

RESEARCH ARTICLE

Association between Smartphone Addiction and Physical Activity, Sleeping Hours among Medical Science Students in Duhok City

Rebar Y. Abdullah*, Kawther M. Galary, Robar A. Majid

Department of Community Health and Maternity Nursing, College of Nursing, University of Duhok, Duhok, Kurdistan Region, Iraq

*Corresponding author:

Rebar Y. Abdullah,
Department of Community
Health and Maternity
Nursing, College of Nursing,
University of Duhok, Duhok,
Kurdistan Region, Iraq.
E-mail: Rebar.abdullah@
uod.ac

Received: 22 April 2020

Accepted: 19 July 2020

Published: 30 December 2020

DOI

10.25156/pj.v10n2y2020.pp60-65

ABSTRACT

Background and Aim: Smartphones become a part of today's life. In spite of the convenience, it contributes to our daily lives and activities, one of the most important problems is smartphone addiction. As known, smartphone addiction is a type of technological addiction or non-substance addiction. The present study is to investigate the association between smartphone addiction and physical activity, sleeping hours among medical science students in Duhok City.

Subjects and Methods: A cross-sectional study design carried out with 295 students in medical science colleges in the Duhok City of both gender. Self-reported data collected from December 15, 2019, to January 22, 2020. Structured questionnaire has been used to gather data related to sociodemographic, physical activity, sleeping hours, and smartphone addiction.

Results: The study found most students, 78.3% have smartphone addiction, 78% of medical science students are at low physical activity range, and only 2% of students are at normal physical activity range, also revealed 20% of students were inactive. According to daily sleeping hours, more than half of them, 61.7% were in a healthy range of sleeping; however, no statistically significant association found between smartphone addiction with physical activity, sleeping hours while finding a highly statistically significant association between smartphone addiction with gender.

Conclusion: The current study figure out smartphone addiction prevalence was very high among medical science college students. Smartphone addiction showed an effect in increasing sedentary health behavior like low physical activity and poor sleeping quality with no statistically significant association.

Keywords: College students; Medical science students; Physical activity; Sleeping quality; Smartphone addiction

INTRODUCTION

Smartphones are not just communicating devices like mobile phones, but additionally became so common and the main platforms for information collection and acquiring for modern people. There were 2.5 billion smartphone users around the world at the end of 2016 and this total reached to 3.5 billion users by April 14, 2020, and predicted to reach 3.8 billion by 2021 (Statista, 2020). Significant increase of Smartphone using and their capabilities enable all people to access the internet, communicate, and entertain themselves anywhere and anytime. Individuals can become addicted to various substances such as drugs or alcohol, also they can suffer from behavioral addictions, like addiction to computers, games, television, shopping, and the internet and the excessive use of smartphones encompass many features have raised the issue of smartphone addiction (Demirci et al., 2015). Although, as early as 1982, before

the widespread use of mobile phones, it was suggested that techno-dependence may form from pathological use of technology, in recent years, concern regarding problematic mobile phone use has been increasing. However, behavioral addiction does not involve the use of a chemical substance, in general terms, both may be described as disorders involving a loss of control over a compulsive, resource and time-consuming behavior, which persists in spite of adverse consequences and characterizes by a continued escalation of behavior or withdrawal symptoms when engagement in the behavior is reduced (Alosaimi et al., 2016). The development of smartphones made dramatic changes in societies around the world; in addition, it has transformed communication among individuals of all ages. Smartphone is one of the best devices that have integrated "communication, entertainment, and education," it seems the famous idiom "to have the world within the palm of your hand" is the best characterization of smartphones

(Alhazmi et al., 2018). Addiction is considered dependence by WHO, the continuous use of something for the sake of comfort, relief, or stimulation, which frequently causes cravings when it is absent.” The excessive utilize of smartphones to the level where it interferes with the daily lives of users, therefore considered to be smartphone addiction (Kuss and Griffiths, 2011). Functions such as calling, sending, and receiving text messages, upgrading social networking sites, and browsing the internet have historically been defined as sedentary behaviors. Such inactive behaviors relate to a variety of health issues, including obesity or metabolic syndrome, because it leads to low levels of energy consumption (Owen et al., 2010).

