

## Cell Phone Usage, Attitude And Academic Achievement Among Primary And Preparatory School Student

Nadia Ahmed Eladham<sup>1</sup>, Lamia. A. Awad<sup>2</sup>

1.Community health nursing department, faculty of nursing, Fayoum university

2.Community health nursing department, faculty of nursing, Mansoura university

Corresponding Author: Nadia Ahmed Eladham I

**Abstract:** In Egypt, the past 10 years experienced a huge increase in the number of mobile phone subscribers, with widespread use among teenagers. The aim of this study was to examine the relation between mobile phone use and academic performance among primary and preparatory schoolchildren. This cross-sectional analytic study was carried on a multi-stage stratified cluster sample of 400 schoolchildren in primary and preparatory private schools in Dakhliya Governorate. A self-administered questionnaire form covering socio-demographic characteristics, pattern of use of cell (mobile) phone, and attitudes towards its hazards. The school performance was obtained from school records. The results showed that 94.3% of the schoolchildren were using mobile phones, mostly the smart type, 50.7% used their mobile for one hour, and 61.5% had positive attitude towards mobile phone use. Higher percentages to those having very good and excellent grades were not taking their phones to school. Conclusion, the use of mobile phones is highly prevalent among primary and preparatory schoolchildren, and have a positive impact on their school performance, although their use at school could have a negative influence on their grades. More strict school policies regarding the use of mobile phones in schools are needed, with encouraging utilization in academic purposes and applications to help in learning process.

**Keywords:** Mobile phone, Academic performance, Schoolchildren

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### I. Introduction

The use of mobile or cell phones witnessed a high surge during the last decade. This was attributed not only to their ease of use and wide outreach, but also to the advanced technology continually adding to their versatile functions and applications. Now mobile phone applications exceed the basic functions of communication by voice or texting, to a variety of added functions including educational (Reed et al, 2017; Gavali et al, 2017) as well as medical purposes (Kaner et al, 2017; Rico et al, 2017; Varleta et al, 2017). Their use is now essential in telemedicine and telenursing (Welch et al, 2015; Tonn et al, 2017).

In Egypt, the past 10 years experienced a huge increase in the number of mobile phone subscribers. The users reached 96.7% of the youth in the age group 18-29 years according to the CAPMAS 2017 statistical yearbook (CAPMAS, 2017). This very high prevalence of mobile phone use could be mandated by the changes in the communities, with more mobility, more distances traveled, and more likelihood to exposure to hazards, so that people and especially parents of schoolchildren need to be able to contact them at any time and wherever they are. This would serve to reassure them about the safety of their children (National Academy of Science, 2012). Given this extreme widespread use of this technology especially among teenagers, many research work addressed the pros and cons of the use of mobile phones in schoolchildren. The findings are debatable. Thus, a number of studies reached to conclusions against the use of mobile phones by adolescents and schoolchildren due to associated hazards, whether physical (Dasdag and Akdag, 2016; Singh, 2015), psychosocial (Sharma et al, 2017; Vernon et al, 2017, educational (Movvahedi et al, 2014)I, and even dependence and addiction (de-Sola et al, 2017). On the other hand, other studies denied such hazards (Mohan et al, 2016) or even demonstrated beneficial effects of use of mobile phone among adolescents (Vilchis-Gil et al, 2016, Haug et al, 2017; Law et al, 2017). Therefore, the present study is an attempt to contribute more information to settle this debate.

### II. Aim of the study

The aim of this study was to examine the relation between mobile phone use and academic performance among primary and preparatory schoolchildren. It was hypothesized that there is a positive association between schoolchildren' use of mobile phone and their academic performance.

