Prevalence of Smartphone Addiction and Relationship with Musculoskeletal Disorder Among Health Sciences Students

Muhammad Azwan Azri[1*], Farah Natasha Binti Mohmad[2], Mohd Ikhmal Hanif Abdul Khalid[3], Muhammad Iqbal Bin Shaharudin[4], Norsyaqina Binti Shamsudin[5]

[1, 4 & 5] Faculty of Health Sciences

Universiti Teknologi MARA Cawangan Pulau Pinang Kampus Bertam, Pulau Pinang

[2] Faculty of Health Sciences

Universiti Teknologi MARA Cawangan Selangor Kampus Puncak Alam, Selangor

[3] Faculty of Pharmacy

Universiti Teknologi MARA Cawangan Pulau Pinang Kampus Bertam, Pulau Pinang

[*]*Corresponding author: azwanazri@uitm.edu.my*

ABSTRACT

An increase in frequency and time spent on smartphones is closely related to smartphone addiction. Along with the rise in smartphone use, potential risks for musculoskeletal problems have been reported. However, there is a lack of studies on smartphone addiction and musculoskeletal disorder (MSD) is conducted among health sciences students in Malaysia. This study was conducted to identify the prevalence of smartphone addiction and its relationship with musculoskeletal disorders among healthscience students. This study is a cross-sectional study using the following outcome measures: Smartphone Addiction Scale-Short Version (SAS-SV) for smartphone addiction and Nordic Musculoskeletal Questionnaires (NMQ) for MSD. Participants were 190 health science students from Universiti Teknologi MARA (UiTM) Puncak Alam and Universiti Kebangsaan Malaysia (UKM). The results showed that 139 (73.2%) of health science students have smartphone addiction with most of them in 22-24 years old 94 (67.6%), females 123 (88.5%), third- and fourth-year students 97 (69.8%) and students that live in urban areas 83 (59.7%). Academic year level shows statistically significant association with smartphone addiction (X^2 = 310, P = 0.016). The body parts that were reported with the highest prevalence of musculoskeletal pain were the neck 96 (69.1%), followed by wrists 89 (64.0%) and the upper back 81 (58.3%). The study showed most of the health science students in Malaysia were addicted to smartphones and were exposed to MSD.

Keywords: *smartphone, smartphone addiction, health science students, musculoskeletal disorder*

Introduction

The smartphone is created to make our lives easier and more comfortable. It is a technology that covers multiple fields such as communication like calling and messaging and other daily activities such as financing activities like paying bills and studies. Along with the improvement in functions and use, the use of the smartphone has reported. Van (2015) in the infographic stated Malaysian spent more time at 187 minutes daily with their smartphone than other neighbouring countries.

Smartphone use has increased across all economic and age groups, with university students serving as one of the main target markets and the biggest consumer group of Smartphone services (Head & Ziolkowski, 2012). According to one study, 15% of American young adults aged 18–29 is heavily reliant on smartphones for online access (Smith, 2015). Hatice et al.et al., 2016, found that 4-6 hours a day was used by 40.1% of students on the smartphone. In a study by Matar et al. (2017), 27.2% out of 2367 university students aged 20 to 24 years old in Riyadh, Arab Saudi, stated that they used their smartphone for more than 8 hours daily.

Smartphone addiction is not currently recognized as an official clinical disorder in DSM5 or the International Classification of Diseases (ICD10), but there appear to be similarities in many aspects of behavior. Gambling disorder is the only component of behavioural addiction that being recognized by DSM- 5, in contrast to other addictive behaviours such as "Internet gaming," "sex addiction," "exercise addiction," or "shopping addiction" are considered to be impulse disorders (American Psychiatric Association, 2013).