Increase usage of Smartphone addiction lead to physical health-related issues, such as musculoskeletal disorders of the hand, cervical spine, wrist, back muscles, ocular manifestations, and increasing risk of psychological disorders such as attention deficit, aggression, and disturbance of sleep (Yang et al., 2010). While smartphone use across all sectors has been increasing, university students have been seen as the largest group of smartphone services consumer (Hong et al., 2012). Students use smartphone for several purposes, for instance, to explore applications which provide new functions, to communicate with others face to face, enjoy with deferent kinds of entertainments like games, and help students to escape from uncomfortable situations; hence, smartphones become vital to them (Head and Ziolkowski, 2012). The aim of the current study was to determine the association between smartphone addiction with physical activity and sleeping hours among medical science students in Duhok City.

SUBJECTS AND METHODS

Study Design

This study was a descriptive cross-sectional study design.

The Setting of the Study

The present study done in Duhok City in five Medical Science Colleges (Medicine, Nursing, Dentistry, Pharmacy, and Health Sciences).

Time of the Study

The present study conducted from December 03, 2019, to March 08, 2020.

Sampling Methods and Sample Size

A cluster-stratified-simple random sampling applied to reach 295 students from all classes of selected medical colleges.

Data Collection

Data of the present study collected using the questionnaire, which includes (sociodemographic data, questions related to smartphone addiction, physical activity, and sleeping

hours). Data were collected through the direct interview technique with students to fill the questionnaire. The first part of the questionnaire purposed to collect sociodemographic characteristic of students, physical activity, and sleeping hours. Normal sleeping hours ranged between 7 and 9 h daily, according to Sleep Foundation (Hirshkowitz M, et al., 2015). Also, the physical activity set in four categories: inactive, low active, moderate and high active (WHO, 2010; US. Department of Health and Human Services, 2008). The second part aimed to assess smartphone addiction which has been assessed using the SAS-SV, which constructed by South Korean researchers (Kwon et al., 2013). We used cutoff values of 31 and 33 for male and female study participants, respectively. The scale for addiction depended on a 6 Likert scale. We utilized the already published short version of smartphone addiction scale (SAS) questionnaire which consists of 10 questions with response choices from 1 to 6, where 1 is considered strongly disagree and 6 is considered strongly agree. The total responses of participants were calculated and compared to cutoff points of 31 for males and 33 for females. Students who scored higher than the cutoff points were considered to be addicted to smartphone.

Data Analysis

The data analyzed using Statistical Package for Social Sciences (SPSS) (v 23). Descriptive data analyzed as frequency, percentage, mean, standard deviation, and inferential statistical data analysis using Fisher Exact test and Chi-square test as appropriate to investigate the relationship between SA and physical exercise, sleeping hours among medical sciences students in Duhok City.

Ethical Considerations

The ethical approval had been taken from the ethical Committee of General Directorate of Health in Duhok City and document consent had been taken from all selected College's administrations and verbal consent from students who agree to participate in the current study.

RESULTS

Sociodemographic Characteristics of the Students

Regarding the distribution of sociodemographic characteristics among medical science colleges, Table 1 shows that age group 18–20 is the highest age group percentage rate among study samples, which is 47.1% of total sample age; however, 24–26 age group is the lowest age percentage rate 9.5% among study age groups. Concern for gender, the table reveals the majority of study samples were female, about 51.2%. The majority of study samples were at first and fourth class 23.4–23.4%, respectively, while 3.7% of them were at sixth class.

Distribution of Physical Exercise and Sleeping Hours among Medical Science Students

In respect of the distribution of physical exercise and sleeping hours among medical science students, Table 2 shows that most of the students, 78% were at a low physical activity level, and only 2% of students were at the moderate physical activity level; also, the table reveals 20% were inactive. Concerning to daily sleeping hours more than half of students, 61.7% were in healthy level of sleeping. Concerning to daily sleeping hours more than half of students, 61.7% were in healthy level of sleeping. While nearly 40% of students had poor and unhealthy sleep quality, poor quality and unhealthy sleep (32.5% and 7.4%), respectively.