#### 2.1 Subject and methods:

**2.2 Research design:** A cross-sectional analytic research design was utilized to conduct this study.

### **2.3 Setting:**

It was carried out in morning primary and preparatory private schools in Dakhlia Governorate,

### **2.4 Subjects:**

All schoolchildren attending grade six in private primary schools and grade three in private preparatory schools in Dakahlia Governorate during the study period were eligible to be included in the study sample. The sample size was calculated to demonstrate a medium effect size ( $r$ -square =0.15) in a multiple regression analysis with 20 independent variables at 95% level of confidence and 90% power. The required sample size according to 2.5 2.5 **Cohen et al (2003)** was 191. This was increased to 400 to adjust for a design effect of 2 due to cluster sampling, in addition to a non-response rate of about 10%. A multi-stage stratified cluster sampling technique was used in recruiting the schoolchildren. In the first stage, three districts were randomly selected from Dakhlia Governorate 18 districts. These were Mansoura, Dekrnes, and Manzala districts. In the second stage, one private primary/preparatory school was randomly selected from each district. In the third stage, four classrooms were selected from each school, two from primary grade-6, and two from third preparatory grade. All schoolchildren in the selected 12 classrooms were selected, with an average of 30 to 35 per classroom.

### **III. Data collection tool**

A self-administered questionnaire form was prepared for data collection. It consisted of three main parts. The first part was for schoolchild' socio-demographic characteristics such as age, gender, birth order, parents' education and job, residence, income, crowding index, etc. It also involved the history of chronic diseases or disability, smoking, practicing physical exercise, smoking, having hobbies, etc. The second part was for the use of cell (mobile) phone. It asked about the type of machine, the functions used daily, texting, playing games, average numbers of text messages and e-mail sent daily, and the number of hours of daily use. It also asked about taking mobile to school and its use there. The third part was an attitude scale with 13 statements reflecting schoolchild' attitudes towards the hazards of mobile phone and its potential negative effects on school performance. The response was on a 3-point scale: agree/uncertain/disagree. These were scored from 3 to 1 respectively, with reverse scoring for positive statements so that a higher score indicates higher agreement upon the negative effects of mobile phone. The school performance was obtained from school records as total grade points and ranked grades of previous school year. The tool was rigorously revised by experts in community nursing and community medicine for relevance, comprehensiveness, and clarity. The reliability of the attitude scale was examined through measuring its internal consistency, and demonstrated acceptable reliability with Cronbach alpha coefficient 0.60.

### **IV. Pilot study**

A pilot study was carried out on 40 schoolchildren representing 10% of the main study sample. Since no modifications were needed in the tool, they were included in the main study sample.

### **V. Fieldwork**

After obtaining necessary official permissions, the researcher visited the selected schools and met with the headmasters, explained to them the study aim and procedures, and asked for their cooperation. Then, the process of selection of classrooms was done, with two selected from primary grade 6, and two from preparatory grade 3. The total numbers of schoolchildren from primary grade 6 was 199, and 201 from preparatory grade 3. The researcher explained to the schoolchildren in each selected classroom the aim and process of the study and asked for their assent to participate. The data collection form was distributed to them, and the researcher read each question and asked each schoolchild to write down his/her response. Then the filled forms were collected from them and revised for completeness. The work with each classroom took at least two sessions, one for explanation and another one for filling the forms. The process was repeated for each of the 12 selected classrooms in the three schools. The school performance of each selected schoolchild was ascertained through the school records. The data collection procedure lasted during the period from October 2016 January 2017.

### **VI. Administrative And Ethical Considerations:**

Official permissions were obtained from the Ministry of Education, as well as from the regional Directors of Education the selected districts after explaining the study aim and the data collections process. These permissions were handed to school headmasters to facilitate the data collection procedure. Informed consents were signed by each schoolchild's parent/guardian before collecting any data; this was done through school administration. The form explained the study aim in a simple and clear manner to be understood by lay people, and indicated that participation was totally voluntary. They were reassured about the confidentiality and anonymity of any obtained information, and that it would only be used in research purposes. Verbal assents were also obtained from schoolchildren before filling the forms. No harmful maneuvers were performed or used, and no foreseen hazards were anticipated from conducting the study.

