Perceived Health Risks Of Mobile Phone Usage Among Adolescents In Zagazig City: Patterns And Dependency

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Abstract

Background: Mobile phones have become increasingly popular in recent years, especially in young generation. The dependence on the mobile phone is increasingly high. At the same time, this new information and communication technology cause harm. **Aim of the study:** Assess mobile phone usage among adolescents in Zagazig City: patterns, dependency and perceived health risks. **Subjects and methods: Research design:** Cross sectional descriptive design was utilized. **Setting:** The study was conducted at preparatory and secondary schools in Zagazig city from both East and West administration. **Subjects:** The current study enrolled 870 of adolescent by using stratified multistage cluster sample. **Tools of data collection:** A self- administrated questionnaire sheet composed of four parts was used; the socio demographic characteristics, usage patterns, dependency and mobile phone related health risks. **Results:** The results of present study revealed that internet browsing (53.7%) was the most favorite feature of mobile phone use. Meanwhile, 9.2% of adolescents were severely dependent on their mobile phone phones; headache (47.4%) and tinnitus (40.5%) were the common complains. In addition to, moderate uncomfortable pain especially at the neck and slightly uncomfortable pain of different areas of the hands. **Conclusion:** Begin in secondary school increased the level of total mobile phone dependency. **Recommendation:** Seminar, conferences and workshops should be held to raise adolescents' awareness about mobile phone dependency and related health risks.

Keywords: Adolescents, Mobile phone, Usage, Patterns, Dependency, Health risks.

Introduction:

Every month, new technologies are being created and today's marvels quickly become yesterday's news. While technologies capture attention and have use ability and the easiness of everyday life. Furthermore, feelings of loneliness, isolation or boredom can be replaced with the pleasure of free flow of electronic delights. It brings together worlds miles together. [(1)]

Mobile phone become one of the essential belongings to human beings and may be described as a necessity among the teenagers considered their lives incomplete, dull and monotonous without mobile phones. [(2)]

Mobile phones have become part of daily life where many people carry them all times; they provide an opportunity to reach who were previously hard to reach via traditional modes of communication. [(3)] According to the International Telecommunication Union (ITU), there are more than 7 billion mobile subscriptions worldwide in 2015, up from 738 million in 2000. [(4)]

The mobile phone was designed not only as a means by which to talk to other people in any location but also as a multifunctional electronic device with many applications previously supported only by other, specialized devices, e.g., use as a photo camera, video recorder or player, alarm clock, games console, and so on. Furthermore, the mobile phone has many attributes that are highly attractive to young people and teenagers that serve to encourage use of mobile phone. [(5)]

Term 'mobile phone dependency' has been used to describe a pattern of usage in which 'addiction' was referred to as excessive use of mobile phone that can be deemed problematic. Although this term has been applied

mostly to adults, the high usage rates among adolescents suggest that it may also be a concern in younger populations. [6]

Excessive mobile phone use has been found to be associated with health problems such as impaired concentration, headache, dizziness, fatigue, thermal sensations in and around ear, facial dermatitis, stress, sleep disturbances owing to nighttime use, and frustration. Inappropriate use of mobile phone by students presents many deleterious effects, for example, usage of phones during lectures causes disturbances in classrooms affecting students' academic performances. [7]

Community health nursing has an obligation to prevent health problems, and to promote higher level of wellness. Community health nurses take initiative to seek out high-risk groups, potential health problems, and situations that contribute to health problems. Furthermore, Prevention of health problems constitutes a major part of community health practice. Prevention means anticipating and averting problems or discovering them as early as possible to minimize potential disability and impairment. [8]

Significance of the study

Up to researcher's information the current study is the first to assess mobile phone usage patterns, dependency and perceived health risks among adolescents in Zagazig city. So; it can serve as a baseline for future studies that could consider working on adolescents and mobile phone dependency. Mobile phones are considered to be one of the most quickly developing technologies in the human race especially in younger group within a short span of time. Those born after 1994(Generation Z**)**, are more tech savvy than previous generations. They are accustomed to high-tech and multiple information sources, with messages bombarding them from all sides. They have never lived without the Internet. Adolescents are more motivated towards using

mobile phones for activities other than communication than older group. In such stage, adolescents are more susceptible to changing fashion trends and style, and certainly can face behavioral disorders. So, the existing study will be conducted to assess mobile phone usage among adolescents in Zagazig City: patterns, dependency and perceived health risks.

