

Mobile Phone Head and Neck Pain Syndrome: Proposal of a New Entity

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Abstract

Background: The aim of this study was to assess the health effects of mobile phone usage among university students of Saudi Arabia and proposal of a new syndrome. **Subjects and methods:** 396 students studying in dental college and medical college of Aljouf university, Kingdom of Saudi Arabia were included in the study. They were given self-administered, pre-tested questionnaire which included various mental and physical health symptoms related to mobile phone usage. **Results :** Cervical pain was the most commonly reported complaint, which was seen in 71.2% of study respondents, followed by headache (63.3%), irritability (54.5%), anxiety (50.7%), lack of concentration (47.4%), straining of eyes (36.8%), insomnia (31.3%), memory problems (28.5%), depression (19.69%). Itching and/or erythema of periauricular skin the least commonly seen complaint (16.91%). **Conclusion:** The findings of the present study demonstrate that excessive use of mobile phones pose significant health related problems, more specifically in head and neck region. The mobile phone users usually experience subjective symptoms, the intensity of which is dependent on the intensity of use of mobile phones.

Key Words: Mobile phone, Cell phone, Cervical pain, Adverse effects, Syndrome

Introduction

In today's developing world applicability of electronic media such as computers, lap tops, mobile phones, television, gaming consoles, tablets and other related gadgets have become very common amongst all the genders and age groups. In spite of some acquaintance regarding hazardous health effects, the habitude of mobile phones has heightened severely especially from the moment they have become more economical and accessible all over the globe [1]. Availing of mobile phones (MPs) has suddenly increased, with over 3 billion citizens presently handling MPs ubiquitously [2]. Adoption of electronic communicating and entertaining equipments is reported to be more prevalent in students of Saudi Arabia, practically, entire clan use televisions, computers and laptops, audio devices and use of MPs with internet access reported to be boundless amidst all teenage population [3].

Mobile phones praxis routines such as time period of usage and application of mobile phones for accessing internet, social media and for playing games may be considered as prime contingency factors which may enhance prospect of endangerment emerging from the use of MPs. Delinquency and increased inclination towards usage of MPs may become the cardinal factor for a mishap like road traffic accidents and it may also dilapidate the personal and family lives [4]. Eventhough MPs have been proven as the best and efficient way for communication between families, friends, and among various professionals, surplus usage of this device may adversely affect the health of the individual. Exuberant adoption of electronic gadgets is often divulged to be conjoined with prolonged and chronic undesirable health effects, lack of regular exercise leading to obesity, enhanced health-conciliating habits like usage of tobacco or consumption of alcoholic beverages, exaggerated health issues in terms of ambiguous signs and symptoms like lethargy, lack of orientation, memory disturbances, and difficulty in concentration, depression and insomnia [1]. The excessive usage of MPs reported to have a negative influence on our

anxiety and stress levels. The persistent ringing and vibrating alerts may plunk down a mobile phone user on edge.

Prolonged usage of a mobile phone may attenuate the attention of visual field and also possibilities of growth of brain tumor [5] along with excess traits of extraversion and neuroticism have also been reported in the literature [6]. Few researchers assessed a satisfying theoretical and clinical corroboration to collar the hypothesis that about 5% to 8% of mobile phone users may manifest with ephemeral symptoms of vestibular disturbance conjoined with the mobile phone usage [7] Mobile phones have an adverse impact on the essence of living by subjecting the individual to radiofrequency not only during day hours but also noted even more marked during the sleeping period. Lack of proper sleep may lead to fatigue, tiredness, and shortfall of energy during morning hours. It is reported that legitimate mobile phone usage during late night by teenagers may even lead to mood and personality disturbances and other issues like [8].

Pain related conditions affecting the neck, shoulder and arms are prevalent in various population groups [9]. The existence of head and neck symptoms in association with cell phone usage has been previously described, but is very rare. Hence a study on impact of mobile phone use on the health of university students, more specifically to head and neck region was carried out along with a proposal of new syndrome.

Material and Methods

This was a cross sectional study. Students from dental college and medical college of Aljouf University, Kingdom of Saudi Arabia, using mobile phones were included in this study. Students with history of musculoskeletal disorders, neurological disorders, psychological disorders and other related conditions were excluded from the study. Ethical clearance was obtained from the institutional ethical committee. A self-administered questionnaire was distributed to all subjects (Figure 1). The questionnaire was pilot tested for its expediency and legitimacy (the questionnaire was validated using first year students of dentistry, in Aljouf University). The final questionnaire was modified based upon

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feedback and the format was finalized. Stratified random samples of 396 students were recruited. The participants were first made aware about the hypothesis of this study. A formal consent was obtained from all the subjects. Complaints/symptoms like neck pain, headache, insomnia, depression, sadness, irritability, anxiety and loss of memory were asked. The data obtained was tabulated and statistically analysed using the Statistical Package for Social Science 21.0 (SPSS 21.0, Chicago, USA).