## **VII. Statistical Analysis**

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables; and means and standard deviations and medians for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the developed tools through their internal consistency. Qualitative categorical variables were compared using chi-square test. In order to identify the independent predictors of the total grade points, multiple linear regression analysis was used and analysis of variance for the full regression model was done. Multiple logistic regression was used to identify the predictors of academic failure. Statistical significance was considered at  $p\text{-value} < 0.05$ .

## **VIII. Results**

The study sample involved 400 primary and preparatory schoolchildren whose age ranged between 10 and 16 years, with a majority of girls (76.5%) as shown in Table 1. Few of them were having chronic diseases or disability, and only seven (1.8%) were smokers. Around two-thirds or more of them reported practicing sports (65.8%), and having hobbies (75.0%). Their school achievement was almost equally distributed among the four grade levels, with slightly more having a fair grade (28.8%). Only 6.0% of them reported previous school failure. Table 2 indicates that the highest percentages of schoolchildren's parents were having no formal education, while less than one-fourth were having university education. The majority of the fathers were manual workers (74.0%), and of mothers were housewives (84.3%). The residence was mostly urban (85.3%), with a crowding index  $> 1$  person per room (55.8%), and sufficient income (62.8%). As regards schoolchildren's use of cell phone, Table 3 shows that almost all of them were using it (94.3%), mostly the smart type with touchscreen (82.5%). The functions most used daily were those of games (71.6%) and music (64.2%), while the least were sending and receiving email, 16.4% and 17.0%. The majority reported using one hand for texting (64.7%) and both hands for playing games (63.1%). The average number of SMS sent daily was mostly one to ten (61.3%). Meanwhile, slightly less than half of them sent no emails by phone (47.7%). On average, 50.7% of them used their mobile for one hour or less per day. Table 4 demonstrates that approximately two-fifth (39.8%) of the schoolchildren in the study sample reported taking their mobile phones to school. The majority were using it only in recess (70.0%). The most frequent uses were in playing games (34.5%) and listening to music (32.1%), while only 9.3% used it in sending emails. Slightly less than two-thirds of the schoolchildren (61.5%) had positive attitude towards mobile phone use and disagreed upon its drawbacks.

As illustrated in Table 5, a statistically significant association was revealed between school achievement and schoolchildren's taking their mobile phones to school ( $p=0.007$ ). It is noticed that higher percentages to those having very good and excellent grades were not taking their phones to school. Meanwhile, no significant relation could be found with previous school failure. Table 6 points to statistically significant relations between previous school failure and school achievement from one side and schoolchildren's attitude towards mobile phone use from the other side,  $p=0.01$  and  $p<0.001$  respectively. It is evident that higher percentages to those having previous failure and those having fair and excellent grades were having a positive attitude towards mobile phones.

In multiple logistic regression analysis (Table 7), schoolchild increasing age and higher birth order were significant risk factors of previous school failure. On the other hand, the use of cell or mobile phone as well as a higher level of mother education and an urban residence were protective against such failure, with Odds Ratios (ORs) far below one. As regards the multivariate analysis of the total grade points, Table 8 indicates that parents' education, urban residence, and the number of SMS per day were statistically significant independent positive predictors. Conversely, a higher school year, a working mother, and taking the phone to school were negative predictors. The model explains 27% of the variation in the total grade points.

