Original Article

Exploring the Relationship Between Sleep Quality and Musculoskeletal Pain in Internet-Addicted College Students

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ABSTRACT

Background: The pervasive use of the internet among college students has raised concerns about internet addiction and its associated health implications. This addiction is characterized by excessive and obsessive internet usage that often leads to detrimental effects on physical, psychological, and social well-being. Among these effects, musculoskeletal discomfort and poor sleep quality are prevalent symptoms reported by this demographic.

Objective: This study aims to explore the relationship between sleep quality and musculoskeletal pain in internet-addicted college students to identify potential interventions that can mitigate these adverse effects.

Methods: A cross-sectional study was conducted with 171 students aged 16-20 years, who reported using screens for more than three hours daily and experienced idiopathic musculoskeletal pain. The study employed the Nordic Musculoskeletal Questionnaire (NMQ) and the Sleep Quality Scale (SQS) for data collection. Statistical analyses, including chi-square tests, were performed using SPSS Version 25 to explore associations between internet usage hours, sleep quality, and musculoskeletal pain.

Results: The participants had a mean age of 17.99±1.37 years, with a balanced gender distribution (50.3% male, 49.7% female). Musculoskeletal pain was most frequently reported in the neck and shoulder regions (29.8% each), followed by the lower back (26.9%). Regarding sleep quality, 44.5% of students suffered from severe sleep disorders. Significant associations were found between the number of hours of internet usage and both the presence of musculoskeletal pain ($p<0.001$) and poor sleep quality ($p=0.049$).

Conclusion: The findings indicate a significant correlation between excessive internet use and both increased musculoskeletal pain and deteriorated sleep quality among college students. These results underscore the need for targeted interventions to promote healthier internet use habits and improve the ergonomic and sleep hygiene practices among this population.

Keywords: Internet addiction, musculoskeletal pain, sleep quality, college students, ergonomic health, cross-sectional study, SPSS analysis.

INTRODUCTION

The prevalence of musculoskeletal pain (MSKP), which encompasses discomfort in bones, joints, ligaments, tendons, or muscles, poses a significant public health challenge across all demographic groups. Such conditions, often resulting from poor ergonomics or repetitive actions, have been consistently highlighted in global health reports as leading contributors to disability-adjusted life years (DALYs) from adolescence through to older age groups (1). Over the past three decades, musculoskeletal disorders have shown a marked increase, being identified as the second-largest contributor to additional DALYs (2). The World Health Organization has identified MSKP as the leading cause of disability worldwide, attributing substantial economic and psychological impacts due to direct healthcare costs, lost productivity, and emotional distress (3).

The increasing integration of the internet into daily life has introduced new dynamics in the epidemiology of MSKP, particularly among the youth. A notable rise in social media usage over the last decade, with 97% of teenagers in the United States engaging with social media platforms regularly, correlates with an increase in physical and mental health issues among this demographic (4). This connection is further evidenced by studies suggesting that prolonged use of social media can lower body satisfaction and overall

happiness among adolescents (5). The intricate relationship between internet use and adolescent development necessitates a thorough understanding to develop effective intervention strategies

Sleep quality, an essential component of overall health, has been significantly impacted by the lifestyle changes brought about by digital technology use. Poor sleep quality can profoundly affect physical, mental, and social health, thus making it crucial to investigate the factors that influence sleep, particularly among vulnerable groups. Musculoskeletal disorders, for instance, have been strongly associated with sleep disturbances, which in turn exacerbate the severity of pain, creating a debilitating cycle of discomfort and sleep disruption (6). Research supports a bidirectional relationship between sleep quality and musculoskeletal pain, where poor sleep can intensify pain perception and vice versa (7). This is particularly relevant in the context of internet addiction, which has been linked to both increased musculoskeletal discomfort and disturbed sleep patterns (8).

Given the escalating concerns around internet addiction, particularly among college students, this study aims to explore the relationship between sleep quality and musculoskeletal pain within this group. This demographic is particularly at risk, given their high engagement with digital media for both academic and leisure activities. The study aligns with previous research, which indicates that internet-addicted individuals report higher levels of musculoskeletal pain and poorer sleep quality (9). Understanding these associations is crucial for developing targeted interventions that can mitigate the adverse health effects of excessive internet use, thereby improving the well-being and academic performance of college student.

MATERIAL AND METHODS

The study employed a cross-sectional design to investigate the relationship between sleep quality and musculoskeletal pain among internet-addicted college students. A total of 171 students, aged between 16 and 20 years, were enrolled from a single university, ensuring a focused examination of the cohort. The participants included both males and females who reported using digital screens for over three hours daily and experienced idiopathic musculoskeletal pain in at least one body part. Those with a history of trauma or surgical procedures within the previous year, physical disabilities, diagnosed psychological disorders, or those taking pain or sleep medications were excluded to minimize confounding variables.

Data collection was conducted using a combination of a Self-Structured Questionnaire and two standardized instruments: the Nordic Musculoskeletal Questionnaire (NMQ) and the Sleep Quality Scale (SQS). The questionnaire was designed to capture detailed demographic information, internet usage patterns, and health-related variables. The NMQ was utilized to assess the presence and severity of musculoskeletal pain across various body regions, including the neck, shoulders, elbows, wrists/hands, and lower back. Meanwhile, the SQS was employed to evaluate the quality of sleep among the participants, categorizing their sleep disorders into minimal, mild, moderate, and severe.

All procedures performed in the study adhered to the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Prior to data collection, informed consent was obtained from all individual participants included in the study. Participants were assured of their anonymity and the confidentiality of their responses during the data handling and analysis phases.