Smartphone Addiction Rate among Students

As regards distributing the smartphone addiction rate among medical science students, Table 3 shows more than third-to-fourth of students, 78.3% have smartphone addiction, while 21.7% are non-addict.

Table 1: Sociodemographic characteristics distribution of students

Items	Categories	Frequency (%)
Age	18–20	139 (47.1)
	21–23	128 (43.4)
	24–26	28 (9.5)
Gender	Male	143 (48.5)
	Female	152 (51.5)
Class	First class	69 (23.4)
	Second class	57 (19.3)
	Third class	56 (19)
	Fourth class	69 (23.4)
	Fifth class	33 (11.2)
	Sixth class	11 (3.7)
Total		295 (100)

Table 2: Distribution of physical exercise and sleeping hours among medical science students

Items	Categories	Frequency (%)
Physical exercise	Inactive	59 (20)
	Low active	230 (78)
	Moderate (normal)	6 (2)
Sleeping hours	Poor healthy sleep <7 h	94 (31.9)
	Healthy sleep (7–9 h)	182 (61.7)
	Unhealthy sleep >9 h	19 (6.4)
Total		295 (100)

Table 3: Smartphone addiction among students

Item	Categories	Frequency (%)
Smartphone addiction	Nonaddict <31 for male and <33 for female	64 (21.7)
	Addicted ≥31 for male and ≥33 for female	231 (78.3)
Total		295 (100)

Association between Smartphone Addiction with Physical Activity

Concerning the association between smartphone addiction and physical activity, Table 4 reveals that most of the smartphone addiction students were in a low level of physical activity. However, there was no statistically significant association ($P = 0.107$).

Association between Smartphone Addiction with Sleeping Hours

About the association between smartphone addiction with sleeping hours among medical science students, Table 5 reveals no statistically significant association between smartphone addiction and sleeping hours among students ($P = 0.384$).

Association between Smartphone Addiction with Gender

Regarding gender and smartphone association, Table 6 shows a high smartphone addiction rate between both gender and shows a highly statistically significant association between gender and smartphone addiction ($P = 0.001$), which shows that the male is more addict to smartphone than female 53.6%–46.4%, respectively.

DISCUSSION

The current study finding showed that majority of medical science students were at age group (18 years–20 years) than other age groups, concerning to gender among students the present study findings revealed that more than fifty percent, 51.3% of medical science students were female; also, present study results showed that both first and fourth class had majority percent than other classes 23.4% and 23.4%, respectively.

Regarding the prevalence of smartphone addiction, the current study showed that the majority of students 78.3% had smartphone addiction. One of the reasons for this high prevalence could be that a lot of educational material is available on the internet, and students feel more comfortable using a smartphone than a laptop or desktop computer. Similar to our current study findings, other studies done in Saudi Arabia by Venkatesh et al., in 2016, among dental college students revealed that smartphone addiction was 71.9%. In another study in India by Kumar et al., among 150 medical students, 67 44.7% were addicted to smartphone usage (Kumar et al., 2019); however, another study done in China by Chen et al., 2017, they found the smartphone addiction was low among medical students of China 29.8% (30.3% in males and 29.3% in females). Other studies done on SA among medical students by Basu et al. in 2018 found that 40.2% of undergraduate medical students at a Medical College in Delhi were addicted to

Table 4: Association between smartphone addiction with physical exercise

Factors	Categories	Not addicted <31 for male and <33 for female	Addicted ≥31 for male and ≥33 for female (%)	P value
Physical activity of the medical science students	Inactive (0 min/week)	9	50 (21.64)	Fisher's exact test 0.107
	Low activity (<150 min/week)	52	178 (77.06)	
	Moderate activity (150–300 min/week)	3	3 (1.3)	
Total		64	231	295