## **IX. Discussion**

The present study examine the impact of cell or mobile phone use among primary and preparatory schoolchildren and their scholastic performance. The findings indicate generally positive impacts on school achievement in terms of grade points achieved and academic success. However, the use of these phones at school seems to have a negative impact on their school performance. According to the present study findings, almost all schoolchildren are using mobile phones. Moreover, they mostly use high technology smart phones with touchscreen. These machines are costly, which could be explained by the high percentage having sufficient family income and residing in urban areas. Moreover, according to CAPMAS report, the number of mobile phone lines in Egypt surpasses the total population, and 88% of the population own a mobile phone (CAPMAS, 2016). A similarly high rate of use of mobile phones was reported in a study in Spain among teenage schoolchildren, reaching 90% of the study sample (Muñoz-Miralles et al, 2014). Moreover, the use of smartphone was reported among more than two-thirds of a sample of students in Rome, Italy (Poscia et al, 2015). As regards the most common uses of mobile phones among the schoolchildren in the present study, these

turned to be playing games and music listening to music. These are pastime applications with no direct benefit on their school performance. Moreover, slightly less than two-thirds of them reported using both hands while playing games, which indicate mastery of manipulation reflecting very frequent use for this purpose. In congruence with this, Reolid-Martínez et al (2016) in a study on Spanish teenagers found that girls mostly used their mobile phones to listen to music and chat, while boys mostly played games. A similar pattern of use was also reported in a study on teenage schoolchildren in France, which demonstrated that more than half of the time of the use of electronic devices such cellphones or tablets was spent in playing games and watching video clips (Royant-Parola et al, 2017). Meanwhile, only around one-third of the current study schoolchildren reported using their mobile phones in study like looking for a study topic. Additionally, around a half of the schoolchildren used their mobile phones in browsing the internet, which could serve in part in study purposes. The relatively low proportion of schoolchildren in the present study using their mobile phone for these constructive purposes indicates lack of perception of the utility of this technology. In this respect, a study in Turkey found that the great majority of the parents of schoolchildren indicated the importance of access to the internet in the educational process of their children (Dinleyici et al, 2016). A relatively large proportion of the schoolchildren in the current study were taking their mobile phones to school, and approximately one-third of them were using them in class, which could seldom be for use in scholastic activities since the majority were using it in playing games and listening to music. This might explain the study finding that taking the mobile phone to school was a negative predictor of the schoolchild's total grade points. In line with this, Ling and Helmersen (2010) found that mobile phones at school disturbs school and students' roles and rules. They tend to distract students and alter their concentration through allowing contacts outside school environment. The present study results demonstrated that about two-thirds of the schoolchildren had a positive attitude towards mobile phone use. They mostly disagreed upon its drawbacks such as distraction, loss of time, as well as its physical hazards and ethical problems. Further, those who had such a positive attitude experienced less school failure. However, the relation between attitude and school achievement in terms of grades revealed that such attitude is a double sword weapon. Thus, a majority of those having a positive attitude were among those having the extreme grades of fair and excellent. Thus, the positive attitude could push the schoolchild towards excellence, or on the other hand to a just pass grade, which could be attributed to the drawbacks of mobile phones. This would have a negative impact on their academic performance. In agreement with the current study, Cilliers et al (2017) in a study on university students in South Africa revealed a majority of positive attitudes towards the use and benefits of mobile phone in seeking information for study.

Furthermore, the use of mobile phone seems to have a protective effect against school failure, with an Odds Ratio (OR) 0.03. This indicates a beneficial effect of mobile phone use on scholastic performance. In agreement with this, a study in Iran revealed a positive effect of exposure to mobile phone radiation on primary schoolchildren's short-term memory functions (Movvahedi et al, 2014). Moreover, two studies on secondary schoolchildren in Nigeria demonstrated a positive relationship between their use of mobile phones and their level of academic performance (Rabiu et al, 2016; Jairus et al, 2017). Additionally, the number of text (SMS) messages per day were turned to be a significant positive predictor of their total grade points, i.e. improved their school performance. This could be explained by the improvement in their vocabulary. The finding is in agreement with those of a study on primary schoolchildren in the Netherlands, where the use of text messaging had a positive effect on their language and grammar abilities (van Dijk et al, 2016). Schoolchildren's school achievement was also influenced by certain socio-demographic characteristics. Thus, school failure seems to be more probable in older age children, and having high birth order rank, which is quite plausible given that a schoolchild older than his/her peers often has lower scholastic abilities. As for the higher birth order, it might be explained by the less care given at home compared to firstborns. Other socio-demographic characteristics affecting school achievement in the current study were parents' education, and urban residence. These had a positive impact, which might be attributed to the higher socioeconomic level of the family, and its repercussion on child's academic performance due to better care. On the other hand, a working mother had a negative effect on schoolchild achievement. This could be due to less time the mother spends with her child, in addition to the added job stress on mother's burden. Similar associations were reported in a study among Chinese adolescents, and these socio-demographic characteristics were shown to interact with the mode of use of mobile phones (Jiang et al, 2014).

