Correlation of Smartphone Addiction Leading to Text Neck Syndrome, Anxiety Disorder and Depression among AIMST University Students: A Cross-Sectional Study

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Abstract

Background: Over the past decade, smartphone technology has spread rapidly worldwide. Excessive usage has resulted into smartphone addiction which may cause musculoskeletal disorders along with mental health disorders including anxiety and depression. Text neck syndrome is caused due to repetitive stress injury where the neck is flexed for prolonged hours.

Objective: To find the correlation between smartphone addiction with text neck syndrome, anxiety and depression.

Method: A sample of 359 students was recruited by convenient sampling to participate in the cross-sectional study. Correlation was evaluated with the help of questionnaire. The questionnaire consisted of Smartphone Addiction Scale (SAS), Neck Disability Index (NDI), Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI).

Results: There was a predominance of females (n=251) over males (n=108) in our study. Mean±SD of SAS, NDI, BAI and BDI was 3.15±0.80, 6.20±5.06, 9.30±10.31, 7.74±7.98 respectively. Spearman correlation showed a positive correlation between SAS and NDI (r=0.254, p=0.000), SAS and BAI (r=0.156, p=0.003), and SAS and BDI (r=0.164, p=0.002) with level of significance at p value ≤0.05.

Conclusion: The study showed university students in Malaysia were inclined towards smartphone addiction and were exposed to neck disability, anxiety and depression.

Keywords: Smartphone addiction, Text Neck Syndrome, Anxiety, Depression

INTRODUCTION

Smartphone addiction is said to be a form of obsession that alters and affects behaviours where users are most prone to succumb into failure of controlling these addictive actions. Although smartphone usage has been increasing globally across all economic sectors and age groups, university students are deemed to be one of the largest consumers of smartphone services (Al-Barashdi et al., 2015). A smartphone is an incredible device that provides its users with not only the ability to make phone calls but to also have access to the Internet. When both combined, this device ultimately became the breakthrough in the communication and information sectors; indeed, a device serving the best of both worlds. This portable device has contributed numerous benefits to society. However, excessive usage has resulted into smartphone addiction which is alarming and has become a public health concern. Smartphone usage plays a significant role in our lives especially among university students. However, excessive usage of this handheld device may lead to the incidence of several

musculoskeletal disorders along with mental health impairments. Smartphone devices have become an integral part of our lives, whereby in a matter of a click or two, internet services and social platforms are readily available (Mustafaoglu et al., 2021). In an article written by (Robinson et al., 2021) mentioned that applications present on the phone lead to tendencies of excessive usage of these devices. With the massive variety of social media platforms, it is evidently difficult to stay away from the smartphones. Besides, many students rely greatly on this device as it allows them to browse information almost instantly, thus inevitably leading to heavier use (Al-Barashdi et al., 2015). In a recent study by (Ahmed et al., 2022) found that excessive smartphone causes a variety of musculoskeletal pains commonly involving the neck, shoulder, elbow, and hand. Text neck syndrome, as described by (Shah & Sheth, 2018) is a repetitive stress injury or an overuse syndrome to the neck due to excessive use of handheld devices for prolonged hours while keeping the head in a hung or flexed forward position. In a study conducted by (Neupane et al., 2017), mentioned that text neck syndrome may lead to detrimental symptoms such as neck and shoulder pain, increased curvature of the spine, upper back pain along with chronic headaches. In addition, (Neupane et al., 2017) have also mentioned that in an upright posture with the ears aligned to the centre of the shoulders, the average weight of the head exerts approximately 10-12 lbs of force through the muscles of the neck. However, if the head is moved forward by an inch beyond the neutral position, the burden of the head dramatically increases six times more, thus causing more strain to the muscles and compression to the spine. In conjunction to this, if left untreated, it may lead to several serious complications including flattening of the spinal curvature, disc compression, nerve damage, disc herniation, onset of early arthritis, spinal degeneration, reduced lung volume capacity, and muscle damage (Neupane et. al 2017). Smartphone addiction leads to psychological impacts that may involve anxiety disorder and depression (Matar Boumosleh & Jaalouk, 2017). Furthermore, (Zulkefly and Baharudin, 2009) added that Malaysian university students who spend more time on their smart gadgets are susceptible to psychological disorder. Anxiety is a basic emotion that is normal and necessary for individual survival, however, when anxiety arises in the absence of any threat, it is considered a disease which requires treatment as it keeps the affected individual from leading a regular life (Ströhle et al., 2018). In addition, (Ströhle et al., 2018) also stated that the World Health Organization (WHO) reported in 2015 that anxiety disorders tiered in sixth place among all mental and somatic illnesses worldwide. Individuals with depression experience loss of interest or pleasure, feelings of low self-worth and guilt, unhappiness, disturbed sleep or appetite, poor concentration and low energy (Alhassan et al., 2018). It may be extremely emotionally draining and can decrease a person’s ability to function normally at work or home. Over 300 million individuals, or 4.4 percent of the world's population, are thought to suffer from depression, making depression and anxiety disorders two of the most frequent conditions worldwide (Alhassan et al., 2018). Furthermore, according to (Alhassan et al., 2018) it is hypothesized that individuals with mood problems are more susceptible to develop smartphone addiction and that smartphone addiction can impact one's mental and behavioral health. So the objective of the study was to find correlation between smartphone addiction and text neck syndrome, anxiety and depression.