Table 5: Association between smartphone addiction with sleeping hours

Factors	Categories	Not addicted <31 for male and <33 for female	Addicted ≥31 for male and ≥33 for female (%)	P
Sleeping hours per day for young adults	Poor quality <7 h	19	75 (32.5)	$\chi^2=0.384$
	Healthy sleeping (7–9) h	43	139 (60.1)	
	Unhealthy sleeping >9 h	2	17 (7.4)	
Total		64	231	295

Table 6: Association between smartphone addiction with gender

Factors	Categories	Not addicted <31 for male and <33 for female	Addicted ≥31 for male and ≥33 for female (%)	P
Gender	Male	19	124 (53.6)	$\chi^2=0.001$
	Female	45	107 (46.4)	
Total		64	231	25

smartphone; Alhazmi et al., 2018 and Jain et al., 2019 showed less SA prevalence of smartphone addiction comparing to current study findings, they found 24.65% of students were addicted.

Regarding gender and SA association, the current study showed high addiction prevalence between both gender and showed highly significant association between gender and smartphone addiction which revealed that male students are more addict to smartphone than female students. Same results found by Hasan et al. in 2018 in Kirkuk university among Nursing students; also, Alosaimi et al., 2016; Dixit et al., 2010; Alhazmi et al., 2018; Ammati et al., 2018; and Bisen and Deshpande, 2016 found that smartphone addiction was higher in male than females participants students. However, disagree to our current study findings, some studies reported that female has a higher prevalence of smartphone addiction than males (Demirci et al., 2014; De-Sola et al., 2016; Jain et al., 2019; Tavakolizadeh et al., 2014). On the other hand, studies done by Alosaimi et al., 2016; Boumosleh and Jaalouk, 2017; they found no association between SA with gender difference.

Concerning SA and sleeping hours association, the present study revealed that approximately 40% of smartphone-addicted medical science students had poor quality and unhealthy sleep (32.5% and 7.4%), respectively; however, the current study showed no statistically significant association between SA and sleep hours among medical science

students, similar findings in study done by Basu et al., in 2018, among medical students found 40.2% of excessive smartphone user students reported reducing hours of sleeping; also, Soni et al., 2017; Alosaimi et al., 2016; and Hysing et al., 2015 found that excessive use smartphone may lead to poor sleep quality and sleep disturbances and decreasing sleep hours. Moreover, other researchers, Lemola et al., 2015, found excessive use of smartphone at night could affect one up late. In contrast to our study results, studies done by Kurugodiyavar et al. in 2018 and Ibrahim et al. in 2018 found that smartphone addiction had a significant association with poor sleep quality.

Our study revealed most of the smartphone addiction students were in a low level of physical activity. However, there was no significant association between SA and physical activity. Similar to our study results, Penglee et al. in 2019 found smartphone addiction among US students was not associated with less physical activity but differ from our study results they found excessive smartphone use per day was found to be associated with fewer days per week of engaging in physical activity among the Thailand students. The same results by Barkley and Lepp, 2015 showed no relationship was found between smartphone use with physical activity among college students in a Midwestern US University. Furthermore, other researchers, Barkley and Lepp, 2016; Rebold et al., 2016, supported the argue that use of a smartphone during physical activity may lead to reducing the intensity of physical activity. Moreover, Lepp et al. in 2013 reported leisure-time physical activity disrupted by cell phone use.

CONCLUSION

The current study concluded that there was a high smartphone addiction rate among medical science students in Duhok City, and smartphone addiction may increase sedentary health habits, also it associated with

gender differences. The present study recommended to keep attention on the SA and its associated sedentary behaviors by educating and discussing current study data with students and make more studies on a psychological aspect related to smartphone addiction among medical science students.