In conclusion, the Conclusion and recommendations:

use of mobile phones is highly prevalent among primary and preparatory schoolchildren in the study settings. This seems to have a positive impact on their school performance. Nonetheless, when these phones are used at school, they may have a negative influence on their grades. The study recommends more strict school policies regarding the use of mobile phones in schools. Schoolchildren should be encouraged to increase their utilization in academic purposes and applications to help in their learning process. Further research is needed to elucidate the impact of use of mobile phone educational applications on their learning process.

**Table 1:** Personal, health, and school characteristics of students in the study sample (n=400).

	Frequency	Percent
Age:		
<=12	143	35.8
>12	257	64.3
Range	10.0-16.0	
Mean±SD	13.3±1.2	
Median	14.0	
Gender:		
Male	94	23.5
Female	306	76.5
Birth order:		
1	153	38.3
2+	247	61.8
Have chronic disease	41	10.3
Have disability	11	2.8
Smoking	7	1.8
Practice sports	263	65.8
Have hobbies	300	75.0
School achievement:		
Fair	115	28.8
Good	102	25.5
Very good	90	22.5
Excellent	93	23.3
Total Grade Point Average (max=100)		
Range	18.0-100.0	
Mean±SD	75.9±13.4	
Median	74.50	
Previous school failure	24	6.0

**Table 2:** Socio-demographic characteristics of students in the study sample (n=400)

	Frequency	Percent
Father education:		
None formal	144	36.0
Basic	46	11.5
Intermediate	125	31.3
University	85	21.3
Father job		
Employee	104	26.0
Manual work/trade	296	74.0
Mother education:		
None formal	135	33.8
Basic	46	11.5
Intermediate	127	31.8
University	92	23.0
Mother job:		
Housewife	337	84.3
Working	63	15.8
Residence:		
Rural	59	14.8
Urban	341	85.3
Crowding index:		
1	177	44.3
>1	223	55.8
Income:		
Insufficient	111	27.8
Sufficient	251	62.8
Saving	38	9.5

**Table 3:** Use of cell phone among students in the study sample (n=400)

	Frequency	Percent
Use cell phone	377	94.3
Type:		
Regular	40	10.6
Smart	18	4.8
Smart touchscreen	311	82.5
Multiple	8	2.1
Functions used daily:		

Making voice calls	163	43.2
Receiving voice calls	183	48.5
Sending text messages	112	29.7
Receiving text messages	200	53.1
Sending email	62	16.4
Receiving email	64	17.0
Browsing net	192	50.9
Looking for study topic	134	35.5
Games	270	71.6
Music	242	64.2
Texting using:		
One hand	244	64.7
Both hands	133	35.3
Playing games using:		
One hand	139	36.9
Both hands	238	63.1
Average SMS sent/day		
None	113	30.0
1-10	231	61.3
11-25	22	5.8
26-50	11	2.9
Average email sent/day		
None	180	47.7
1-10	156	41.4
11-25	30	8.0
26-50	11	2.9
Hours of mobile use/day:		
1 or less	191	50.7
2-3	74	19.6
4+	112	29.7

