ORIGINAL ARTICLE

The Dilemma of Mobile Phone Overuse: Findings from a Quasi-Experimental Study on a Cohort of Pakistani Adolescents

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ABSTRACT

Objective: This study aimed to assess the change in knowledge and practices after providing awareness session on mobile phone usage to school-going adolescents.

Methods: A quasi-experimental design was employed to conduct a study at three private schools of Karachi from March - May 2019. School going adolescents between 13 to 16 years who were using smartphones were assessed on the predictive factors of smartphone addiction like excessively calling their friends and the length of their calls. Additionally frequency of mobile phone use and knowledge regarding its adverse effects on health and their dependency were also enquired.

Results: Of 385 students, 331 (86%) students used their mobile phones excessively to call their friends and classmates which significantly reduced to 276 (71.7%) after the intervention (p-value < 0.001). Average length of each call per day before the intervention was 5.68 ± 0.13 minutes which significantly declined to 4.92 ± 0.92 minutes (p- value <0.001). Before the intervention, 108 (28.1%) students thought that mobile phones have a negative health impact which was increased afterwards to 327 (84.9%) (p-value 0.021). Furthermore, 193 (50.1%) students believed that they are dependent on their mobile phones which after the intervention significantly decreased to 120 (31.2%) (p-value <0.001).

Conclusion: Positive effects of intervention like awareness session were seen on mobile phone use among adolescents. Conducting such sessions periodically among schools can lessen the usage and addiction of smartphones.

Keywords: Adolescents, Mobile Phone Use, Quasi-Experimental Study

INTRODUCTION

Mobile phones have become an integral part of the life of school going adolescents, managing critical situations and maintaining social relationships.[1] In addition to this, the adolescents face high levels of anxiety when their phones are not switched on.[2] It has been reported that the new generation is emotionally involved in their smartphones to an extent that it makes them consider it as their second self.[3] A large volume of international literature suggests various negative physical, psychological and developmental effects on the life of adolescents.[4-7]

Asia has the largest number of internet users accounting for almost 45% of the total world population. Results from various countries in Asia reported negative health outcomes of internet games.[8] In Pakistan, there are around 100 million users of mobile phone.[9] Studies conducted by various psychiatrists and psychologists suggest mobile phone addiction to be the major source of non-drug based addictions in the current era.[10] The harmful effects have already been reported in various studies on the social, mental and physical health.[11]

Little is known on how to raise awareness among the target population about the harmful aspects of this technology. Therefore this quasi-experimental study sought to work on assessing the change in the level of knowledge, and practices after attending an awareness session on mobile phone usage among the school going teenagers. It also sought to assess the knowledge of health impact due to mobile phone usage and to assess the proportion of mobile phone use among school-going adolescents.

METHODS

This was a quasi-experimental study conducted at three private schools of Karachi, namely Beaconhouse

School, The Learning Tree School and Headstart School from March 2019 to May 2019. Ethical approval from Institutional Review Board of Jinnah Sindh Medical University and permissions from all the three schools were sought. The study was conducted with the smartphone using adolescents aged between 13 to 16 years after obtaining their assent. Participants who were attending schools at the time of the study, with uninterrupted access to smartphones for at least ten hours a day were included in the study. Participants who refused to give assent were excluded. Sample size used for the research was calculated by the World Health Organization sample size software. Study on effect of an intervention on internet addiction was taken as reference with expected prevalence of perceived health status as 52%, a confidence level of 95% and power of 80% which resulted in a sample size of 385. [12] The number of participants was divided approximately equally among the schools with 128 (33.2%), 130 (33.8%) and 127 (33%) students from Beaconhouse School, The Learning Tree School and Headstart School respectively.

A structured questionnaire was prepared to obtain detailed information regarding the purpose of mobile phone use, frequency of mobile phone use, awareness of the impact of mobile phones on human health, and mobile phone dependence. This structured questionnaire was adapted from a study conducted by Kim M, et al. [13] Field testing of the questionnaire was done before the study started.

