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CORRELATION OF PROBLEMATIC SMARTPHONE USE AND TEXT NECK SYNDROME AMONG UNIVERSITY STUDENTS

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Abstract

Background: *The daily use of smartphone devices is increasing worldwide. It can affect personal relationships mental and physical health state. Neck Pain take a great deal on daily health care practice. Neck pain is considered a fourth leading cause of disability.* ***Aim:*** *To investigate the relationship between addiction to smartphone usage and self-reported neck pain, and to assess the predictive factors of the smartphone addiction among university students to better understand this relationship.* ***Objective :*** *To evaluate the association of neck pain with smartphone use and their usage duration among students of Mosul University , and correlate its use with neck pain. Method: The study examined 164 healthy students of nursing college in Mosul University by random table sampling, in the age group of 20-25 years. They were given self-administered, pre-tested questionnaire which include various mental and physical health symptoms related to smart phone usage and fill a questionnaires of Smartphone Addiction Scale (SAS), Neck Disability Index (NDI). Spearman correlation coefficient was used to correlate between the SAS and NDI.* ***Result:*** *Most of students (61.2%) are regular users of smartphones.47.6%had no neck pain, There is an association between SAS&NDI in male students, and there is high association of type of device use& NDI with female gender.* ***Conclusions:*** *The excessive use of smart phones has health related problems, more specifically in neck region. The smart phone users complain from neck pain (Text neck), more clearly related to the duration of use of smart phones.*

Keywords: *Smartphone addiction, Text neck, (NDI), SAS.*

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Introduction

The number of smartphone users has increased dramatically [1]. People are becoming more dependent on smartphone devices than ever. People are using smartphones for different purposes, such as social communication, checking social media, connections, watching videos, reading books, messages, doing some form of jobs (consumer deals), browsing the internet, email, seeking and sharing information, contacting and relating with other people, emotional support, diversion and relaxation (music), internet access, and entertainment (photos and games) [2]-[5]. The simple use and portability of a smartphone make it possible to use it anywhere, and for unlimited durations worldwide [6]. Until now, many researchers have conducted studies to

determine the prevalence of neck pain associated with smartphone use [7]. The effects of smartphone use on the musculoskeletal system have been reported, although studies on smartphone usage posture and its effect on changes in the neck flexion angle over time are insufficient [8]. There is an increasing incidence of neck pain in different age groups. Nowadays, younger age groups are complaining of neck pain more than ever [4], [5]. There is a correlation between the amount of time spent using a smartphone and the severity of the complaint; prolonged use of smartphones might lead to deficient postures, such as forward head posture and rounded shoulders, as a compensatory posture due to poor work habits or poor workstation arrangements, which may predispose individuals to musculoskeletal deficits [1]-[4], [9]. The term "text neck" has been used to describe an "overuse syndrome" where a person's head is flexed in a forward position and bent down, looking at the mobile or other electronic devices for a prolonged period [10]-[14]. The maintenance of a head in a forward posture decreases cervical lordosis of the lower cervical vertebrae and creates a posterior curve in the upper thoracic vertebrae to maintain balance, resulting in the "text neck" or "turtle neck posture," or, "upper crossed syndrome" [3], [9], [15]-[17]. Fatigue and stress in the neck and shoulders occur with the use of touchscreen computers more than with desktops because small-monitor devices such as smartphones and tablet PCs cause people to look down more than with desktops [18], [19]. People with smartphone addiction complain of social, psychological, and health problems. Smartphone addiction could be categorized as a behavioral addiction with six core symptoms: salience, conflict, mood modification, tolerance, withdrawal problems, and relapse [1], [20], [21]. The daily use of a smartphone produces pleasure, reduces feelings of pain and stress, and leads to a failure to control extensive use despite its harmful consequences in financial, physical, psychological, and social aspects of life [1], [3], [22]. The daily duration of smartphone use is one of the most significant indicators of smartphone addiction [1], [7], [17]. Excessive adoption of smart devices is often associated with prolonged and chronic undesirable health problems, lack of exercise leading to obesity, enhanced bad health habits such as the use of tobacco or consumption of alcoholic beverages, exaggerated health problems such as lethargy, lack of orientation, memory disturbances, difficulty in concentration, depression, and insomnia [16], [23]. It is evident in the excessive use of smartphones while engaged in other duties such as studying, driving, social activities, and even sleeping [24]. Many people fail to recognize that smartphone addiction is a serious issue and has a negative effect on a person's thoughts, behavior, tendencies, feelings, and sense of well-being. It reduces an individual's social engagement in the real world and, as a consequence, psychological well-being, because it produces isolation, loneliness, and depression, which the individual seeks to ease by connecting to the Internet [4], [21]. Addiction as a term not only applies to drug or substance abuse but can also refer to gambling, the internet, games, or even excessive smartphone use. These can belong to the category of behavioral addiction [3], [25]. Conventional diagnostic criteria strictly regard only symptoms caused by repetitive and excessive substance use as addiction. However, not only ordinary people but even clinicians use the term 'addiction' when a person is obsessed with certain activities that result in disturbances in daily activities and shows a pattern similar to substance dependence [26]. There was

