three groups according to their scores on the Young's Internet Addiction Test (YIAT): Group A- no internet addiction, Group B- mild internet addiction, Group C- moderate to severe internet addiction. The Pittsburgh Sleep Quality Index (PSQI), the Perceived Stress Scale (PSS), and the International Physical Activity Questionnaire (IPAQ-SV) were used to measure the participants' sleep quality and levels of stress and physical activity.

Result: The findings showed that, of the 118 participants, 33.89% (40) had moderate to severe online addiction, whereas 27.96% (33) had mild internet addiction. When comparing moderate to severe internet users to those without internet addiction, significant differences were found in their levels of stress, physical activity, and sleep quality. Furthermore, a significant positive correlation was found between PSQI and PSS score whereas negative correlation between IPAQ with internet addiction score.

Conclusion: Internet addiction is associated with poor sleep quality, increased stress level as well as reduces physical activity among the collegiates.

Keywords: *Internet addiction, sleep, stress, physical activity*

1. INTRODUCTION

In today's world, the use of internet has dramatically increased in the recent years, and the ubiquity of the internet has made internet addiction a pervasive and complex issue affecting larger population worldwide [1]. Internet addiction, often referred to as problematic or compulsive internet use, is a behavioural disorder that affects individuals across diverse age groups, cultures, and backgrounds [2]. Globally, more than three billion people use the internet daily with young people being the most common users [3-5]. Research published in January 2021 estimated that 4.66 billion people, or 59.5% of the world's population, regularly use the internet [6]. India is one of the leading countries for the maximum number of internet users with prevalence rate of internet addiction around 58.34% among adults indicating a higher prevalence compared to western countries [7]. Internet addiction has been linked to a range of negative consequences, including poor sleep quality, increased stress, anxiety, depression and self-esteem [8]. Based on the aforementioned results, we hypothesize that IA may be a significant concern for college students, and it is crucial to investigate its relationships with stress, physical activity, and sleep quality in order to take the necessary action to address this problem. Their academics may be compromised affecting their long-term professional aspirations, and society as a whole may suffer greatly as a result of this addiction. Therefore,

the purpose of this study was to evaluate the relationships between internet addiction and stress, physical activity, and sleep quality among college students at SGT University in Gurugram.

2. MATERIALS AND METHODS

This study was conducted from May- December 2024 in various disciplines of SGT University, Gurugram, Haryana, India. This cross-sectional study was done after receiving approval from the Institute Research and Ethics Committee [SGTU/FPHY/2022/437]. Study included 118 young adults (both males and females) aged 18–26 years of various courses at the SGT University based on the convenient sampling technique. Participants were included in the study after obtaining their written informed consent.

Assessment of Internet addiction

The Internet Addiction Test (InAT; Young, 1998) was used to measures internet use using a 20 item self-report questionnaire that measures mild, moderate and severe levels of Internet Addiction [9]. The 20-item questionnaire measures characteristics and behaviors associated with compulsive use of the Internet that include compulsivity, escapism, and dependency. Questions also assess problems related to addictive use in personal, occupational, and social functioning. Questions are randomized and each statement is weighted along a Likert-scale continuum that ranges from 0 = less extreme behaviour to 5 = most extreme behaviour for each item. The criteria used to develop the IAS were based on the seven Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM–IV; American Psychiatric Association, 1994) substance dependence criteria and two additional criteria (i.e., salience and mood modification) recommended by Griffiths (1996) [10]. The maximum score is 100 points. The IAT total score ranges, with the higher the score representing the higher level of severity of Internet addiction. Total scores that range from 0 to 30 points are considered to reflect a normal level of Internet usage; scores of 31 to 49 indicate the presence of a mild level of Internet addiction; 50 to 79 reflect the presence of a moderate level; and scores of 80 to 100 indicate a severe dependence upon the Internet [11].

Assessment of quality of sleep

The subjects' sleep quality over the past month was assessed using the Pittsburgh Sleep Quality Index (PSQI), which assessed sleep in the following seven components: 1. subjective sleep quality, 2. sleep latency, 3. sleep duration, 4. sleep efficiency, 5. sleep disturbance, 6. use of sleep medications, and 7. daytime dysfunction. Each component score has a value of "0" (no difficulty) to "3" (severe difficulty), and a global score was calculated by adding all seven component scores [12].

