



ORIGINAL ARTICLE

The association of sleep and late-night cell phone use among adolescents[☆]

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KEYWORDS

Sleep;
Cell phone;
Adolescents

Abstract

Objective: This study aims to assess the relationship of late-night cell phone use with sleep duration and quality in a sample of Iranian adolescents.

Methods: The study population consisted of 2400 adolescents, aged 12–18 years, living in Isfahan, Iran. Age, body mass index, sleep duration, cell phone use after 9 p.m., and physical activity were documented. For sleep assessment, the Pittsburgh Sleep Quality Index questionnaire was used.

Results: The participation rate was 90.4% ($n = 2257$ adolescents). The mean (SD) age of participants was 15.44 (1.55) years; 1270 participants reported to use cell phone after 9 p.m. Overall, 56.1% of girls and 38.9% of boys reported poor quality sleep, respectively. Wake-up time was 8:17 a.m. (2.33), among late-night cell phone users and 8:03 a.m. (2.11) among non-users. Most (52%) late-night cell phone users had poor sleep quality. Sedentary participants had higher sleep latency than their peers. Adjusted binary and multinomial logistic regression models showed that late-night cell phone users were 1.39 times more likely to have a poor sleep quality than non-users (p -value < 0.001).

Conclusion: Late-night cell phone use by adolescents was associated with poorer sleep quality. Participants who were physically active had better sleep quality and quantity. As part of healthy lifestyle recommendations, avoidance of late-night cell phone use should be encouraged in adolescents.

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PALAVRAS-CHAVE

Sono;
Celular;
Adolescentes

Associação entre o sono e o uso noturno de celular entre adolescentes**Resumo**

Objetivo: Este estudo visa avaliar a relação entre o uso de celular à noite e a duração e a qualidade do sono em uma amostra de adolescentes iranianos.

Métodos: A população estudada consistiu em 2400 adolescentes, com idades entre 12 e 18 anos, residindo em Isfahan, Irã. Foram documentados a idade, índice de massa corporal, duração do sono, uso de celular após as 21h00 e prática de atividade física. Para avaliação do sono, utilizamos o questionário de Índice de Qualidade do Sono de Pittsburgh (PSQI).

Resultados: A taxa de participação foi de 90,4% (n = 2257 adolescentes). A idade média (DP) dos participantes foi de $15,44 \pm (1,55)$ anos; 1270 participantes relataram o uso do celular após as 21h00. Em geral, 56,1% das meninas e 38,9% dos meninos relataram sono de má qualidade, respectivamente. Os indivíduos que utilizaram celular à noite acordaram às 8h17 min (2,33) e os que não utilizaram acordaram às 8h03 min (2,11). A maior parte (52%) dos usuários de celular à noite apresentou má qualidade de sono. Aqueles sem nenhum tipo de atividade física apresentaram maior latência do sono que seus outros pares. Os modelos ajustados de regressão logística binária e multinomial mostraram que os usuários de celular à noite foram 1,39 vezes mais propensos a ter má qualidade do sono que seus outros pares (valor de $p < 0,001$).

Conclusão: O uso de celular à noite por adolescentes foi associado a pior qualidade do sono. Os participantes fisicamente ativos apresentaram melhor qualidade e maior tempo de sono. Como parte das recomendações de estilo de vida saudável, os adolescentes devem ser incentivados a evitar o uso de celular à noite.

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Introduction

It is well-documented that sleeping is a main component for solid cognitive and physical functions.^{1,2} Sleep has a crucial role in different aspects of life³; proper sleep is especially important for children and adolescents.⁴ It is suggested that sleep disturbances might increase the risk of physical and mental problems, especially during adolescence.⁵ Sleep deprivation among adolescents is not a new phenomenon; however, in recent years, its adverse health effects have drawn more clinical and academic attention.⁶

The technological revolution has made cell phones very attractive and popular.^{7,8} They have become a part of daily life,⁹ being increasingly used among children and adolescents,¹⁰ and have become one of the most common means of communication.⁵ Some children and adolescents are so dependent on their cell phones that they take them to bed, to ensure that they do not miss any incoming message.¹¹

Due to the widespread use of cell phones, it is important to study possible adverse health effects of the exposure.¹² Cell phone use has been reported to be associated with health problems.⁵ A number of studies have indicated that the use of cell phones as a part of electronic media is associated with sleep disorders. One study showed a significant correlation between cell phone use after lights out and sleep disturbances such as short sleep duration, low sleep quality, and excessive daytime sleepiness, as well as symptoms of insomnia among Japanese adolescents.⁵ King et al. demonstrated a decrease in objective sleep efficiency, total sleep time, and rapid eye movement sleep, along with an increased subjective sleep onset latency (SOL) in

adolescents.¹³ According to Troxel et al., nighttime texting was associated with insufficient sleep.¹⁴

The various findings of studies in different populations may be due to cultural differences. The use of mobile devices is widespread in different countries, but most previous studies have been conducted in Western countries. To the best of the authors' knowledge, no previous study has been conducted in this field in Middle Eastern children and adolescents. The experience in this regard in the pediatric population is limited. Studying different populations would help comparing the findings in different communities. This study aimed to assess, for the first time, the relationship of late-night cell phone use with sleep quality and duration in a sample of Iranian adolescents.

Methods

This cross-sectional study was conducted in 2015 in Isfahan, the second largest city in Iran. This study was approved by the Research and Ethical Committee of the Isfahan University of Medical Sciences. An informed written consent was obtained from parents and oral assent from participants. To include participants with various socio-demographic levels, 2400 adolescents from 46 schools (23 all-female and 23 all-male) located in different parts of the city were selected. The questionnaires, along with the parents' consent forms, were distributed among participants; the authors asked the students to complete it anonymously at home. Inclusion criteria consisted of students aged between 12 and 18 years who agreed to participate in the study. Individuals with neurological or psychological conditions that would have

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