

## ORIGINAL ARTICLE

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**Mobile phone usage characteristics of children at school and parents' approach**** Izzet Goker Kucuk<sup>1</sup>,  Utku Eser<sup>2</sup>,  Murat Cevik<sup>3</sup>,  Kurtulus Ongel<sup>4</sup>**<sup>1</sup>Kemaloz Family Health Center, Usak, Turkey<sup>2</sup>Usak University, Faculty of Medicine, Department of Family Medicine, Usak, Turkey<sup>3</sup>Gudul Family Health Center, Ankara, Turkey<sup>4</sup>Katip Celebi University, Faculty of Medicine, Department of Family Medicine, Izmir, Turkey

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**Abstract**

The use of mobile phones has gradually increased in recent years. Consequently, many negative effects on children and young people have been observed. The aim of this study was to determine the characteristics of mobile phone use by children, as well as determining the parents' opinions about this subject. The survey was a cross-sectional study and conducted prospectively between September 1, 2018, and December 1, 2018. A total of 1020 people participated in the present study (mean age 41.8±5.8). 92.8% of the children involved in the present study had mobile phones. The mean age, at which the mobile phone was purchased, was 12.1±2.5 years (min: 3, max: 18). The most common reason for the purchase of mobile phones was the parents' desire of the parents to reach (71.5%). 92.8% of mobile phones were smartphones. 41.5% of those, who participated in the present study, agreed on the partial prohibition of mobile phones in schools. Parents, who had problems regarding the use of mobile phone, reported that mobile phones should be banned at a higher rate ( $p<0.05$ ). The parents having problem with the use of mobile phones requested the ban on mobile phone usage statistically significantly more ( $p<0.05$ ). There was a significant relationship between the duration of mobile phone use and the necessity of banned in the school ( $p<0.05$ ). The rate of parents, who have problems due to mobile phone use, was 56%. The rate of the mother or father, who is satisfied with the use of his/her mobile phone, was 42.3%. Most parents are against the use of mobile phones in the schools. However, they have a positive view on the use of mobile phones for communication purposes during lunch breaks and after the school hours.

**Keywords:** Cell phone, parent, school**Introduction**

The communication has always been very important since the beginning. The revolution of communication reached a very different point in 1876, when Graham Bell invented the telephone. The introduction of cellular phones at the end of the 20th century further increased the communication opportunities.

The first mobile phones had the voice and SMS communication features. However, in addition to the features of classical mobile phones, smartphones have also additional functions such as the Internet, camera, gaming, video player, navigation, e-mailing, and social networks (such as Facebook and Instagram) [1]. Because of the parents' desire to access their child(ren), the number of children having and using mobile phones gradually increases. Besides many positive properties of mobile phones, they also

have certain negative aspects. Some of their positive features are the easy access to information, providing the abstract phenomena with visual quality, storing the images of information, and enabling repeating lessons. Some of the negative aspects, however, are distractibility, impairment of concentration, academic failures in school, sleep disorders, socialization impairments, prevention of reading habit, and Internet addiction [2]. Besides that, in cases of intense and long uses, they might cause many adverse effects on the health.

The aim in the present study is to reveal the parents' perspective on the use of mobile phones in school, which causes significant problems in recent years, and to discuss the factors influencing it by making use of literature.

**Materials and Methods****Study design and data Sources**

The present study was carried out upon the approval of the Non-interventional Clinical Studies Ethics Committee of Izmir Katip Celebi University (Nr.410, 12.19.2018). The face-to-face

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questionnaire was used for data collection. The survey was a cross-sectional study and was conducted prospectively between September 1, 2018, and December 1, 2018, on the parents having student child(ren).

In this study having prospective design, the informed consent form was obtained from one of the parents and, in order to determine the perspective of parents on the use of mobile phones in the schools, a 24-item questionnaire prepared by the authors was conducted. The first 8 items were related with socio-demographic characteristics and the rest 16 with the use of mobile phones.

The inclusion criteria were determined to be as follows: being a mother or father, having bought a mobile phone for his/her child(ren), being informed about the study, accepting to participate, and answering all the questions. The exclusion criteria were determined to be as follows: missing answers in the survey form and not being a volunteer.