Aim of the study:

The present study aimed to assess mobile phone usage among adolescents in Zagazig City: patterns, dependency and perceived health risks.

Research Questions:

1. What are mobile phone usage patterns among adolescents in Zagazig city?

2. What are levels of mobile phone dependency among adolescents in Zagazig city?

3. What are mobile phone health risks as perceived by adolescents in Zagazig city?

4. Is there relation between dependency and health problems?

Subjects and methods:

Research design:

A cross sectional descriptive design was used.

Study setting:

The study was conducted at preparatory and secondary schools in Zagazig city. From preparatory schools 506 adolescents and secondary schools 364 adolescents from both East and West administration.

Study subjects:

Stratified multistage cluster sample consisted of 870 adolescents from preparatory and secondary schools in Zagazig city during the time of data collection and who fulfilled the following inclusion criteria:

- Age ranged from 12-19 years.
- Have mobile phone.
- Agree to participate in the study.

Exclusion criteria:

Have physical problems before using mobile phone

Tools of data collection:

A self-administrated questionnaire sheet composed of four parts:

Part I: socio-demographic characteristics: It was developed by El-Gilany et al. **(9)** To assess socio-demographic characteristics of the students as sex, residence, father education, mother education…..etc.

Scoring system: Total score 84

Levels of social class status:
- Low   (<50%)
- Moderate   (50%-65%)
- High   (>65%)

Part II: Mobile phone usage patterns: This part was developed based on the current related literature. It included closed ended questions as" "favorite features of using mobile phone"

Part III: Mobile phone dependency: it was developed by Toda et al to assess mobile phone dependency among adolescents. The measure consisted of 20 item on a four point likert scale ranging from "true" (3), "somewhat true" (2), "somewhat untrue" (1) and "not true at all" (0).

Scoring system: a value of 0 to 3 was assigned for each of these evaluations (Likert scores for each item were then summed to provide an overall mobile phone dependence score ranging from 0 to 60). A higher score indicates a stronger tendency toward mobile phone dependence.

Part IV: Mobile phone related health risks: This part was developed based on the current related literature. It included the following four aspects:

i. **General health**: it included two questions with response answer either yes or no. They were "Suffer from fatigue on an ongoing basis using mobile phone" and "Suffer from headache frequently".

ii. **Hearing:** it included questions with response answer either yes or no. They were "Suffer from tinnitus after phone calls or listen to audio files",

"suffer from earache after phone calls or listen to audio files".

iii. **Musculoskeletal problems:** it composed of three parts**:**

1. Neck position during mobile use: the "neck position during using mobile phone".

2. The degree of severity of musculoskeletal pain of the body: It asked about the severity of pain encountered at the level of neck, shoulder, upper back, upper arm, lower back, forearm, wrist, high buttocks, thigh, knee and lower legs". Response answers were slightly pain, moderate pain and severe pain.

Scoring system: Severity of total musculoskeletal pain of the body:
- No pain
- Low pain   (<50%)
- Moderate pain   (50-75%)
- Severe pain   >   (75%)

3. Pain severity of different areas of the hands: It asked about the severity of pain encountered at different areas of the hands (right & left): first three finger, last two fingers, thumb, palm, base of hand and muscle which control thumb movement". Response answers were slightly pain, moderate pain and severe pain.