Assessment of Stress

The Perceived Stress scale (PSS)-10 contains ten items. Each item is a statement that participants rate based on their feelings and experiences over the past month. The PSS includes various statements reflecting common stress-related experiences. These items are designed to capture various aspects of perceived stress, from feelings of being overwhelmed to feelings of confidence in coping

abilities. After scoring all items, the total PSS score is calculated by summing the individual item scores. The PSS-10 total score can range from 0 to 40, with a higher score indicating higher perceived stress [13].

Assessment of physical activity level

The physical activity level of the subjects over the "last 7-day" period was assessed using the International Physical Activity Questionnaire (IPAQ)-short version. The metabolic equivalent of tasks (MET) was calculated. It is a 7 item self-rated scale which measures the frequency and duration of vigorous physical activities, moderate physical activities, walking and sedentary behaviour. A minimum of 1500 MET minutes a week are categorised as high, 600 MET minutes a week as moderate and if the subject is not meeting any of these criteria, then he/she is categorised as having low physical activity [14-16].

Statistical Analysis

The statistical analysis for the data was done using SPSS version 21. The participants were categorized into three based on Internet Addiction Test score: no internet addiction (IAT score > 30), Mild internet addiction (IAT score 31-49) and moderate to severe internet addiction (IAT score <50) according to descriptive statistics of demographic variables. Shapiro-Wilk test of Normality was used for normal distribution of data. As data was not normally distributed Kruskal Wallis was used to analyse the significance of difference in demographic data, PSQI total score, PSS, IPAQ based on internet addiction score among the three categories. Post hoc was analysed using Dunn's Test after significance was determined on Kruskal Wallis. The Spearman's Correlation was applied for determining factors related to internet addiction. The *p*-value was considered significant at the level of 0.05.

3. RESULT

A total of 118 subjects were included in the study who were further categorised into three i.e., no internet addicts (45), mild internet addicts (33) and moderate to severe internet addicts (40) with a mean age of 21.9, 21.6 and 20.6 years respectively.

Demographic details of the participants are given in Table 1.

Table 1. Demographic details of the participants

		Group A n= 45 (Mean± SD)	**Group B** n= 33 (Mean± SD)	**Group C** n= 40 (Mean± SD)	***p* value**
Age (years)		21.9 ±2.54	21.6± 2.54	20.6 ±2.26	0.03*
Gender %(n)	Male	18	9	19	0.13
	Female	27	24	21	
Gadget use per day % (n)	<5 hours	66.7% (30)	51.5% (17)	47.5% (19)	0.17
	≥5 hours	33.3% (15)	48.5% (16)	52.5% (21)	
Internet usage per day %(n)	0-2hours	11.1% (5)	9.1% (3)	12.5% (5)	0.73
	2-4 hours	42.2% (19)	42.4% (14)	30% (12)	
	>4 hours	44.4% (20)	48.5% (16)	57.5% (23)	
Educational status %(n)	UG	53.3% (24)	60.6% (20)	85% (34)	0.006*
	PG	46.7% (21)	39.4% (13)	15% (6)	
Internet Addiction Test (IAT) score		22± 6.81	38.4± 5.57	61.6± 7.37	<0.001*

*: Statistical significance at the level of $p<0.05$, UG: Undergraduates, PG: Postgraduates, Group A: No Internet Addiction, Group B: Mild Internet Addiction, Group C: Moderate to severe Internet Addiction

The mean age significantly differed among the groups ($p = 0.03$), with participants in the moderate to severe addiction group being younger (20.6 ± 2.26 years) compared to those in the no addiction (21.9 ± 2.54 years) and mild addiction groups (21.6 ± 2.54 years. The proportion of daily gadget use ≥5 hours increased with the severity of internet addiction, ranging from 33.3% in the no addiction group to 52.5% in the moderate to severe group. Similarly, daily internet usage >4 hours was most common among participants with moderate to severe addiction (57.5%), compared to those with mild (48.5%) and no addiction (44.4%). A statistically significant difference was found in educational status across the groups. A notably higher proportion of undergraduates were in the moderate to severe addiction group (85%) compared to the no addiction group (53.3%) and the mild addiction group (60.6%).