Results

The total number of respondents was 396. Two hundred and twelve (53.33 %) of the respondents were from the dental

college and the rest, 184 students (46.46%) were from college of medicine. The subjects were divided into four groups on the basis of the duration of mobile phone usage.

Distribution of patients according to the years of cell phone usage

Table 1 shows that, among total of 396 respondents, 19.94% were using cell phones less than 1 year of duration (Group 1), 21.96% using since 1-3 years of duration (Group 2), 27.02% were using from 3-5 years of duration (Group 3) followed by 31.06% of subjects who were using cell phone more than 5 years of duration (Group 4).

Table 1. Distribution of patients according to years of cell phone usage.

| Duration | Number (n) | Percentage (%) |
|---------------------|------------|----------------|
| < 1 year (Group 1) | 79 | 19.94 |
| 1-3 years (Group 2) | 87 | 21.96 |
| 3-5 years (Group 3) | 107 | 27.02 |
| > 5 years (Group 4) | 123 | 31.06 |

Prevalence of symptoms among mobile phone using subjects

Data from table 2 reveal that, a maximum of 71.2% of the study respondents had cervical pain and a minimum of 16.91% respondents had itching and/or erythema of

periauricular skin followed by headache (63.3%), irritability (54.5%), anxiety (50.7%), lack of concentration (47.4%), straining of eyes (36.8%), insomnia (31.3%), memory problems (28.5%), depression (19.69%).

Table 2. Prevalence of symptoms among cell phone using subjects.

| Symptoms | N | % |
|---|-----|-------|
| Cervical pain | 282 | 71.2 |
| Headache | 251 | 63.3 |
| Irritability | 216 | 54.5 |
| Anxiety | 201 | 50.7 |
| Lack of concentration | 192 | 48.6 |
| Straining of eyes | 142 | 35.9 |
| Insomnia | 124 | 31.3 |
| Memory problems | 113 | 28.5 |
| Depression | 78 | 19.69 |
| Itching and/or erythema of periauricular skin | 67 | 16.91 |

From the results of the table 3 it can be seen that,

- A maximum of 102 (82.9%) of respondents in group 4 and a minimum of 39 (49.3%) had cervical pain symptom in group 1 followed by 78 (72.8%) in group 3 and 63 (72.4%) in group 2. The differences was found to be statistically significant (chi-square=13.603, p<0.05).
- A maximum of 111 (90.2%) of respondents in group 4 and a minimum of 18 (22.7%) had headache symptom in group 1 followed by 74 (69.1%) in group 3 and 48 (55.1%) in

- group 2. The differences was found to be statistically significant (chi-square=23.867, p<0.05).
- Highest of 89 (72.3%) of respondents in group 4 and a lowest of 30 (37.9%) had irritability in group 1 followed by 63 (58.8%) in group 3 and 34 (39.0%) in group 2. The differences was found to be statistically significant (chi-square=10.464, p<0.05).
- A maximum of 75 (60.9%) of respondents in group 4 and a minimum of 21 (26.5%) had anxiety in group 1 followed by 59 (55.1%) in group 3 and 46 (52.8%) in group 2. The

differences was found to be statistically significant (chi-square=16.841, $p<0.05$).

- Highest of 71 (56.9%) of respondents in group 4 and a lowest of 20 (25.3%) had lack of concentration in group 1 followed by 58 (53.3%) in group 3 and 42 (47.1%) in group 2. The differences was found to be statistically significant (chi-square=24.167, $p<0.05$).
- A maximum of 51 (42.2%) of respondents in group 4 and a minimum of 14 (18.9%) had straining of eyes in group 1 followed by 45 (42.0%) in group 3 and 34 (39.3%) in group 2. The differences was found to be statistically significant (chi-square=18.981, $p<0.05$).
- Highest of 56 (45.5%) of respondents in group 4 and a lowest of 9 (11.3%) had insomnia in group 1 followed by 38 (35.5%) in group 3 and 21 (23.1%) in group 2. The differences was found to be statistically significant (chi-square=24.501, $p<0.05$).
- A maximum of 46 (37.3%) of respondents in group 4 and a minimum of 11 (13.9%) had memory problems in group

1 followed by 32 (29.9%) in group 3 and 24 (27.5%) in group 2. The differences was found to be statistically significant (chi-square=23.813, $p<0.05$).