Scoring system: Levels of total hands pain:
- Low pain   (<50%)
- Moderate pain   (60-75%)
- Severe pain   >   (75%)

Content validity and reliability:

The tool was finalized after being face and content validated through experts' opinions for clarity, relevance, comprehensiveness and understandability by a panel of experts from both medicine and nursing faculty in the field of study.

Field work*:*

After securing the official permissions, the researcher met with the director of each of the selected schools and explained the aim of the study and data collection tool, and for safety of students and for not interrupting school schedule and for facilitating the researcher's work, the social worker of each school accompanied the researcher during

data collection. The classes were selected randomly from the educational schedule. The researcher started by introducing herself to students and briefly explained the purpose and nature of the study and the instruction of filling out the data collection tool. Students were asked to fill out the questionnaire under guidance of the researcher who stayed in the classroom to answer any specific questions that arose while students were completing the questionnaire.

Participants were asked not to discuss their answers with colleagues because there is no right or wrong answer and that each student should describe his/her own state. Time spent with each student to complete answering the questions ranged from 20-25 minutes. The duration of data collection started from the end of March 2016 to the beginning of May 2016. The researcher visited each of the selected schools from Sunday to Thursday in the morning period and also the evening period.

Pilot study*:*

A pilot study was carried out on 10% of the study subjects to test the clarity, applicability and relevance of the data collection tools. Also to ensure that there was no confusion or ambiguity regarding the meaning of the questions. It also served to estimate the time required for filling out the questionnaire sheet. The participants involved in the pilot study were not included in the main study sample

Administrative and Ethical considerations:

Official permissions were obtained from vice minister of education at Zagazig city based on letter from post graduates department at faculty of nursing containing the aim of the study. Firstly, the study proposal was approved by the Research Ethics Committee (REC) at the Faculty of Nursing, Zagazig University**.** Moreover, agreement for participations was taken from

participants after explaining the aim of the study. They were given the opportunity to refuse the participation and they were notified that they could withdraw at any time without giving any reasons. As well they were assured that all information would remain confidential and would be used for the research purpose only. The researcher assured maintaining anonymity and confidentiality of subjects' data.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 16, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which described a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test (χ^2). Significance was adopted at $p<0.05$ for interpretation of results of tests of significance.

Results:

The current study enrolled 870 adolescent whose mean age was 14.77 ± 1.5years, slightly less than three- fifths (57.2%) of adolescents were females. In addition, the majority of them (88.9%) belonged to urban areas.

Figure (1): Regarding the favorite features of mobile usage among adolescents, figure 1 displays that the most favored feature was internet browsing 53.7% followed by gaming 29.20%.

Figure (2): concerning the levels of total mobile phone dependence tendency among the studied adolescents, figure 2 Clarifies that 46.6% of adolescents were moderately dependent and whereas 9.2% of them were highly dependent.

Table (1): Shows that in general health headache was the most common problem reported by adolescents followed by fatigue

(47.4% & 40.9%) respectively. As to hearing problems, tinnitus was the most common representing 40.5%, followed by earache representing 39.4%. In addition, between eye problems eye strain was the most prevalent symptom representing 49.4% of participants followed by blurring vision (39%).

Table (2): As to neck position during mobile phone use, the most commonly adopted neck position among adolescents was 22.2 kg (33.2%), followed by 18.1 kg (25.6%).

Table (3): Regarding pain degree of different areas of the hands due to use of hand- held mobile phone as perceived by the studied adolescents. Table 3, shows pain degree in right hand is more than pain degrees in left hand especially thumb was moderately uncomfortable pain.

Table (4): indicates a statistically significant relation between level of mobile phone dependency and adolescents suffered from fatigue and headache result from using mobile phone (P= 0.001 & P= 0.002 respectively). In addition, a statistically significant relation was found between level of mobile phone dependency and adolescents suffered from tinnitus and Lose the ability to distinguish between the large numbers of votes (P= 0.019 & P= 0.014 respectively). On other hand, a statistically significant relation between level of mobile phone dependency and adolescents suffered from blurring eyes, redness of eye, increase lacrimation, difficulty of double vision (P<0.05). A statistically significant relation between severity of total musculoskeletal pain of the body and hands regardless level of dependency (p= 0.0001 & p= 0.002 respectively), where perception of low pain was the highly reported.