One of the negative consequences of smartphone addiction is MSD. With the increase in the use of smart phones, people are increasingly concerned about the musculoskeletal issues related with the heavy use of smart phones. Because of the prolonged, forceful, low amplitude, repetitive use of handheld gadgets, the occurrence of musculoskeletal disorders of the hand, wrist, forearm, arm, and neck has been increasing globally (Mustafaoglu et al., 2021). Sustained smartphone use can result in a variety of musculoskeletal disorders impacting the hand, wrist, neck, back, and eyes (Tonga et al., 2017; Kang et., 2012). A study stated those using the device for four hours or more indicated a tendency to have pain (Xie, Szeto & Dai, 2017).

Methodology

This is a cross sectional study. The participants consist of students of health sciences faculty from Universiti Teknologi MARA (UiTM) and Universiti Kebangsaan Malaysia (UKM). Questionnaire was distributed via online platform which is Google Forms. The respondents are gathered by using convenience sampling method. The inclusion criteria consists of smartphone users, health science students who enrolled in and UKM, age between 19 – 25 years old, able to read and understand English and not having chronic disease or medical illness. Those who already having chronic disease or illness are excluded from this study. The research instruments consist of demographic profile, Smartphone Addiction Scale – Short Version (SAS-SV) and Nordic musculoskeletal questionnaire (NMQ). Data were anaylsed by using SPSS.

Permission for the research to be conducted has been granted by the Research and Ethics Committee (REC) of UiTM Shah Alam [Reference: REC/02/2021(UG/MR/74)] and the Faculty of Health Sciences of UiTM Puncak Alam.

Result

Demographic Data Profile

The targeted sample consisted of 380, but only 211 answered thequestionnaires. By excluding the respondents that did not fit in the study and unfinished responded to questionnaires, only 190 health science's students of UiTM and UKM participated. Table 1 shows that most respondents are from the age group of 22-24 years old 129 (67.9%), followed by 18-21 years old group 39 (20.5%), and only 22 (11.6%) of them are 25 years old and above. Then, 171 (90%) of respondents are females, and only 19 (10%) are male. Students in the third and fourth year are major group 123 (64.7%), and first- and second-year students only 67 (35.3%). Students living in urban areas are 113 (59.5%). Meanwhile, students in rural areas are only 77 (40.5%).

Table 1: Frequencies of Demographic profile

Variables	Frequency (n) (n=190)	Percentage (%) (%=100)
Age group in years		
18-21 years	39	20.5
22-24 years	129	67.9
25 and above	22	11.6
Gender		
Male	19	10
Female	171	90
Academic year level		
First and second year	67	35.3
Third and fourth year	123	64.7
Area of living		
Urban	113	59.5
Rural	77	40.5

Prevalence of Smartphone Addiction

The frequency of smartphone addiction among the respondents is reported based on the demographic profile (age, gender, year of study, and living area). Table 2 shows that 139 (73.2%) of health science's students have smartphone addiction, and 51 (26.8%) of respondents are not addicted to smartphones. Firstly, the age group with the most students addicted to smartphones are 22-24 years old 94 (67.6%), followed by 18-21 years old 30 (21.6%) and only 15 (10.8%) among 25 years old and above. On the other hand, students in the age group 18-21 years that are not addicted to smartphones are 9 (17.6%), 35 (68.6%) in 22-24 years old and 7 (13.7%) among 25 years old and above students.

Next, females are most respondents that have smartphone addiction, 123(88.5%), and only 16 (11.5%) of them are male. On the other hand, among the students who are not addicted to smartphones, 48 (94.1%) are female, and 3 (5.9%) are male.

Then, in terms of year of study, the year group with the most smartphone addiction is third- and fourth-year students 97 (69.8%) and followed by first and second year 42(30.2%). On the other hand, 26 (51%) of not addicted students are from third and fourth year; 25 (49%) are from the first and second year.

Finally, students that live in urban areas have a higher number of addicts 83 (59.7%), than those who live in rural areas 56 (40.3%). Among those not addicted, 30 (58.5%) are from urban areas and 21 (41.5%) from rural areas.

Table 2: Prevalence of smartphone addiction (n=190)

Variables	Smartphone addiction	
	Addicted n (%) (n=139)	Not Addicted n (%) (n=51)
Age group in years		
18-21 years	30 (21.6%)	9 (17.6%)

Table 4.2, continued.