- Highest of 36 (29.2%) of respondents in group 4 and a lowest of 8 (8.8%) had depression in group 1 followed by 25 (23.3%) in group 3 and 9 (10.3%) in group 2. The differences was found to be statistically significant (chi-square=21.867, $p<0.05$).
- Lastly, a maximum of 29 (23.2%) of respondents in group 4 and a minimum of 6 (7.5%) had itching and/or erythema of periauricular skin in group 1 followed by 20 (18.6%) in group 3 and 12 (13.7%) in group 2. The differences was found to be statistically significant (chi-square=13.204, $p<0.05$). It clearly showed that, who were belonging to groups 4 had significant and higher symptoms as compared to group 1 and followed by group 3 and group 2.

Table 3: Comparison of symptoms between groups.

| Symptoms | Gr 1 n (%) | Gr 2 n (%) | Gr 3 n (%) | Gr 4 n (%) | X2 | P-value |
|---|---------------|---------------|---------------|---------------|--------|---------|
| Cervical pain | 39 (49.3) | 63 (72.4) | 78 (72.8) | 102 (82.9) | 13.603 | <0.01 |
| Headache | 18 (22.7) | 48 (55.1) | 74 (69.1) | 111 (90.2) | 23.867 | <0.001 |
| Irritability | 30 (37.9) | 34 (39.0) | 63 (58.8) | 89 (72.3) | 10.464 | 0.015 |
| Anxiety | 21 (26.5) | 46 (52.8) | 59 (55.1) | 75 (60.9) | 16.841 | 0.001 |
| Lack of concentration | 21 (25.3) | 42 (47.1) | 58 (53.3) | 71 (56.9) | 24.167 | <0.001 |
| Straining of eyes | 14 (18.9) | 33 (39.3) | 44 (42.0) | 51 (42.2) | 18.981 | <0.001 |
| Insomnia | 9 (11.3) | 21 (23.1) | 38 (35.5) | 56 (45.5) | 24.501 | <0.001 |
| Memory problems | 11 (13.9) | 24 (27.5) | 32 (29.9) | 46 (37.3) | 23.813 | <0.001 |
| Depression | 8 (8.8) | 9 (10.3) | 25 (23.3) | 36 (29.2) | 21.867 | <0.001 |
| Itching and/or erythema of periauricular skin | 6 (7.5) | 12 (13.7) | 20 (18.6) | 29 (23.2) | 13.204 | 0.004 |

Discussion

The aim of the present study was to evaluate health effects of mobile phone usage amongst the University students of Aljouf province, Kingdom of Saudi Arabia.

The most common symptom observed in this study was cervical pain, which was reported from 71.2 % of subjects. The use of mobile phone leverage our body demeanor and mechanics in unsound manner which may bequeath neck, shoulder, upper back and arm along with whole body pain. A new medical term text neck is applied to the harmful and dangerous condition resulting from extensive and long-term use of MPs. This condition is known to be affecting majority of mobile phone users and is also considered as an amplifying sharp global burden, affecting population of both the sex and all the age groups belonging to every society. This condition consummate from the reciprocated mutilation resulting from repetitive stress to the body resulting from long term use of handheld electronic gadgets, recurrent forward head flexion

while seeing downwards at the screens of mobile phone for a longer duration [10],[11]. A research has been conducted to investigate the forces beard by the spine as the head is bent forward, into deteriorating position. The observations of the study concluded that, the weight observed by the spine significantly increases while bending the head in forward position at varying degrees. This leads to loss of the normal curvature of the spine which contributes to substantial increase of stress towards the cervical spine [11].

Al-Khlaiwi et al.,[3] and Khan M [12] reported headache in 21.6% and 16.08% of subjects in Saudi population using mobile phones, in a study carried out among Indian college students by Acharya et al.,[13] headache was noted as commonest symptom seen in 51.47%, Milde-Busch et al.,[14] reported headache in 2.9% of subjects who used mobile phones for more than 30 minutes a day. Researches carried out among mobile phone using population in Sweden and Norway showed headache in 4-13% of users.[15] Santini et al.,[16] reported that 10-20% of cell phone users noticed

headache in France. Chu et al.,[2] observed that 18.9% of subjects suffered headache who used mobile phones more than 10 times during the last 1 year of their study. In contrast to the results of these studies, headache was observed in 63.3% of subjects of the present study, which was much higher but similar to the results of Szyjkowska et al.,[17] who observed headache in 70% of mobile phone using subjects but out of 70 % subjects who reported with headache, only 6.8% related headache to mobile phone usage. The ingenious association between headache and usage of mobile phones is not established till date. Headache while or after usage of mobile phone may result from diversifying circumstances during mobile phone use like radiofrequency fields, psychological factor, changes in local temperature, vibrations, cacophony and amalgamation of these various factors. [1].