Table (5): A statistically significant relation between severity of total musculoskeletal pain of the body and hands regardless level of dependency (p= 0.0001 & p= 0.002 respectively), where perception of low pain was the highly reported**.** A statistically significant relation was found between

favorite features of using mobile phone (internet browsing) and all levels of total mobile phone dependence tendency (p=0.0001). Indicates that a statistically significant relation between education level and levels of total mobile phone dependence tendency P= 0.0001.

Discussion:

People are very much attracted to mobile phones, therefore, mobile phone may affect different groups in different ages and cultures specially adolescents Kalhori et al. [10] Youth are more inclined towards using mobile phones for activities other than communication than older generation because in adolescence stage, youth are more susceptible to changing fashion trends and style, building them more Tech savvy which creates certain behavioral disorders Goswami and Singh. [11]

Concerning adolescents' age, the present study results revealed that age of ranged from 12-19 years. This age category was chosen because it is more attractive to use mobile phone than older people as reported in similar studies in India by Leung [12]**.**

As regards socio demographic characteristics, the current study results displayed that three fifths of adolescents were females. Such result might be attributed to that girls are more committed to attend school class than boys or that in our community families become worry about their girls when they are outside so they can follow them from time to time. Similarly, Amidtaher et al. [13] conducted a study in Iran and found that slightly less than three fifths of participants in their study were females. In dissimilar way, Takao [14] conducted a study in Japan found that the majority of participants in his study were males.

As regards residence, the current study results revealed that the majority of adolescents belonged to urban areas. Possible explanation of such result is that people in urban areas have more chance to use technology and all methods of technology

available to them all time. Likewise, Vasudev et al. [15] who conducted a study in India and found that the majority of students belonged to urban areas. On the same line, Acharya et al. [16] who conducted a study in India and found that around two thirds of participants belonged to urban areas. As well, Zheng et al. [17] in China found that more than two thirds of participants belonged to urban areas.

Considering mobile phone usage patterns, the present study results presented that more than half of the adolescents in the sample reported that internet browsing was the most favored feature of mobile phone usage. Possible explanation of such result might be that the internet is the magic gate to diversity of applications world. In agreement with this, Liang and Hwang [18] conducted a study in Taiwan and found that the majority of participants used mobile phone for browsing. Similarly, Stalin et al. [19] conducted a study in India and found that two fifths of participants used mobile phone for internet. Similarly, Dayapoğlu et al. [20] conducted a study in Turkey and found that slightly more than half of participants used mobile phone for internet.

Regarding mobile phone dependency among adolescents in Zagazig city, the present study results revealed that more than two fifths of adolescents in the study sample were moderately dependent on mobile phone. This result might be attributed to the attractive nature of mobile phones, where adolescents feel position or status while carrying phone, also it is a mean expression of status and identity, and as a tool for seeking information online or entertainment, relaxation, passing time by playing games, picture and video taking. Mobile phone is a virtual electronic platform where young people can fully express their own ideas without having to be mindful of others' viewpoints or judgment of them.

On the same line, a higher percentage reported by Alabi [21] in Nigeria where three fifths of students were moderately dependent on mobile phone. Meanwhile, a lower percentage was reported by Nikhita et al. [22] who conducted a study in India and found that around one third of participants reported mobile phone dependency. Likewise, Chen et al. [23] in Taiwan concluded that all respondents in the average have moderate mobile phone dependency.