All the available students in the school at the time of the survey who fulfilled the inclusion criteria were interviewed. Permission to conduct the research study was taken from all relevant authorities. Permission from the parents of the students was also taken before the students participated in the study. Assent was taken from all students. It was ensured that no participant was subjected to any form of discomfort during the study. A session on information, security, and their knowledge regarding the negative health impact on student's health was conducted. The baseline data was collected before the session was delivered on use of smart phones. After 1 month of session, same participants were interviewed again to assess change in knowledge and behavior.

The data were analyzed on SPSS version 23. Mean ± SD was calculated for age. Frequencies and percentages were calculated for categorical variables like gender, name of school and distribution based on gender. For associations between pre and post response, the McNemar test for nominal categorical variables like purpose of using mobile phones, awareness regarding

their impact on health was used. Paired t-test was used for identifying the difference between pre and post responses for continuous variables like average length of call, time spent on making calls and on spending on internet each day. p-value ≤ 0.05 was taken as criteria for statistical significance.

RESULTS

A total 385 participants were recruited in the study with mean age 15.5 ± 1.42 years. There were 197 (51.2%) males while 188 (48.8%) females with approximately equal representation 128 (33.2%), 130 (33.8%) and 127 (33%) from Beaconhouse School, The Learning Tree School and Headstart School respectively. As far as gender distribution was concerned, there were 83 (64.8%) males from Beaconhouse School with 45 (35.2%) females. From The Learning Tree School, there were 51 (39.2%) males and 79 (60.8%) females and from Headstart School, there were 53 (41.7%) males and 74 (58.3%) females.

Before the session, 346 (89.9%) participants reported using their mobile phones to communicate with their family members. However, it significantly reduced to 328 (85.2%) (p-value 0.050). Furthermore, 331 (86%) participants used their mobile phone to call their friends or classmates which significantly decreased to 276 (71.7%) (p-value <0.001). There were 261 (67.8%) participants who played internet games on their mobile phones which significantly decreased to 154 (40%) (p-value <0.001). Participants who used to communicate with friends over social network decreased from 265 (68.8%) to 183 (47.5%) (p-value <0.001). Participants who used mobile phones for sending SMS also decreased from 260 (67.5%) to 184 (47.8%) (p-value <0.001). (Table 1)

Before the session, a mean 18.29 ± 0.68 minutes per day usage of a mobile phone was reported by the study participants to make calls which significantly declined to 15.82 ± 0.15 minutes (p-value <0.001). The average length of each call per day was 5.68 ± 0.13 minutes while after the session, it significantly decreased to 4.92 ± 0.98 minutes (p-value <0.001). It was also identified that an average of 2.72 ± 0.56 hours per day were spent by the participants on the internet using their mobile phones while after the session it significantly declined to 2.34 ± 0.53 hours per day (p-value <0.001). (Table 2)

There were 209 (54%) participants who kept their mobile phones turned on while sleeping which significantly decreased to 194 (50%) (p-value <0.001). Additionally, 108 (28%) participants believed that mobile phones have a negative health impact which significantly increased to 327 (85%) (p-value <0.001).

Table 1: Pre and post comparison of the purpose of mobile phone usage among the study participants (n= 385)

Variables		Pre	Post	p-value
		n (%)	n (%)	
I use a mobile phone to call my family (parents, siblings etc.)	Yes	346 (89.9%)	328 (85.2%)	0.050
	No	39 (10.1%)	57 (14.8%)	
I use a mobile phone excessively to call my friends, classmates	Yes	331 (86.0%)	276 (71.7%)	<0.001
	No	54 (14.0%)	109 (28.3%)	
I use a mobile phone for playing games on the internet	Yes	261 (67.8%)	154 (40.0%)	<0.001
	No	124 (32.2%)	231 (60.0%)	
I use a mobile phone to communicate with my friends on social networks	Yes	265 (68.8%)	183 (47.5%)	<0.001
	No	120 (31.2%)	202 (52.5%)	
I use a mobile phone to send SMS	Yes	260 (67.5%)	184 (47.8%)	<0.001
	No	125 (32.5%)	201 (52.2%)	