a tendency to use non-pathological terminology, such as "Problematic Smartphone Use," which involves excessive use accompanied by symptoms similar to substance-related dependence, withdrawal when not using their smartphones, and associated functional impairment, rather than the term smartphone addiction [10], [18], [24]. The aim of the present study was to assess the level of self-reported smartphone addiction and correlate its relationship with musculoskeletal disorders in the neck in young healthy university students.

Methods

This cross-sectional study, approved by the Ethics Committee at the Nursing College, Mosul University, Iraq, involved 164 third- and fourth-year students aged 20-25 who used smartphones for at least 1 hour daily. The research methodology was designed to comprehensively assess the correlation between smartphone addiction and musculoskeletal disorders, specifically neck dysfunction, among the students. Data collection occurred from November 1, 2018, to March 15, 2019, using a self-administered questionnaire that included demographic data, the Smartphone Addiction Scale-Short Version (SAS-SV), and the Neck Disability Index (NDI). The SAS-SV assessed smartphone addiction, while the NDI evaluated neck dysfunction. Higher scores on both scales indicated greater addiction and disability. Statistical analysis was performed using SPSS version 21, with SAS and NDI scores presented as Mean ± Standard deviation. Spearman correlation was used to assess the relationship between SAS and NDI scores, and a chi-square test with a forward stepwise selection method was employed to compare univariate and multivariate logistic regression models, considering gender as a potential confounder. Differences with a $P < 0.05$ were deemed significant.

Results and Discussion

The overall percentage mean score (PMS) of Smartphone Addiction scale (SAS-SV) was 50.2 ± 20.25, The sample composed of 164 participants (Age mean± SD =21.80±1.29), most of whom were females (116/164) with maximum people having usage hours of 2-4 hours per day (58/164).

Table 1:Participant characteristics and smartphone user behavior.

	Frequency	Percent
Gender:		
Male	**48**	**29,26**
Female	**116**	**70,73**
The Average hours of use:		
<1 hour	**17**	**10,64**
1-2 hour	**46**	**28,04**
2-4 hours	**58**	**35,36**
4-6 hours	**14**	**8,53**
>6 hours	**29**	**17,68**
Types of device used:		
Mobile phone	**157**	**95,73**
I Pad	**6**	**3,65**
Lap top	**1**	**0,6**

Table2. :Descriptive Statistics and Correlations for the SAS Subscales and Process Usage and Social Usage.

Variable	M	SD	Min	Max
1.Daily Life Disturbance	9.56	2.42	3	30
2.Positive Anticipation	23.45	4.31	4	35
3.Withdrawal	18.24	3.70	3	27
4.Cyberspace oriented Relationships	18.56	3.56	4	33
5.Overuse in digital relationships	16.78	2.65	3	32
6.Tolerance	14.75	2.85	2	26
7.Process Use	22.57	3.98	4	37
8.Social Use	18.56	2.23	3	22

Table (3):The distribution of Smartphone Addiction Proneness Scale.