REFERENCES

- Alhazmi, A. A., S. H. Alzahrani, M. Baig, E. M. Salawati and A. Alkatheri. 2018. Prevalence and factors associated with smartphone addiction among medical students at King Abdulaziz University, Jeddah. *Pak. J. Med. Sci.* 34(4): 984-988.
- Alosaimi, F. D., H. Alyahya, H. Alshahwan, N. Al Mahyijari and S. A. Shaik. 2016. Smartphone addiction among university students in Riyadh, Saudi Arabia. *Saudi Med. J.* 37: 675-683.
- Ammati, R., A. Kakunje, R. Karkal, D. Nafisa, G. Kini and P. Chandrasekaran. 2018. Smartphone addiction among students of medical university in South India: A cross-sectional study. *Ann. Int. Med. Dent. Res.* 4(2): PY01-PY03.
- Barkley, J. E. and A. Lepp. 2015. Cellular telephone use while walking significantly reduces average free-living walking speed. *Med. Sci. Sports Exerc.* 47: 726-732.
- Barkley, J. E. and A. Lepp. 2016. Mobile phone use among college students is a sedentary leisure behavior which may interfere with exercise. *Comput. Hum. Behav.* 56: 29-33.
- Basu, S., S. Garg, M. M. Singh and C. Kohli. 2018. Addiction-like behavior associated with mobile phone usage among medical students in Delhi. *Indian J. Psychol. Med.* 40: 446-451.
- Bisen, S., Deshpande, Y. 2016. An analytical study of smartphone addiction among engineering students: A gender differences. *Int. J. Indian Psychol.* 4: 70-81.
- Boumosleh, M. J. and D. Jaalouk. 2017. Depression, anxiety, and smartphone addiction in university students-a cross sectional study. *PLoS One*.12: e0182239.
- Chen, B., F. Liu, S. Ding, X. Ying, L. Wang and Y. Wen. 2017. Gender differences in factors associated with smartphone addiction: A cross-sectional study among medical college students. *BMC Psychiatry.* 17: 341.
- Demirci, K., H. Orhan, A. Demirdas, A. Akpinar and H. Sert. 2014. Validity and reliability of the Turkish version of the smartphone addiction scale in a younger population. *Bull. Clin. Psychopharmacol.* 24(3): 226-234.
- Demirci, K., M. Akgonul and A. Akpinar. 2015. Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *J. Behav. Addict.* 4: 85-92.
- De-Sola, G. J., F. R. de Fonseca and G. Rubio. 2016. Cell-phone addiction: A review. *Front. Psychiatry.* 7: 175.
- Dixit, S., H. Shukla, A. Bhagwat, A. Bindal, A. Goyal, A. K. Zaidi and A. Shrivastava. 2010. A study to evaluate mobile phone dependence among students of a medical college and associated hospital of Central India. *Indian J. Community Med.* 35: 339-341.
- Hasan, N. N., H. O. Mehammed-Ameen and Y. F. Sameen. 2018. Smartphone addiction among nursing college students in Kirkuk University. *Kufa J. Nurs. Sci.* 8(2): 1-7.
- Head, M. and N. Ziolkowski. 2012. Understanding student attitudes of mobile phone features: Rethinking adoption through conjoint, cluster and SEM analyses. *Comput. Hum. Behav.* 8: 2331-2339.
- Hong, F. Y., S. I. Chiu and D. H. Huang. 2012. A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese University female students. *Comput. Hum. Behav.* 28: 2152-2159.
- Hysing, M., S. Pallesen, K. M. Stormark, R. Jakobsen, A. J. Lundervold and B. Sivertsen. 2015. Sleep and use of electronic devices in adolescence: Results from a large population-based study. *BMJ Open.* 5(1): e006748.
- Ibrahim, N. K., B. S. Baharoon, W. F. Banjar, A. A. Jar, R. M. Ashor, A. A. Aman and J. R. Al-Ahmadi. 2018. Mobile phone addiction and its relationship to sleep quality and academic achievement of medical students at King Abdulaziz University, Jeddah, Saudi Arabia. *J. Res. Health Sci.* 18: e00420.
- Jain, P., S. R. Gedam. and P. S. Patil. 2019. Study of smartphone addiction: Prevalence, pattern of use, and personality dimensions among medical students from rural region of central India. *Open J. Psychiatry Allied Sci.* 10: 132-138.