Mcnemar test applied, p-value ≤0.05 considered significant

Table 2: Pre and post comparison of the frequency of mobile phone use (n= 385)

Variables	Pre	Post	p-value
	Mean ± SD	Mean ± SD	
Mean time spent on making calls each day	18.29 ± 0.68	15.82 ± 0.15	<0.001
Average length of your calls	5.68 ± 0.13	4.92 ± 0.98	<0.001
Mean hours spent on using internet on your phone each day	2.72 ± 0.56	2.34 ± 0.53	<0.001

Paired t - test applied, p-value ≤0.05 considered significant

Furthermore 199 (52%) participants reported that they would limit their use of mobile phone only if their negative health effects are proven, which significantly increased to 325 (84%) (p-value <0.001). Another, 227 (59%) wanted to gain more information about the possible risks associated with mobile phone overuse, which significantly increased to 324 (84%) (p-value <0.001). There were 130 (33.8%) who felt depressed which significantly decreased to 77 (20%) and 193 (50.1%) participants believed they were dependent on mobile phone use, which significantly decreased to 120 (31.2%) (p-value <0.001). (Table 3)

DISCUSSION

The current study highlights one of the methods to increase the awareness among the school going teenagers regarding the effects of the mobile phone usage to promote the health and wellbeing among the teenagers, by preventing the effects these devices produce on young minds and bodies. It was hypothesized that the teaching and awareness session would increase the knowledge and attitude of teenagers. Results from our study indicated a significant gain of knowledge regarding the harmful effects of smartphones. We evaluated the pre and post effects of awareness session on mobile phone use. The key findings of the study were that our awareness session produced positive effects on school going adolescents with reducing their frequency of mobile phone and internet use along with the duration of calls. In this study, before the session the participants reported dependence over their smartphones and feeling depressed while not having their phones

Table 3: Pre and post comparison of awareness of the impact of mobile phones on health (n=385)

Variables		Pre n (%)	Post n (%)	p-value
Do you have your mobile phone turned on while sleeping?	Yes	209 (54.3%)	192 (49.9%)	<0.001
	No	176 (45.7%)	193 (50.1%)	
Does mobile phone have a negative impact on your health?	Yes	108 (28.1%)	327 (84.9%)	0.021
	No	277 (71.9%)	58 (15.1%)	
If negative impacts of mobile phones on human health are proven, would you limit its use?	Yes	199 (51.7%)	325 (84.4%)	<0.001
	No	186 (48.3%)	60 (15.6%)	
Would you like to gain more information about risks of mobile phone overuse?	Yes	227 (59.0%)	324 (84.2%)	<0.001
	No	158 (41.0%)	61 (15.8%)	
Do you feel depressed when you cannot communicate through mobile phone?	Yes	130 (33.8%)	77 (20.0%)	<0.001
	No	255 (66.2%)	308 (80.0%)	
Do you think that one can be dependent on mobile phone?	Yes	193 (50.1%)	120 (31.2%)	<0.001
	No	192 (49.9%)	265 (68.8%)	

Mcnemar test applied, p-value ≤0.05 considered significant

around, these findings were consistent to a study conducted in Malaysia which included a sample of 409 teenagers which also reported similar addiction among the adolescents.[1] These findings were also in concordance with another study conducted in China which reported a significant high dependence of mobile phones among Chinese youth.[14]

In the Middle Eastern countries, the usage of smartphone has increased from around thirty five percent to almost seventy percent. Kuwait has shown an increase in mobile phone usage to thirty seven percent, followed by Lebanon with thirty four percent, UAE with thirty percent, Saudi Arabia with sixteen percent and, Egypt with seven percent increase.[15] Moreover, studies have shown that with smartphones, internet accessability has increased too. Lebanon and Saudi Arabia had an overall increase of sixteen percent while UAE had an increase of nighteen percent.[16] After the sessions, we found that there was a decrease in the mobile phone dependence among teenagers.

According to a study conducted in Spain on a sample of 1328 adolescents between the ages of 13 to 20 years studying in high school, almost ninety-seven percent students had their own cell phones. The estimated prevalence of cell phone dependence was twenty percent.[17] This figure is in concordance with our results as the dependence was similar in our study before the session.