SAS	Percent	Mean	St Dev.
Regular user group	61,21	67,59	16.9
Potentially dangerous use group	21,28	27,71	12.58
High-risk user group	17,61	12,96	7.31

Table (4):The distribution of NDI among study sample:

NDI	Percent	Mean	St Dev.
Zero	47,62	78,11	24.42
1	30,77	50,77	14.64
2	13,07	21,44	11.51
3	3,99	6,55	2.65
4	2,84	4,66	6.04
5	1,49	2,44	2.93

Table(5):The relationship between SAS and NDI according to the gender

	Male		Female	
Relationship between	**Chi-square**	**P-value**	**Chi-square**	**P-value**
SAS+NDI	387,970	0,026	763,935	0,413
Hours of use + SAS	116,823	0,073	164,296	0,566
Hours of use + NDI	67,651	0,137	73,265	0,436
Type of device use + SAS	34,044	0,936	95,127	0,191
Type of device use + NDI	12,70	0,994	135,590	0,000

Discussion

The aim of the present research was to assess the health effects of smartphone usage among nursing students of Mosul University and to identify the predictors of smartphone addiction, or what is commonly called "problematic smartphone" use. Other terms used to describe overuse of a smartphone include "addiction," "excessive use," "compulsive use," and "compensatory use." “Compensatory use” may not be exactly the same as problematic use, but it can explain the motivation for such use, i.e., to escape real-world problems and duties, and/or avoid negative emotions and affect. Problematic smartphone use as an addictive disorder has only limited research evidence. Frequent use of a smartphone is not necessarily a pathological behavior unless accompanied by clear evidence of addictive symptoms [7], [18], [21].

The daily use of smartphones affects human body physiology and mechanics in an unhealthy way, especially in the neck, shoulder, upper back, and arms, along with whole-body pain. The medical term "text neck" is used to describe the harmful and unhealthy condition resulting from extensive smartphone use. It is also considered an extensive international burden, affecting populations of both genders and all age groups in every community [14], [21], [28].

The present study (Table 1) showed that the sample comprised 164 participants (Age mean± SD = 21.80±1.29), most of whom were females (116/164) with maximum usage hours of 2-4 hours per day (58/164). The degree of smartphone influence was significantly correlated with musculoskeletal discomfort in the participants. The results of this research are consistent with numerous previous and similar studies suggesting that the prevalence of musculoskeletal disorders is considerable among university students. The occurrence of neck pain is related to several factors, including gender, grade, and soreness after exercise. The distribution of musculoskeletal symptoms or pain of any severity was most common in the neck, followed by the upper back and then the shoulders. The total time spent using a smartphone was significantly associated with any pain in the neck and shoulders [15], [29]-[31].

Various surveys of adults and adolescents have shown that smartphone use can increase the incidence of neck pain [1], [21]-[24]. The smartphone use time and the occurrence of musculoskeletal pain were correlated, increasing the prevalence of neck pain [3], [29], [31].

Table 2 presents descriptive statistics for the scale scores analyzed, along with zero-order Pearson correlations for the SAS subscales and process and usage variables.

Process and social usage are correlated at P ≤ .001. A significant positive correlation between both SAS and NDI was found ($p < 0.001$). An association between smartphone addiction and altered lifestyle habits was found, with a higher tendency among smartphone addicts to skip meals, eat unhealthy diets, gain weight, and experience sleep disorders compared to less addicted smartphone users [24]. Overuse of smartphones causes problems with attention and focusing, as these people are more likely to show more functional impairments that interfere with learning, work, and family life [9].

Moreover, Table 3 shows the majority of students are regular users at 61.21%, while 17.61% had a higher score indicating addiction to smartphone use depending on the SAS scale. Along with it, the scores of NDI showing simple disability 47.62% (Table 4). The neck disability among smartphone-addicted users could be correlated to neck flexion posture and depend on the stress on the cervical spine, yielding to spasm in the skeletal muscles and ligaments due to repetitive and continuous movements of the head and neck toward the screen for a long time, leading to chronic neck pain and may explain the strong association between SAS and NDI scores [10], [12], [24], [29].