Variables	Smartphone addiction	
	Addicted n (%) (n=139)	Not Addicted n (%) (n=51)
22-24 years	94 (67.6%)	35 (68.6%)
25 and above years	15 (10.8%)	7 (13.7%)
Gender		
Male	16 (11.5%)	3 (5.9%)
Female	123 (88.5%)	48 (94.1%)
Academic year level		
First and second year	42 (30.2%)	25 (49.0%)
Third and fourth year	97 (69.8%)	26 (51.0%)
Area of living		
Urban	83 (59.7%)	30 (58.5%)
Rural	56 (40.3%)	21 (41.2%)
Total	139 (73.2%)	51 (26.8%)

Association of Demographic Profile with SmartphoneAddiction

Table 3 shows the association of demographic profile with smartphone addiction. Pearson's Chi-squared test is used to measure the association between smartphone addiction and the musculoskeletal problems of the students (P-value < 0.05). This study found that academic year levelfrom first to second years and third to the fourth year show statistically significantassociation with smartphone addiction ($X^2 = 310$, $P = 0.016$).

Table 3: The association between demographic profile and smartphone addiction

Variables	Addicted n (%)	Not Addicted n (%)	X² statistic (df)	P value
Age group in years				
18-21 years	30 (21.6%)	9 (17.6%)	.564 (2)	.755
22-24 years	94 (67.6%)	35 (68.6%)		
25 and above years	15 (10.8%)	7 (13.7%)		
Gender				
Male	16 (11.5%)	3 (5.9%)	1.313 (1)	.252
Female	123 (88.5%)	48 (94.1%)		
Academic year level				
First and second year	42 (30.2%)	25 (49.0%)	5.779 (1)	.016
Third and fourth year	97 (69.8%)	26 (51.0%)		
Area of living				
Urban	83 (59.7%)	30 (58.5%)	.310 (1)	.912
Rural	56 (40.3%)	21 (41.2%)		

P value has been calculated using Chi square test.

Prevalence of MSD among Smartphone Addicted Students

Table 4 presents the prevalence of MSD among 139 of health science's students with smartphone addiction during the past 12 months and during the past seven days. In the past 12 months the most pain faced by respondents are neck 96 (69.1%).Then, in the past seven days, shoulder pain 62 (44.6%) was the most pain faced by respondents.

Table 4 Prevalence of musculoskeletal pain during past year and past week among smartphone addicted (n=139)

Musculoskeletal parameters	Pain during past 12 months n (%)	Pain during past 7 days n (%)
Neck	96 (69.1%)	59 (42.4%)
Shoulders	66 (47.5%)	62 (44.6%)
Elbows	65 (46.8%)	47 (33.8%)
Wrists	89 (64.0%)	19 (13.7%)
Upper back	81 (58.3%)	53 (38.1%)
Lower back	70 (50.4%)	55 (39.6%)
Hips/Thighs	25 (18.0%)	13 (9.4%)
Knees	17 (12.2%)	14 (10.1%)
Ankles/Feet	19 (13.7%)	12 (8.6%)

Discussion

The study results indicate that most health science students are addicted to smartphones, with 73.2% of 190 students. According to a study of 420 Egypt Physical Therapy students, 62.4% of them are addicted to their smartphones (Soliman Elserty et al., 2020). In a survey among medical students of Qassim University, Saudi Arabia, 60.3% of 242 medical students were addicted to smartphones (AlSalameh et al., 2019). These two studies showed similar results to this study in which more than half of the respondents were addicted to smartphones. Meanwhile, in a study at King Abdulaziz University, Jeddah, 36.5% of 181 medical students were addicted to smartphones which had a slightly lower incidence rate than this study (AlHazmi, Alzahrani, Baig, Salawati, & Alkatheri, 2018). A survey conducted among university students in Malaysia showed that among 369 participants, 47.7% experienced high smartphone addiction, which is also slightly lower than the outcome of this study (Ithnain, Ghazali, & Jaafar, 2018).