Irritability is a feeling of agitation resulting as an excessive response to stimuli. In the present study irritability was reported from 54.5% of subjects which was in accordance to Acharya et al., who reported irritability in 50.8% of subjects [13].

Anxiety is defined as an unpleasant state of a fear and concern, often accompanied by nervousness and somatic complaints. It was noted in 50.7% of subjects, this was more in comparison to the results of Acharya et al., who observed anxiety in 38.5% of patients [13]. Lack of concentration was noted among 48.6% of population, which was almost similar to the observations of Acharya et al., who noticed 47.4% of subjects complained of inability to concentrate in their studies [13]. Khan M noted impaired concentration among 34.27% of Saudi subjects, which was almost similar to the present results [12].

Eye strain was reported by 35.9% of subjects, this may result of constant staring at the screen of the mobile phone during continuous texting and playing games. Acharya et al., noted straining of eyes in 36.5% of subjects, which was slightly high in comparison to the results of this study [13].

Insomnia was observed among 31.3% in this class of subjects, this was more when compared to the results by Al-Khlaiwi et al., [3] and Khan., [12] who noted sleep disturbance among only 4% and 38.8% of mobile phone users respectively, where as Acharya et al., reported insomnia in 35.4% of subjects, which was comparatively higher than the results of the present study [13]. It is reported that high mobile phone use was related to sleep disturbances and symptoms of depression and other psychological problems [18],[19]. In the present study, memory problems and depression was reported from 28.5% and 19.69% of subjects, these findings were not reported in the studies by Al-Khlaiwi et al.,[3] and Acharya et al.[13] Khan M observed memory disturbances in 40.56% of subjects [12].

Discrepancies in the proportion of MP users who experienced various complaints may be due to differences in different types of mobile phones, frequency and duration of mobile phone use, demographic features of participants.

Mobile phone allergic contact/facial dermatitis is an emerging problem, it is substantiated that, during prolonged use of mobile phone, the chromate, which is present in the body of the mobile phone reacts with sweat of the individual

and turn into an allergen which leads to facial dermatitis [20]. Bercovitch analyzed different models of mobile phones for the existence of nickel and noticed that 10 devices showed the presence of metals incorporating the various operating buttons, logos, edge of the screen and over the region of the phone where paint was chipped [21]. This condition classically manifests as erythematous plaques around the ears unilaterally corresponding to the areas where the metal parts of the mobile phone come in contact of the face [20]. In the present study 16.91% of the participants were observed with such symptoms, Szyjkowska et al. [17] who noticed facial dermatitis in 11% of subjects and Khan M observed in 16.78% [12]. Facial dermatitis associated with mobile phone can be prevented by covering the phone with a plastic film, or by using a wireless ear piece, or change to a mobile phone which does not contain metal on surfaces [20].

A syndrome, in medical practice, is the anthology of signs and symptoms that are ascertained in, and emblematic of an exceptional condition. Considering all above facts and after reviewing the literature the authors propose that 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 (Dr Bader and Dr Santosh Syndrome) when there is presence of

- Neck pain
- Headache

Along with other symptoms such as:

- Irritability
- Anxiety
- Lack of concentration
- Straining of eyes
- Insomnia
- Memory problems
- Depression
- Itching or erythema of periauricular skin

We also emphasize that other than the above positive signs; there should be no history of psychological, neurological and musculoskeletal disorders before the usage of cell phone.

Conclusion

The results of the present study revealed that the mobile phone users usually experience subjective symptoms, the intensity of which is dependent on the intensity of use of mobile phones. Our observations also connote that mobile phones may evince as a risk factor for multifarious health problems in long-term users. All the symptoms/adverse effects observed in our study couldn't be correlated to be caused by only the use of mobile phones. We recommend that to minimise the adverse effects by limiting the frequency of duration of talking over mobile phones, holding the device as much away from the head, use of handsfree devices, maintaining the proper body posture while texting and avoiding usage of mobile during sleeping hours.

Author Contributions

BKZ: Design of the study, data collection, approval of the final version. SRP: interpretation of data, writing the paper, approval of the final version.

Disclosure

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