METHODOLOGY

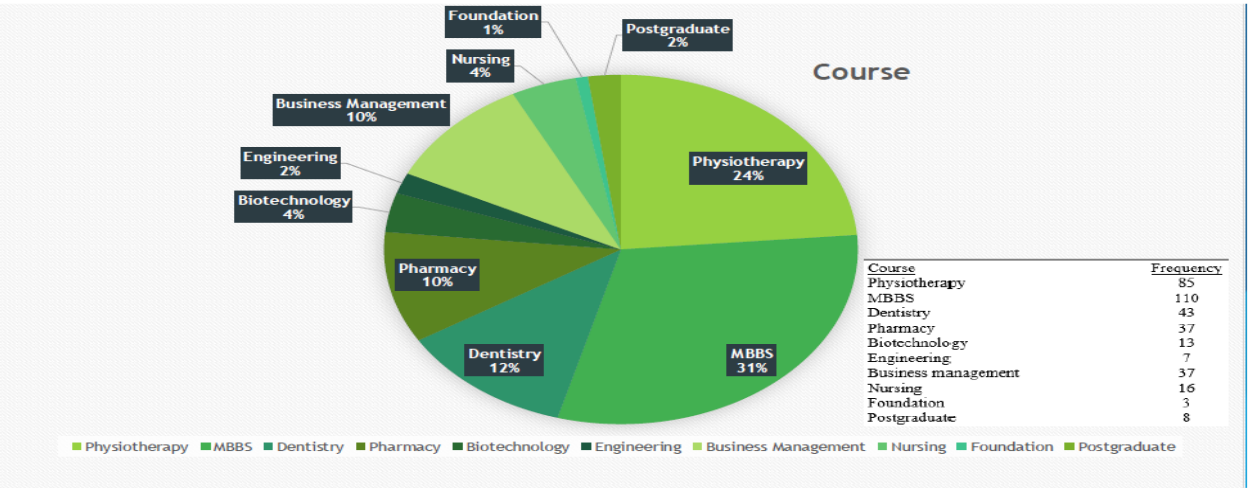
Ethical approval was obtained from AIMST University Human and Animal Ethics Committee prior to the initiation of the study.

A sample of 359 AIMST University students was recruited by convenient sampling to participate in this cross-sectional study. The selected participants were 15 from all faculties of AIMST University which include School of General and Foundation studies (SGFS), Faculty of Medicine (FOM), Faculty of Pharmacy (FOP), Faculty of Applied Sciences (FAS), Faculty of Dentistry (FOD), Faculty of Allied Health Professionals (FAHP), Faculty of Engineering and Computer Technology (FECT) and Faculty of Business Management (FBM). The participants received a brief introduction on the purpose of the study. Participants who agreed to participate were required to sign the consent form before answering the questionnaire. Each participant took approximately 15-20 minutes to answer the set of questions. Once completed, the questionnaires were collected. The period of data collection was from June 2022 to July 2022. Questionnaire included were Smartphone Addiction Scale (SAS), Neck Disability Index (NDI) and Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI).