This study stated a significant association between the year of study with smartphone addiction and the opposite result for other demographic profiles. This result is supported by a study where the educational year level was discovered to have a significant relationship with the level of smartphone addiction. meanwhile no association in gender, age and area of living (AlSalameh et al., 2019). A study by Mustafaoglu et al. (2021) also stated that there is no association found between age and smartphone addiction. As stated in this study, there is no association between gender and smartphone addiction. This outcome is supported by few studies that females and males have a different prevalence of smartphone addiction. Even though many studies show that females have a higher prevalence of smartphone addiction than males, (Mustafaoglu et al., 2021; Demirci et al., 2015), there also studies resulted to male to be higher than female (Chen et al., 2017; AlSalameh et al., 2019). Studies have mentioned that there is no association between gender with smartphone addiction (Matar Boumosleh & Jaalouk, 2017). However, Choi (2018) reported a significant link between gender and smartphone addiction and the average daily use of smartphones.

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This study demonstrated neck, wrists and upper back as the highest MSD. Among those addicted to smartphones, neck pain was the highest pain faced by them in 12 months. This outcome was similar to a study conducted among smartphone users in Korea discovered that 18.8% of smartphone owners had MSD symptoms in at least one part of the body, particularly the neck, upper trunk, and upper limbs (Eom, Choi & Park, 2013). In a study involving Korean smartphone users, Kim and Kim, 2015 found that neck was the most painful body region among them. Another similar result was stated in a study conducted in Thailand that shown that the most occurrence musculoskeletal disorder in smartphone owners is neck pain which associated with flexed neck posture (Namwongsa et al., 2018). According to Mustafaoglu et al. (2021), MSD symptoms in the previous year and last week demonstrated a higher incidence of discomfort in the upper back, neck, and wrist/hands. The respondents described discomfort in their upper back, waist, and wrists/hands, preventing them from performing everyday tasks in their homes or offices for a day or more. Meanwhile, Yang et al. (2017) reported adolescent's most frequent body discomfort is elbow and neck A study among physical therapy students in Egypt found neck, eyes and back regions as the frequent pain experienced by them (Soliman Elserty et al., 2020).

Most action done by the users is typing where it is applied in most applications, such as social media applications. However, typing movements can cause musculoskeletal pain in the upper extremities, particularly the thumb. A study found that during texting, the planes that cover by thumb motions are extension, abduction-adduction, opposition and flexion (Sharan, & Ajeesh, 2012). They also noted the formation of tendinitis in extensor pollicis longus, myofascial pain syndrome (70.37%) of adductor pollicis, 1st interossei and extensor digitorum communis and thoracic outlet syndrome (51.85%). Along with the existence of fibromyalgia syndrome (25.93%), hypothyroidism (7.41%), wrist tendinitis (14.81%), and De Quervain's syndrome (7.41%) among texters.

Generally, most of the smartphone features require users to sharply downwards their head or outreach their arms forward (AlAbdulwahab et al., 2017). Smartphone users would continuously flex their head forward or bend the arm which lead to pain at the shoulders, neck, and hands. A study confirmed that neck and shoulder pain is related to cranial vertebral angle and scapula dyskinesia. He pointed out that a high degree of smartphone addiction can reduce the angle of the spine and increase scapular dyskinesia (Akodu,

Akinbo, and Young, 2018).

Conclusion

The study showed most of the students of health science faculty in Malaysia were addicted to smartphone and were highly exposed to MSD. The prevalence of smartphone addiction among health science students is very high which more than 70%. Female students and those in age range of 22-24 is the majority of smartphone addicted. It followed with those in third and fourth years are more addicted to smartphone as well as those living in urban area. The most common MSD was neck, wrists, and upper back. There is significant association between years of study with smartphone addiction and smartphone addiction showed significant association with the MSD disorder of neck, shoulder, wrists, upper and lower back.

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