Concerning mobile phone health risks as perceived by adolescents in Zagazig city, the present study results revealed that in terms of general health more than two fifths of adolescents complained from headache. This could be attributed to the use of mobile phone for long hours and the subsequent effects of radiations from the phone affecting the skull part the phone is held against could be a cause. Continuous talking and listening to others could cause headache In the same stream, Acharya et al. [16] who conducted a study in India and found that more than half of participants reported having headache. As well Stalin et al. [19] conducted a study in India and found that more than one third of participants reported having headache.

Concerning hearing problems, the results of present study clarified that two fifths of adolescents suffered from tinnitus after phone calls or listening to audio files. Possible explanation of such result might be that using headphones for long hours, the effects of mobile phone radiation is more on hearing and ear is the closest organ to mobile phones receiving higher energy deposition than other organs. In the same vein, lower percentage was reported by Khan [24] in Saudi Arabia who found that more than one fifth of participants using mobile phones had hearing problems. On the same line, lower percentage was reported by Youssef et al. [25] in Saudi Arabia who found that more than one fifth of participants suffered from tinnitus as a result of using mobile phone.

Considering eye problems, the present study results showed that around half of adolescents suffered from eye strain as result of using mobile phone. This might due to focusing on the screen for long time which means starring and reduce in blinking rate and dryness of eye. The findings are in agreement with Acharya et al. [16] who conducted a study in India and found that more than one third of participants using mobile phone had eye strain.

As to neck position during using mobile phone, the present study results revealed that one third of adolescents' neck position was 22.2 kg while using mobile phone. This might be attributed to that handling the phone in hand force the users to lean forward and in turn flex their neck downwards to stare at the lowered object and maintain the head in a forward position for long periods of time increase the pressure of head weight on neck.

As regards the degree of musculoskeletal pain, the present study results revealed that one tenth of adolescents complained of moderate uncomfortable pain especially at the neck. This might be due to the use of mobile phone in uncomfortable position. Likewise, Balakrishnan et al. [26] in Malaysia found that one tenth of students had moderate pain. As well, Stalin et al. [19] in India found that less than one fifth of participants reported having neck pain during using mobile phone.

Concerning the severity of total pain of different areas of the hands due to use of hand- held mobile phone, the present study results revealed that around an one fifth of adolescents complained of moderate sever pain of different areas of the hands. Possible explanation of such result might be that using mobile phone by both hands for long period while playing games, browsing internet or social media and watching videos on mobile phone. The thumb getting jammed (digital thumb) due to overuse of the mobile device,

repeated strain on fingers being used on the keypad could be the cause. The findings are in agreement with Balakrishnan et al. [26] who conducted a study in Malaysia and found that around one quarter of students had moderate pain in hand. Similarly, Acharya et al. [16] in India found that more than one tenth of participants complained from fingers pain.

Considering the relation between mobile phone dependency and health, the present study revealed a statistically significant relation between level of mobile phone dependency and complaining from fatigue and headache (P<0.05). This result could be attributed to the use of mobile phone for long hours and the subsequent effects of the electromagnetic field of mobile phone in which using mobile phone for long hours for playing games, listening music and text chatting on keyboard cause headache.

The present study referred to statistically significant relation between level of mobile phone dependency and adolescents' complain of tinnitus and lose the ability to distinguish between the large numbers of votes (P<0.05). Possible explanation of such result might be when users depend on mobile phone while using headphone for long hours and electromagnetic field of mobile phone can cause tinnitus. As Rupavate [27] said that people who attended phone calls for approximately 2 hours every day were at a higher risk of impaired hearing compared to those who moderate users' 10-20 minutes.

As regards the relation between mobile phone dependency and musculoskeletal pain, the present study revealed a statistically significant relation between level of mobile phone dependency and severity of total musculoskeletal pain of the body and hands (P<0.05). It can be said that when users become dependent on mobile phone he/she use it in uncomfortable position.