RESULTS

Among 359 students, female made up the majority with 251 (69.9%) participants while 19

male recorded 108 (30.1%) participants. Their ages ranged between 18 to 29 years old with the mean age 21.92±1.61. Chinese participants were dominant in the study recording 205 (57.1%) out of 359 participants followed by Indian 144 (40.1%) participants, Malay 7 (1.9%) participants and Others 3 (0.8%). Figure 1 shows the details of the participants.



Course	Frequency
Physiotherapy	85
MBBS	110
Dentistry	43
Pharmacy	37
Biotechnology	13
Engineering	7
Business management	37
Nursing	16
Foundation	3
Postgraduate	8

Table 2 Correlation coefficient between Smartphone Addiction Scale, Neck Disability Index, Beck Anxiety Inventory and Beck Depression Inventory

	Mean	SD	Smartphone Addiction Scale	Neck Disability Index	Beck Anxiety Inventory	Beck Depression Inventory
1. Smartphone Addiction Scale	3.15	0.80	-	-	-	-
2. Neck Disability Index	6.20	5.06	0.254 p=0.000	-	-	-
3. Beck Anxiety Inventory	9.30	10.31	0.156 p=0.003	0.531 p=0.000	-	-
4. Beck Depression Inventory	7.74	7.98	0.164 p=0.002	0.477 p=0.000	0.604 p=0.000	-

Note: SD: Standard deviation; Spearman's rho; n= 359

Table 2 illustrates the Correlation coefficient between Smartphone Addiction Scale, Neck Disability Index, Beck Anxiety Inventory and Beck Depression Inventory. Spearman correlation was used in this study. There is a significant positive correlation between SAS and NDI (r=0.254, p=0.000), SAS and BAI (r=0.156, p=0.003), and SAS and BDI (r=0.164, p=0.002).

Discussion

The correlation of smartphone use and neck disability was evaluated among university students. The results in the present study showed that there is a significant positive correlation between SAS and NDI (r=0.254, p=0.000). Similar results were seen in a study by (Badil Güloğlu & Yalçın, 2021), showed a positive correlation between SAS and NDI (r=0.237, p=0.001). Results of the present study are in line with previous studies. Recent studies indicated that smartphone addiction was associated with an increase in musculoskeletal complaints. Among these investigations, musculoskeletal pain at the neck was accounted for the most frequent location of pain (Eitivipart et al., 2018). According to the NDI results in this study, 177 (49.3%) participants recorded mild disability (5-14). Similar results seen in (Suresh et al., 2021) where 48% of participants had a mild disability. This is supported by studies which stated that excessive smartphone use resulted in neck disability as the neck would have to be flexed more often in order to compromise the posture. This would cause trigger points to form in the upper trapezius, alter the curvature of the spine, and increase the stress on the cervical spine (Suresh et al., 2021). The present study confirms the findings of other authors who stated that the most common posture while using a smartphone is a flexed posture, which causes neck pain. It also acknowledges previous studies that show pain from musculoskeletal disorders is a common problem among college students (Suresh et al., 2021). The cause of neck pain among smartphone users is due to the frequent neck flexion posture, which alters the cervical spine's natural curve and puts more strain on it (Shah & Sheth, 2018). This increased stress causes irritation and spasm in the surrounding skeletal structures and ligaments. When smartphones are used excessively, the head and neck may move habitually, repeatedly, and continuously toward the screen throughout the day (Shah & Sheth, 2018). Such movements are linked to an increased risk of developing chronic neck pain, which could account for the present study's finding of a significant correlation between SAS and NDI scores. In addition, text neck directly impacts the spine while flexing the head forward at varied angles. When the head tilts forward at an angle of 15 degrees, the forces on the neck increase to 27 pounds; at an angle of 30 degrees, they rise to 40 pounds; at an angle of 45 degrees, they reach 49 pounds; and at an angle of 60 degrees, they reach 60 pounds (Neupane et al., 2017). This is a serious problem for children because their heads are larger in comparison to their body size than adults, putting them at a higher risk for text neck due to their proclivity to use mobile phones. Untreated text neck issues can lead to serious irreversible damage that is remarkably similar to occupational overuse syndrome or repetitive stress or strain injuries (Neupane et al., 2017). The results in the present study also showed that there is a significant positive correlation between SAS and BAI (r=0.156, p=0.003). In a study by (Ithnain N et al., 2018) showed that there is a significant positive correlation between SAS with BAI (r=0.227; p<0.001). Our results resonated well with results from multiple prior studies which examined the relationship between smartphone addiction and anxiety. In a study by (Hawi & Samaha, 2017) stated that anxiety levels were high