The impact of internet addiction on sleep quality, perceived stress, and physical activity has shown in Table 2. A significant difference in sleep was observed across the three groups. The mean PSQI score was lowest in the no internet addiction group (5.3 ± 2.96) and progressively higher in the mild (6.8 ± 2.84) and moderate to severe internet addiction groups (7.9 ± 4.15), indicating poorer sleep quality among those with higher levels of internet addiction. There was also a statistically significant difference in perceived stress levels across the groups ($p = 0.007$). The Perceived Stress Scale (PSS) scores increased with the severity of internet addiction: 17.9 ± 7.12 for no addiction, 21.3 ± 5.27 for mild addiction, and 22.3 ± 7.49 for moderate to severe addiction, suggesting greater stress among more addicted individuals. Analysis of physical activity levels revealed a significant decrease with increasing severity of internet addiction ($p = 0.04$). Participants with no addiction had the highest physical activity levels (3368.87 ± 3027.86 MET-min/week), followed by those with mild (2364.6 ± 2194.73) and moderate to severe internet addiction (1818.40 ± 1694.80).

Table 2. Sleep, Stress and Physical activity of groups according to their internet addiction levels.

	Group A (Mean± SD)	**Group B** (Mean± SD)	**Group C** (Mean± SD)	***p*-value**
PSQI (score)	5.3± 2.96	6.8± 2.84	7.9± 4.15	0.01*

PSS (score)	17.9± 7.12	21.3± 5.27	22.3± 7.49	0.007*
IPAQ (METs)	3368.87± 3027.86	2364.6± 2194.73	1818.40± 1694.80	0.04*
*: Statistical significance at the level of $p<0.05$, PSQI: Pittsburgh Sleep Quality index, PSS: Perceived Stress Scale, IPAQ: International physical activity questionnaire				

Table 3: Post hoc: Groupwise comparison of Sleep, Stress and Physical activity according to their internet addiction levels.

	PSQI	PSS	IPAQ
Group A vs Group B	0.09	0.04*	0.73
Group A vs Group C	0.01*	0.01*	0.03*
Group B vs Group C	1.00	1.00	0.68
*: Statistical significance at the level of $p<0.05$, PSQI: Pittsburgh Sleep Quality index, PSS: Perceived Stress Scale, IPAQ: International physical activity questionnaire			

To further examine the relationships of internet addiction with sleep quality, stress and physical activity it was found that a significant positive correlation was found between Internet Addiction Test (IAT) scores and Pittsburgh Sleep Quality Index (PSQI) scores ($\rho = +0.38$, $p < 0.01$) and a moderate positive correlation was observed between IAT scores and Perceived Stress Scale (PSS) scores ($\rho = +0.34$, $p < 0.01$), conversely, IAT scores were negatively correlated with physical activity levels (MET-minutes/week) as measured by IPAQ ($\rho = –0.29$, $p < 0.05$) which are listed in Table 4.

Table 4: Parameters correlated with IAT scores

	Internet Addiction Test (IAT) score
Age	r = -0.23
	p= 0.01*
Gender	r = -0.13
	p= 0.15
Gadget use per day	r = 0.21
	p= 0.02*
Educational status	r = -0.28
	p= 0.02*
Pittsburgh Sleep Quality index (PSQI)	r = 0.25
	p= 0.006*
Perceived Stress Scale (PSS)	r = 0.24
	p= 0.007*
International physical activity questionnaire-IPAQ (MET)	r = -0.23
	p= 0.01*

4. DISCUSSION

The present cross-sectional study was conducted to evaluate the relationships between internet addiction (IA) and its impact on sleep quality, perceived stress, and physical activity among college students at SGT University, Gurugram. In line with our hypothesis, the findings indicate that internet addiction is a significant concern among college students, with meaningful associations observed across all three health domains—sleep, stress, and physical activity.