Regarding to Eapen et al. [28] mobile phone users are at risk of developing various repetitive strain injuries (RSI). The combination of repetitive movements, poor posture, and over-use of mobile phone for texting or playing games, without taking rest breaks, can cause injury to the nerves, muscles, and tendons in the fingers, hands, wrists, arms, elbows, shoulders, and neck, which if ignored, may lead to long-term damage.

Conclusion:

The conclusion drawn from the current study findings was that, internet browsing was the most favorite feature of mobile phone use. Although, minority of adolescents were severely dependent on mobile phone headache and tinnitus after phone calls or listen to audio files were the common complains among adolescents, in addition to moderate uncomfortable pain in neck and slightly uncomfortable pain of different areas of the hands. Ultimately, begin in secondary school increased the level of total mobile phone dependency.

Recommendations

This study opens a window on mobile phone usage for the adolescents, dependency and perceived health risks the following can be recommended in the light of the study finding:

1. Seminar, conferences and workshops should be held to raise adolescents' awareness about mobile phone dependency and related health risks.

2. Health education programs should be directed to adolescents to increase their awareness about safety measures, and how to prevent health hazards through:

• Increase the distance between eye and phone to reduce eye problems as digital eye strain

• Maintain proper body mechanics during using mobile phones to reduce musculoskeletal disorders

3. Further researches are proposed to examine the impact of excessive mobile phone use on adolescents' health.
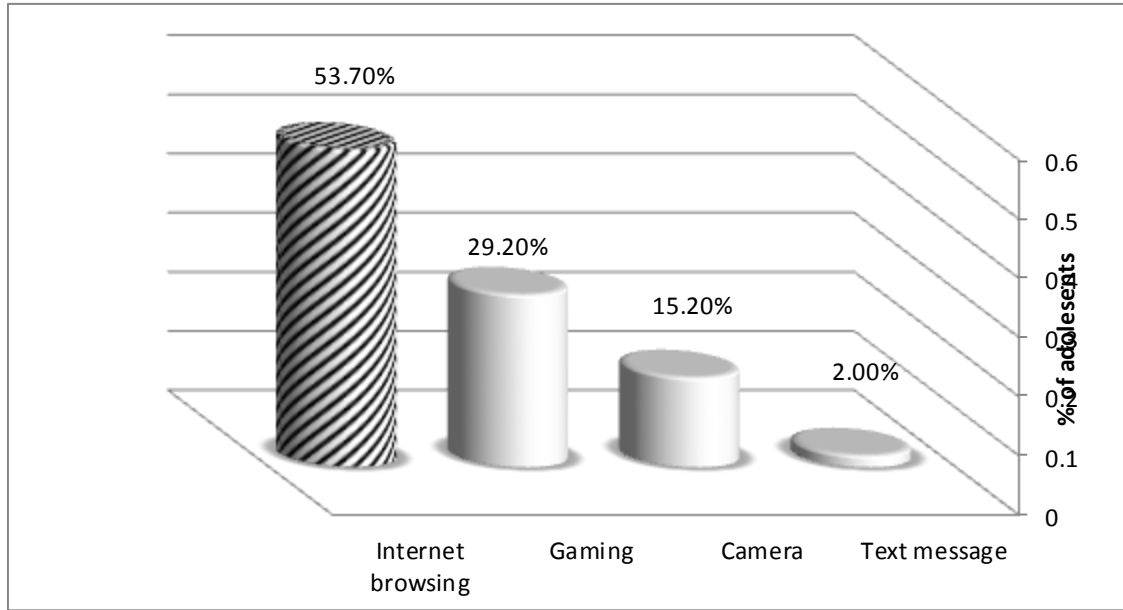
Figure 1: Favorite features of used mobile phone among the studied adolescents in Zagazig city (n=870).
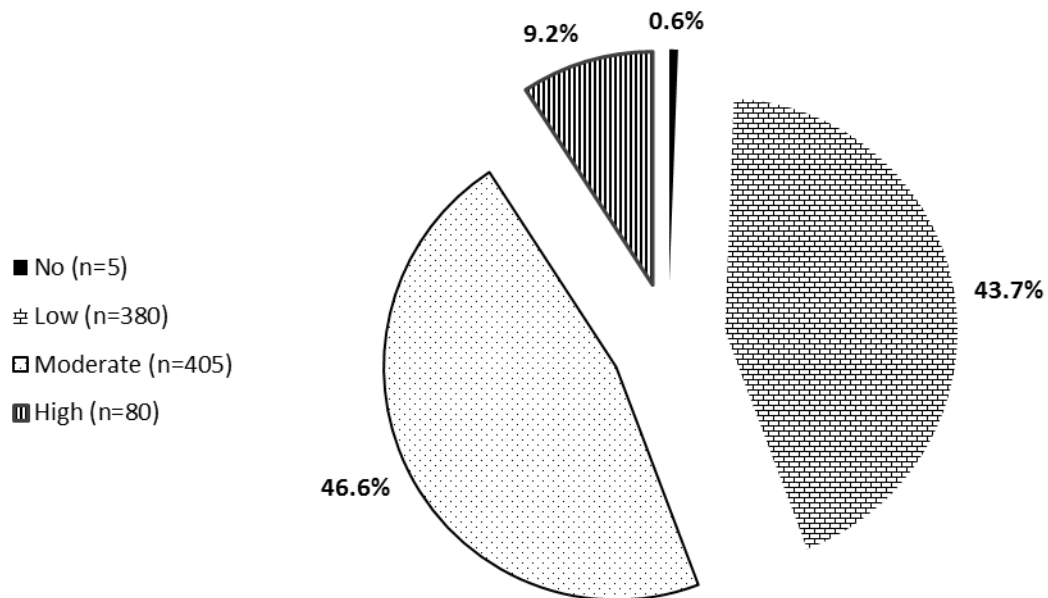
Figure 2: Levels of total mobile phone dependence tendency among the studied adolescents in Zagazig city (n=870).