among university students who were addicted to their smartphones. According to the findings, smartphones may exacerbate anxiety because as smartphone addiction rises, so does the amount of anxiety (Hawi & Samaha, 2017). According to the BAI results in this study, majority of the participants, 319 (88.9%) had low anxiety (0-21), 27 (7.5%) participants had moderate anxiety (22-35) while 13 (3.6%) participants had high anxiety (≥36). In contrary, other studies showed higher results of anxiety among the participants. A study conducted by (Korkmazer et al., 2022) recorded 130 of the participants (50.2%) had no anxiety, 47 (18.1%) had mild anxiety, 45 (17.4%) had moderate anxiety, and 37 (14.3%) had severe anxiety. The present study expands the prior literature by showing a positive correlation between smartphone addiction and anxiety. The findings of the present study are consistent with previous studies (Demirci et al., 2015; Lei et al., 2020). According to a study by (Ithnain N et al., 2018), smartphone addiction was found to be a predictor of anxiety in Malaysian undergraduate students. Previous research, on the other hand, found that anxiety significantly predicted smartphone addiction (Matar Boumosleh & Jaalouk, 2017; Aker et al., 2017) In order to address the issues of smartphone addiction and anxiety, (Yu & Son, 2016) conducted a study on Acceptance Commitment Therapy with 18 participants and divided them into two groups, the Program Group and the Control Group. Acceptance and Commitment Therapy (ACT) is a psychological technique that promotes psychological flexibility by combining acceptance and awareness strategies with commitments and behavioral change strategies. A follow-up research was carried out following the treatment, and the course was monitored for eight sessions. Four weeks were spent in the follow-up period. The study's findings demonstrated that the program might be used as one of the treatment options for smartphone addiction because the program successfully reduced both the level of anxiety and smartphone addiction (Yu & Son, 2016).The present study showed a positive correlation between smartphone addiction and depression which parallels the results of a study conducted among college students (Kim et al., 2015). (Hwang et al., 2012) has also reported that high levels of smartphone addiction is associated with a high levels of depression. In addition, a study among adolescent subjects found a link between smartphone addiction and depression (Young & Rogers, 1998). Considering the relationship between depression and smartphone addiction from a different perspective is also valid (Alhassan et al., 2018). Smartphone addiction can be a risk factor for depression, either directly or indirectly through a mediating effect. There is a link between smartphone addiction and altered lifestyle habits, with smart phone addicts having a higher tendency to skip meals, eat unhealthy diets, gain weight, and experience sleep disorders than less addicted smartphone users. These can be considered risk factors for depression (Alhassan et al., 2018). A study by (Park et al., 2015) was conducted to compare depression among 20 students. They were divided into two groups which were the Heavy Smartphone User Group (n=10) and Control Group (n=10). Results showed that heavy users suffered from depression. The depression scale differed significantly between the two groups in this study. Heavy smartphone use has been linked to somatic complaints, insomnia, depression, psychological distress, and an unhealthy lifestyle. Individuals who are constantly on their smartphones may find that they have less time for other social relationships, particularly activities that require face-to-face interactions (Park et al., 2015). Individuals may feel lonely as a result of this situation. Although smartphones are

used as communication tools, excessive use leads to addiction and isolation which in return leads to depressive symptoms.

CONCLUSION

In conclusion, the present study recorded a significant positive correlation between SAS and NDI, SAS and BAI, and SAS and BDI respectively. This showed that students addicted to their smartphones were not only inclined towards developing text neck syndrome but also developing anxiety disorder and depression. Ultimately, depression, anxiety, and text neck syndrome may be associated with smartphone overuse. As a result, there is a need to develop appropriate health education programs and interventions for university students to deal with addiction and improve their physical and mental well-being. This allows for the implementation of effective intervention and prevention strategies for groups of students who are addicted to smartphones. Future studies are required to further explore this relationship because this is a growing global concern that should be further investigated.

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