- Kumar, V. A., V. Chandrasekaran and H. Brahadeeswari. 2019. Prevalence of smartphone addiction and its effects on sleep quality: A cross-sectional study among medical students. *Ind. Psychiatry J.* 28(1): 82-85.
- Kurugodiyavar, M. D., H. R. Sushma, M. Godbole and M. S. Nekar. 2018. Impact of smartphone use on quality of sleep among medical students. *Int. J. Community Med. Public Health.* 5(1): 10110-10119.
- Kuss, D. J. and M. D. Griffiths. 2011. Online social networking and addiction-a review of the psychological literature. *Int. J. Environ. Res. Public Health.* 8: 3528-3552.
- Kwon, M., D. J. Kim, H. Cho and S. Yang. 2013. The smartphone addiction scale: Development and validation of a short version for adolescents. *PLoS One.* 8(12): e83558.
- Kwon, M., J. Y. Lee, W. Y. Won, J. W. Park, J. A. Min, C. Hahn, X. Gu, J. H. Choi and D. J. Kim. 2013. Development and validation of a smartphone addiction scale (SAS). *PLoS One.* 8(2): e56936.
- Lemola, S., N. Perkinson-Gloor, S. Brand, J. F. Dewald-Kaufmann and A. Grob. 2015. Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age. *J. Youth Adolesc.* 44(2): 405-418.
- Lepp, A., J. E. Barkley, G. J. Sanders, M. Rebold and P. Gates. 2013. The relationship between cell phone use, physical and sedentary activity, and cardiorespiratory fitness in a sample of U.S. college students. *Int. J. Behav. Nutr. Phys. Act.* 10: 79.
- Hirshkowitz, M., K. Whitton, S. M. Albert, C. Alessi, O. Bruni, L. DonCarlos, N. Hazen, J. Herman, E. S. Katz, L. Kheirandish-Gozal, D. N. Neubauer, A. E. O'Donnell, M. Ohayon, J. Peever, R. Rawding, R. C. Sachdeva, B. Setters, M. V. Vitiello, J. C. Ware and P. J. A. Hillard. 2015. National sleep foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health.* 1: 40-43.
- Owen, N., G. N. Healy, C. E. Matthews and D. W. Dunstan. 2010. Too much sitting: The population health science of sedentary behavior. *Exerc. Sport Sci. Rev.* 38: 105-113.
- Penglee, N., R. W. Christiana, R. A. Battista and E. Rosenberg. 2019. Smartphone use and physical activity among college students in health science-related majors in the United States and Thailand. *Int. J. Environ. Res. Public Health.* 16(8): 1315.
- Rebold, M. J., T. Sheehan, M. Dirlam, T. Maldonado and D. O'Donnell. 2016. The impact of cell phone texting on the amount of time spent exercising at different intensities. *Comput. Hum. Behav.* 55: 167-171.
- Soni, R., R. Upadhyay and M. Jain. 2017. Prevalence of smart phone addiction, sleep quality and associated behaviour problems in adolescents. *Int. J. Res. Med. Sci.* 5: 515.
- Statista. 2020. Number of Smartphone Users Worldwide 2016-2021. Available from: <https://www.statista.com/statistics/330695/>

- number-of-smartphone-users-worldwide. [Last accessed on 2020 Feb 28].
- Tavakolizadeh, J., A. Atarodi, S. Ahmadpour and A. Pourgheisar. 2014. The prevalence of excessive mobile phone use and its relation with mental health status and demographic factors among the students of Gonabad University of Medical Sciences in 2011-2012. *Razavi Int. J. Med.* 2(1): 59-72.
- U.S. Department of Health and Human Services. 2008. Physical Activity Guidelines for Americans. Available from: <https://www.health.gov/our-work/physical-activity/previous-guidelines/2008-physical-activity-guidelines/advisory-report>. [Last accessed on 2020 Jul 27].
- Venkatesh, E., M. Jemal and A. Samani. 2016. Smart phone usage and addiction among dental students in Saudi Arabia: A cross sectional study. *Int. J. Adolesc. Med. Health.* 10(15): 0133.
- Yang, Y. S., J. Y. Yen, C. H. Ko, C. P. Cheng and C. F. Yen. 2010. The association between problematic cellular phone use and risky behaviors and low self-esteem among Taiwanese adolescents. *BMC Public Health.* 10: 217.