Table 1: Mobile phone related health risks (general health, hearing and eye problems) as perceived by the studied adolescents in Zagazig city (n=870).

Mobile phone related health risks (General health, hearing and eye problems)	No		Yes	
	n	%	n	%
General health:				
▪Suffer from fatigue on an ongoing basis	514	59.1	356	40.9
▪Suffer from headache frequently	453	52.1	417	47.9
Hearing:				
▪Suffer from tinnitus after phone calls or listen to audio files	518	59.5	352	40.5
▪Suffer from earache after phone calls or listen to audio files	527	60.6	343	39.4
Lose the ability to distinguish between the large numbers of votes	751	86.3	119	13.7
Eye problems:				
Suffer from any of the following symptoms:				
▪Eye strain	440	50.6	430	49.4
▪Blurring vision	531	61.0	339	39.0
▪Redness of the eye	739	84.9	131	15.1
▪Increase lacrimation	704	80.9	166	19.1
▪ Double vision	745	85.6	125	14.4

Table 2: Neck position during mobile usage among the studied adolescents in Zagazig city (n=870).

Neck position during mobile use	n	%
4.5-5.4 Kg	60	6.9
12.2 Kg	100	11.5
18.1 Kg	223	25.6
22. 2 Kg	289	33.2
27.2 Kg	198	22.8

Table 3: Pain degree of different areas of the hands due to use of hand- held mobile phone as perceived by the studied adolescents in Zagazig city (n=870).