The analysis revealed that sleep quality worsened with increasing levels of internet addiction, as evidenced by significantly higher PSQI scores among students with moderate to severe IA compared to those with no addiction. These findings align with those of Alimoradi et al. (2019), who reported in their systematic review that problematic internet use is consistently linked to poor sleep hygiene and delayed sleep onset in young adults [17]. The potential mechanisms may include prolonged screen exposure before bedtime, blue light suppression of melatonin, and psychological arousal related to online engagement. A similar association between internet addiction and impaired sleep was also found by Ekinci Ö, Çelik T, Savaş N, et al. suggested that using the internet at night may directly replace bedtime [18].

Perceived stress, as measured by the PSS, was significantly higher among students with mild and moderate to severe IA compared to those with no addiction. This is consistent with findings by Samaha and Hawi (2016), who demonstrated that excessive internet use not only contributes to academic burnout but also impairs emotional regulation, thereby increasing psychological stress [20]. These outcomes may be attributed to the displacement of healthy coping mechanisms and face-to-face interactions by excessive digital engagement [8,19].

A significant decline in physical activity was observed with increasing IA levels, particularly between the no addiction and moderate to severe addiction groups, with a negative correlation between IAT scores and MET values from the IPAQ. These findings suggest that as internet use becomes excessive, it may displace time allocated for physical activity, echoing previous reports such as that by Kim et al. (2015), who found that adolescents with higher screen time were less likely to meet physical activity guidelines [20]. Also result is in line with the results of Park S, who found a direct association between physical activity and higher sleep satisfaction and inverse association between problematic internet use and physical activity among adolescents [22]. Conversely, a study by Kuss and Griffiths (2017) pointed out that physical activity could be a protective factor against IA, underscoring the need for university health promotion programs to encourage regular movement as a behavioral counterbalance to screen use [23]. These findings support our initial hypothesis that IA may adversely affect the well-being of college students by reducing sleep quality, increasing stress levels, and diminishing physical activity—all of which are critical to academic performance and long-term professional growth. If left unaddressed, internet addiction may contribute to academic underachievement, mental health challenges, and sedentary behavior-related morbidities, ultimately impacting not only individual success but also public health and workforce productivity.

5. LIMITATIONS

This study had several limitations. Firstly, due to its cross-sectional design, it was not possible to determine causal relationships between the variables examined. Secondly, the use of self-reported questionnaires may have introduced subjective bias, as opposed to utilizing standardized objective assessment tools.

6. CONCLUSION

Internet addiction has emerged as a significant public health issue among young adults, often linked to decreased physical activity, elevated stress levels, and impaired sleep quality. Early implementation of preventive strategies is essential to mitigate the adverse health effects associated with excessive smartphone and internet use in this vulnerable population.

Abbreviations

IA: Internet addiction; SPSS: Statistical package for social science; YIAT: Young's internet addiction test; PSQI: Pittsburgh Sleep Quality Index; PSS: Perceived stress scale; IPAQ-SV: International Physical Activity Questionnaire- short version

Acknowledgements

We thank the Faculty of Physiotherapy, Shree Guru Gobind Singh Tricentenary University, Gurugram, Haryana for supporting the research in different ways. We extend our heartfelt thanks to the students who participated in the study.

Authors' contributions

Dr Pooja Bhati and M. Ejaz Hussain designed and supervised the study; also, Dr Pooja Bhati and Dr Vinika Siwach carried out the analysis, and interpreted the data; Dr Pooja Bhati assisted in the design, analysis, and interpretation of the data; and Dr Vinika Siwach wrote the manuscript. All authors contributed toward data analysis, drafting, and critically revising the paper and agree to be accountable for all aspects of the work. All authors read and approved the final manuscript.

Funding

Not applicable.

Availability of data and materials

The datasets supporting the conclusions of this article are not publicly available due to ethics regulations but may be available from the corresponding author upon reasonable request.

Ethics approval and consent to participate

The study was conducted after getting ethical clearance as per guidelines of the Institute Ethical committee, SGT University, Haryana, [SGTU/FPHY/2022/437]. The respondents were informed about the aim of the study. Written consent was obtained from each participant before administering the questionnaire.

Consent for publication

Not applicable.

Competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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