Lee and Song studied pain severity according to smartphone use duration and revealed significant differences in reading, concentration, and headaches, although these could be transient symptoms from smartphone use [12]. Text neck most commonly causes neck pain and soreness. In addition, looking down at smartphones too much can lead to upper back pain, shoulder pain, and tightness ranging from chronic, continuous pain to sharp and severe muscle spasms [8], [12], [14], [29].

Most subjects were using the phones in the wrong position, which could have negatively affected muscles and joints [19], [20]. Smartphone overuse places the head in a flexion posture and continuous muscle contraction, leading to muscle weakness and fatigue that could easily develop into chronic cervical pain [20]. In addition, continuous pressure on specific sites could also increase muscle fatigue and pain [15].

Looking downward promotes muscle fatigue more easily than looking upward. It is expected that the overall posture, including neck posture, will be bent more. This kind of excessive neck flexion can cause deformation of the normal neck bone into a C shape and fatigue on the neck and muscles around the shoulders [29]. Students should be advised to avoid continuous use of smartphones for long periods, correct neck posture while using, take frequent short breaks, and use voice-to-text software programs [8].

The factors that predispose one to developing smartphone addiction should be identified. The importance of cut-off values, which were suggested through the development and validation of the smartphone addiction scale, had been highlighted [18]. In Table 5, the non-significant difference may be attributed to the fact that the postural changes that occur in response to smartphone use may be related to the use of the phone and adaptive posture to this use rather than to the duration of use. Also, it may be explained by the fact that the majority of the sample were college students involved in many similar educational activities like reading, writing, and computer use. These factors might predispose to forward-head posture as a postural adaptation to a visual display terminal [4].

The SAS-SV score was 24 in males and 28 in females, which showed a significant difference by gender in males at a P-value of 0.026 but not in females in correlation with

NDI. Other research on smartphone addiction conducted in South Korea also shows a difference in the degree of addiction by gender. It suggested that the female participants were more aware of their addiction based on the higher self-reporting scores [9]. At the development stage of the SAS, Kwon et al. reported that the higher scores in the female participants were not statistically significant [15]. As self-reporting, the female participants have the tendency to be aware and express their problems more openly than the male participants. Male students have the tendency to externalize their addiction symptoms while female participants relatively internalized them; therefore, the self-awareness showed a difference by gender [18]. While gender differences were not observed, whether in relation to addiction or depression, which was comparable to some studies in the literature [13], [21], [32]. Males tend to use the internet mainly for online gaming, while females tend to use the internet for sending messages, chatting, and blogging [9].

Table 5 also shows no significant difference between smartphone users' time and SAS and NDI, while with other studies, the risk group for smartphone addiction spent more time on the smartphone and mobile messenger than the normal user group did [19], [26], [29], [31].

A survey of adults over the age of 20 years experienced symptoms related to a musculoskeletal disorder from smartphone use, and that pain had increased with duration of use [20], [29], [31]. A study from Turkey found that younger age groups had higher levels of smartphone overuse [30]. Generally, young adults have a higher risk of smartphone addiction compared to adults, as they are more susceptible to accepting new technologies than older adult groups [9], [33].

Conclusion

Smartphone addicted students may experience musculoskeletal problems in neck and may be short term problem but may later lead to long term disability. According to the result of this study we concluded that there is no association of neck pain with usual daily usage of smartphone ,and there is an Association of neck pain with gender . There is a need for educational programs to educate people especially younger adults about the risks associated with excessive use of smartphones. And reasonable use of smart phones is advised. The mobile phone users usually experience subjective symptoms, the intensity of which is dependent on the intensity of use of mobile phones. Mobile phones may consider as a risk factor for multiple health problems in long-term users. There is a lack of studies regarding the physical effects of long-term smartphone use. Additional studies are needed regarding cumulative trauma, posture changes in the neck and shoulders . limiting the duration of use of smart phones, holding the phone away from the head, use of hands free devices, maintaining the proper body posture while texting It is advisable to coin the condition of head and neck pain associated with mobile phone usage as mobile phone head and neck pain syndrome.

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