Pain degree of different areas of the hands		No		Slightly uncomfortable		Moderately uncomfortable		Very uncomfortable	
		n	%	n	%	n	%	N	%
Right hand	**First three fingers**	181	20.8	429	49.3	191	22.0	69	7.9
	Last two fingers	301	34.6	422	48.5	109	12.5	38	4.4
	Thumb	59	6.8	379	43.6	260	29.8	172	19.8
	Palm	291	33.4	382	43.9	114	13.2	83	9.5
	Muscle which control thumb movement	297	34.1	373	42.9	122	14.0	78	9.0
	Base of hand	297	34.1	390	44.8	97	11.2	86	9.9
Left hand	**First three fingers**	475	54.6	264	30.3	98	11.3	33	3.8
	Last two fingers	499	57.4	263	30.2	73	8.4	35	4.0
	Thumb	470	54.0	222	25.5	109	12.5	69	7.9
	Palm	495	56.9	256	29.4	77	8.9	42	4.8
	Muscle which control thumb movement	497	57.1	234	26.9	88	10.1	51	5.9
	Base of hand	499	57.4	240	27.5	71	8.2	60	6.9

Table 4: Relationship between mobile phone related health risks (General health, hearing and eye problems) among the studied adolescents in Zagazig city and their levels of total mobile phone dependence tendency (n=*870*).

Mobile phone related health risks	No (n=5)		Low (n=380)		Moderate (n=405)		High (n=328)		x^2	P
	n	%	n	%	n	%	n	%		
General health:										
Fatigue on an ongoing basis	1	20.0	129	33.9	186	45.9	40	50.0	15.473	0.001*
Headache	2	40.0	155	40.8	220	54.3	40	50.0	14.655	0.002*
Hearing:										
Tinnitus after phone calls or listen to audio files	1	20.0	136	35.8	186	45.9	29	36.3	9.921	0.019*
Earache after phone calls or listen to audio files	2	40.0	149	39.2	165	40.7	27	33.8	1.380	0.710
Lose the ability to distinguish between the large numbers of votes	0	0	38	10.0	64	15.8	17	21.3	10.579	0.014*
Eye problems:										
▪Eye strain	3	60.0	181	47.6	199	49.1	47	58.8	3.509	0.320
▪Blurring eye	4	80.0	150	39.5	166	41.0	19	23.8	12.065	0.007*
▪Redness of the eye	4	80.0	54	14.2	62	15.3	11	13.8	16.827	0.001*
▪Increase lacrimation	3	60.0	66	17.4	77	19.0	20	25.0	7.961	0.047*
▪ Double vision	3	60.0	53	13.9	55	13.6	14	17.5	9.359	0.025*

*Significant (P<0.05)

Table 5: Relationship between severity of total musculoskeletal pain of body and hands pain among the studied adolescents in Zagazig city and their levels of total mobile phone dependence tendency (n=870).

Pain severity	Levels of total mobile phone dependence tendency								x^2	P
	No (n=5)		Low (n=380)		Moderate (n=405)		High (n=328)			
	n	%	n	%	n	%	n	%		
▪Severity of total musculoskeletal pain of the body:										
No	1	20.0	80	21.2	119	29.5	13	16.3	30.029	0.0001*
Low	3	60.0	261	69.0	234	57.9	48	60.0		
Moderate	1	20.0	35	9.3	44	10.9	14	17.5		
Severe	0	0	2	0.5	7	1.7	5	6.3		
▪Severity of total pain scores of different areas of the hands :										
Low	3	60.0	322	84.7	296	73.1	61	76.3	21.370	0.002*
Moderate	2	40.0	49	12.9	100	24.7	15	18.8		
Severe	0	0	9	2.4	9	2.2	4	5.0		
▪ Favorite features of used mobile phone:										
Camera	0	0	64	16.8	53	13.1	15	18.8	21.240	0.012*
Internet browsing	1	20.0	197	51.8	221	54.6	48	60.0		
Gaming	4	80.0	117	30.8	119	29.4	14	17.5		
Text message	0	0	2	0.5	12	3.0	3	3.8		
▪ Education of the studied adolescents:										
Preparatory	0	0	237	46.8	231	45.7	38	7.5	28.598	0.0001*
Secondary	5	2.3	86	39.4	109	50.0	18	8.3		
Technical	0	0	57	39.0	65	44.5	24	16.4		

*Significant (P<0.05)

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