Before the session, more than sixty-seven percent of the teenagers reported to have been using phones for internet with games as the most common reason of being on the phone among the target population.

These findings were consistent with a study conducted in Korea on a large sample of 1824, middle school students who used smartphones.[18] They found that one third of the sample were at a high risk for developing smartphone addiction for using mobile messengers, gaming, and using social networking service. However, in our study this percentage was decreased to forty percent after the awareness session. This can be attributed to effectiveness of the delivered awareness session.

We also found that before the session only twenty-eight percent of the participants reported being aware of the negative health effects of the unrestricted mobile phone usage. These findings were in contrast with a study conducted in India on a sample of 120 adolescents, which found that around seventy-two percent of the adolescents reported being aware of the negative psychological and physical health hazards. Our

contrast in results could be because the study in India did not employ any awareness session and the awareness level was still higher than in our sample.[19] Before the session, only twenty-eight percent of the participants thought that there may be some health hazards of the unrestricted mobile phone usage, which was significantly improved up to eighty-four percent after the session. These findings were in line with the study conducted in Malaysia which reported similar results and that was primarily reported because the Malaysian adolescents staying in the hostels and had such awareness provided to them regularly.[1] According to another study conducted in Switzerland to find the awareness of mobile phone hazards among the students in medical school found that majority of the participants were aware of the side effects of mobile phone usage. [20] These findings are in line with the findings from our study.

According to Bickham et al in 2015, a longitudinal study conducted in the United States on 126 adolescents found a strong correlation between the time spent on a cell phone and depression.[21] Results of this study are in concordance with our results showing that students realized that the use of cell phone has negative impacts on health. In our study around 84.4%, students thought that mobile phone use was associated with negative impact as shown in a Finnish study by Punamki et al, in which, increased use of cell phone led to poor sleep habits and increased tiredness during the day time in both girls and boys between the ages of 12-14 years.[22] Other cross-sectional studies showed frequency and duration of mobile phone use was associated with depressed mood.[13, 23-24] In a study by Christensen et al in 2016, it was found that smartphone and screen time was associated with depressed mood.[25] In a cross-sectional study by Thomee et al, similar correlations were found between the frequency of calls and texts and perceived stress, sleep problems, and depressive symptoms among Swedish young adult.[24]

In a Japanese study conducted on 2785 Japanese adolescents, strong correlation was found between the quantity of time spent on mobile phone and depressive symptoms.[26] According to Augner et al, chronic stress, low emotional stability, female gender, younger age, and depression were associated with excessive mobile phone usage.[27] All of the above studies showed that cell phone use is negatively associated with the mental well-being of individuals and the results are similar to the results obtained from our study.

The major strength of our study was that it involved the use of an awareness session on the school going adolescents, the first study of its kind in urban Karachi,

which impacted their way of cell phone usage and dependence and also showed positive effects. However, despite proving effectiveness of our awareness session in reducing the cell phone usage among school going teenagers, our study is subject to certain limitations. Due to time and resources constraints, we cannot generalize our results. However, they can be used with caution for similar groups of teenagers. Another limitation was that only private schools were selected for the study which makes us unable to generalize the results to all other schools or teenage population. Additionally, since results were self-reported so some element of recall bias cannot be ruled out. Lastly, we believe that only single health education session is unlikely to make drastic change in behavior of teenagers. The current results can serve as groundwork for the development of programs to especially improve private school policies regarding the use of mobile phones during school hours. This essentially will lessen the addiction tendencies of our young adolescents and will cause improvement in their overall health status.

CONCLUSION

The results of the present study showed that there are positive effects of the awareness session on mobile phone use among teenagers. The session reduced the frequency of mobile phone use and also minimized mobile phone dependence. It also increased the awareness of the impact of mobile phones on human health.

AUTHORS' CONTRIBUTION:
MNS: Conception, design and data collection of her project.
LAB: Revising work critically for important intellectual content.
ZA: Data analysis, revising draft for manuscript writing.

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