**Table 4:** Use of cell phone at school among students in the study sample (n=400)

	Frequency	Percent
Take mobile to school	150	39.8
Used in:		
Class	5	3.3
Recess	105	70.0
Both	40	26.7
Used for:		
Making voice calls	103	27.3
Receiving voice calls	113	30.0
Sending text messages	82	21.8
Receiving text messages	104	27.6
Sending email	35	9.3
Receiving email	41	10.9
Browsing net	62	16.4
Looking for study topic	88	23.3
Games	130	34.5
Music	121	32.1
Attitude towards cell phone drawbacks:		
Agree (negative)	154	38.5
Disagree (positive)	246	61.5

**Table 5:** Relations between students' use of cell phone at school and their school performance

	Take mobile to school				X <sup>2</sup> test	p-value
	No		Yes			
	No.	%	No.	%		
Previous school failure:						
No	215	60.1	143	39.9		
Yes	12	63.2	7	36.8	0.07	0.79
School achievement:						
Fair	64	61.5	40	38.5		
Good	44	45.8	52	54.2	12.13	0.007*
Very good	56	65.9	29	34.1		
Excellent	63	68.5	29	31.5		

(\*) Statistically significant at  $p < 0.05$

**Table 6:** Relations between students' attitude towards cell phone drawbacks and their school performance

	Attitude				X <sup>2</sup> test	p-value
	Agree (negative)		Disagree (positive)			
	No.	%	No.	%		
Previous school failure:						
No	139	37.0	237	63.0		
Yes	15	62.5	9	37.5	6.21	0.01*
School achievement:						
Fair	34	29.6	81	70.4		
Good	45	44.1	57	55.9	24.11	<0.001*
Very good	51	56.7	39	43.3		
Excellent	24	25.8	69	74.2		

(\*) Statistically significant at  $p < 0.05$

**Table 7:** Best fitting multiple logistic regression model for the factors determining previous school failure

	Wald	Df	p-value	Odds Ratio (OR)	95.0% CI for OR	
					Upper	Lower
Constant	3.445	1	0.063	0.00	0.063	0.00
Age	9.789	1	0.002	5.21	1.85	14.66
Birth order	6.589	1	0.010	47.63	2.49	910.02
Mother education	9.296	1	0.002	0.06	0.01	0.36
Urban residence	7.937	1	0.005	0.04	0.00	0.37
Use cell phone	7.384	1	0.007	0.03	0.00	0.37
Nagelkerke R Square: 0.63						
Hosmer and Lemeshow Test: $p=1.00$						
Omnibus Tests of Model Coefficients: $p < 0.001$						
Non-significant variables: gender, grade, father education, mother work, crowding index, income, chronic disease, disability, exercise, smoking, allowance, hobbies, attitude score						

**Table 8:** Best fitting multiple linear regression model for the total grade points

	Unstandardized Coefficients		Standardized Coefficients	t-test	P-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	66.34	6.26		10.592	<0.001	54.00	78.67
Grade (school year)	-5.69	1.65	-0.20	3.440	0.001	-8.95	-2.43
Father education	1.79	0.76	0.17	2.350	0.020	0.29	3.29
Mother education	2.67	0.79	0.25	3.397	0.001	1.12	4.22
Working mother	-0.73	0.27	-0.16	2.710	0.007	-1.25	-0.20
Urban residence	4.97	2.06	0.14	2.411	0.017	0.91	9.03
Income	-2.64	1.33	-0.12	1.991	0.048	-5.26	-0.03
Take mobile to school	-4.80	1.55	-0.18	3.098	0.002	-7.85	-1.75
No. of SMS	3.01	0.97	0.17	3.112	0.002	1.10	4.91

r-square=0.27

Model ANOVA:  $F=12.78, p < 0.001$

Non-significant variables: age, gender, crowding index, chronic disease, disability, exercise, smoking, allowance, hobbies, attitude score, hours of use, media

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