Data analysis was performed using SPSS Version 25. Descriptive statistics were used to summarize the demographic data, prevalence of musculoskeletal pain, and sleep quality. The mean and standard deviation were calculated for continuous variables, while frequencies and percentages were used for categorical variables. To explore the association between the number of hours of internet use and the outcomes of interest—musculoskeletal pain and sleep quality—chi-square tests were conducted. A p-value of less than 0.05 was considered statistically significant, indicating a meaningful association between the variables studied.

RESULTS

The results section of the study provided insightful data on the relationship between internet use, musculoskeletal pain, and sleep quality among college students. Here, the findings are presented in a restructured tabulated format, combining relevant variables to provide clarity and conciseness.

Table 1: Demographic and Baseline Characteristics of Participants

Variable	Frequency	Percent	Mean	SD	Min	Max
Age	171	-	17.99	1.37	16	20
Gender						
Male	86	50.3%				
Female	85	49.7%				

Table 2: Distribution of Musculoskeletal Pain and Sleep Quality

Pain Region / Sleep Quality	Frequency	Percent
Musculoskeletal Pain		
Neck	51	29.8%
Shoulder	51	29.8%
Elbow	12	7.0%
Wrists/Hands	11	6.4%
Lower back	46	26.9%
Sleep Quality		
Minimal sleep disorder	21	17.6%
Mild sleep disorder	17	14.3%
Moderate sleep disorder	28	23.5%
Severe sleep disorder	53	44.5%

Table 3: Association between Internet Usage Hours and Musculoskeletal Pain

Hours of Usage Daily	Neck	Shoulder	Elbow	Wrists/Hand	Lower back	Total
2-3 hours	0	0	0	0	12	12
4-8 hours	28	12	12	5	29	86
9-12 hours	17	33	0	6	5	61
More than 12 hours	6	6	0	0	0	12
P-value	0.00					

Table 4: Association between Internet Usage Hours and Sleep Quality

Hours of Usage Daily	Minimal sleep problem	Mild sleep problem	Moderate sleep problem	Severe sleep problem	Total
2-3 hours	0	3	5	4	12
4-8 hours	0	15	28	43	86
9-12 hours	3	16	24	18	61
More than 12 hours	2	2	5	3	12
P-value	0.049				

The analysis revealed a significant association between the number of hours of internet usage and both the prevalence of musculoskeletal pain (p=0.00) and the categories of sleep quality (p=0.049). The most common sites of musculoskeletal pain were the neck and shoulder, each reported by 29.8% of the students, followed by lower back pain (26.9%). In terms of sleep quality, a significant percentage of the participants (44.5%) experienced severe sleep disorders, highlighting a notable impact of internet usage on sleep quality. These findings underline the need for targeted interventions to manage internet usage and promote healthier lifestyle practices among college students.

DISCUSSION

The findings from this study affirm the significant impact of excessive internet use on both sleep quality and musculoskeletal pain among college students. These results are consistent with previous research which suggests that prolonged engagement with digital media can lead to a range of physical health issues, including musculoskeletal discomfort (10), and disturbances in sleep patterns (11-15). In particular, the prevalence of musculoskeletal pain in the neck and shoulder areas, as well as severe sleep disorders among the participants, aligns with studies indicating that high screen time is associated with poor postural habits and irregular sleep cycles (12,13).

The relationship between internet usage and health outcomes is complex and multifaceted. The significant correlation found in this study between hours spent on the internet and symptoms of physical discomfort and sleep disturbance underscores the potential biomechanical and psychological mechanisms involved. Prolonged static postures during screen usage can lead to biomechanical changes that predispose individuals to musculoskeletal pain, a finding supported by the high prevalence of pain in the neck and lower back regions observed in this cohort (10,16). Similarly, the association between excessive screen time and sleep quality may be mediated by the disruption of circadian rhythms and the suppression of melatonin production due to blue light exposure from screens (11,12, 17).

This study has several strengths, including the use of standardized and validated tools such as the Nordic Musculoskeletal Questionnaire and the Sleep Quality Scale, which enhance the reliability of the data collected. The cross-sectional design allowed

for a snapshot of the associations between internet use, musculoskeletal pain, and sleep quality within a specific population, providing valuable insights for health interventions.

However, there are limitations to consider. The cross-sectional nature of the study restricts the ability to establish causality between internet use and the health outcomes observed. Additionally, the sample was drawn from a single university, which may limit the generalizability of the findings to other populations. Self-reported data can also introduce bias, as participants may not accurately recall or may underreport their internet usage or symptoms.

Future research should consider longitudinal designs to better understand the causal relationships between internet use and health outcomes. Expanding the study to include diverse educational institutions would enhance the generalizability of the findings. It would also be beneficial to explore other factors that may influence the relationship between internet use and health, such as physical activity levels, ergonomic practices, and psychological stress.

In conclusion, the association between excessive internet usage and adverse health outcomes in college students highlights the need for targeted interventions. These interventions should aim to reduce screen time, promote better ergonomics, and improve sleep hygiene to enhance the well-being of students. By addressing these factors, educators and healthcare providers can play a crucial role in mitigating the negative impacts of internet addiction on young adults' health.

CONCLUSION

In conclusion, the findings indicate a significant correlation between excessive internet use and both increased musculoskeletal pain and deteriorated sleep quality among college students. These results underscore the need for targeted interventions to promote healthier internet use habits and improve the ergonomic and sleep hygiene practices among this population.

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