The data obtained were statistically analyzed using IBM SPSS Statistics Version 22 package software. For the nominal variables, the quantitative analyses and percentage analyses were performed, whereas the intergroup relationships were determined using the Chi-Square test. In the double-cell tables, Fisher's Exact Test was used in cases that the values in cells do not have the expected volume; Pearson's Chi-Square analysis was performed using Monte Carlo Simulation in RxC tables. When interpreting the results, the statistical significance was set to be  $p < 0.05$ .

## Results

The number of participants was 1020 and the mean age was  $41.8 \pm 5.8$  years (min:26, max:64). Of the participants, 34.9% (n:356) were male and 65.1% (n:664) were female. Considering the educational status, 32% (n:328) of the participants were university graduates, 22.7% (n:234) elementary school graduates, 22% (n:226) high school graduates, 7.7% (n:80) secondary school graduates, 6.4% (n:66) doctorate-postgraduate graduates, 3.6% (n:38) had no educational background, and 4.6% (n:48) did not answered this question. It was determined that all the participants have child(ren); 58.3% (n:595) had 2 children, 19% (n:194) had 1 child, 16.9% (n:172) had 3 children, 4.6% (n:47) had 4 children, and 1.2% (n:12) had 5 or more children. The mean age of children was  $14.4 \pm 3.2$  years (min:5, max:18). 92.8% (n:947) of the children participating in this study had a mobile phone. The mean age of child at the moment they have been given mobile phone was  $12.1 \pm 2.5$  years (min: 3.0, max: 18.0).

After the general socio-demographic data, the type of mobile phones that the children use was examined. It was determined that 92.8% (n:879) of the children had smart/touch-screen phones, whereas 7.2% (n:68) were using classical touchtone mobile phones. The reason for buying children mobile phones was investigated and the results are summarized in the table below (Table 1). Then, the opinions of parents about the ban on the use of mobile phone in school are presented in the table below (Table 2).

**Table 1.** Reasons for buying mobile phone for children

| What was your reason for buying mobile phone?       | n          | %            |
|-----------------------------------------------------|------------|--------------|
| Talk to my child whenever I want                    | 823        | 86.9         |
| He/she wanted                                       | 199        | 21.0         |
| As a help for his/her lessons                       | 67         | 7.1          |
| For entertainment (gaming, social media, and etc..) | 46         | 4.9          |
| Others                                              | 15         | 1.6          |
| <b>Total number of children having mobile phone</b> | <b>947</b> | <b>100.0</b> |

**Table 2.** Parents' opinions about the ban on the use of mobile phones in the schools

|                                                                                                 | n           | %            |
|-------------------------------------------------------------------------------------------------|-------------|--------------|
| It should be completely banned.                                                                 | 405         | 39.7         |
| It should be partially banned (for instance, it might be used in the lunch break.)              | 423         | 41.5         |
| Once the families give education on the proper use of mobile phones, they should be freely used | 192         | 18.8         |
| <b>Total</b>                                                                                    | <b>1020</b> | <b>100.0</b> |

The statistical relationship between the ban on the use of mobile phones in the school and the various situations was also examined, and the statistical significance of the results is summarized in the table below (Table 3). Although there was no statistically significant difference between the genders of parents in terms of the ban on the use of mobile phones in the schools ( $p > 0.05$ ), it was observed that the fathers (43.4%) statistically significantly more frequently advocated the ban. There was a statistically significant difference regarding having any problem in terms of the ban on the use of mobile phones in the schools ( $p < 0.05$ ). The participants having problems advocated the ban more frequently. There was a statistically significant difference in the ban on mobile phone use in the schools according to being pleased with child(ren)'s use of mobile phone ( $p < 0.05$ ). The participants giving the answer "yes" more frequently advocated the ban.

In the present study, the daily duration of children's mobile phone use was also examined. Accordingly, 24% (n:227) of the children used mobile phone for less than 1 hour, 25.5% (n:241) between 1 and 2 hours, 16.9% (n:160) between 2 and 3 hours, 8.6% (n:81) between 3 and 4 hours, and 25% (n:238) for more than 4 hours.

How children use phones is also important. For the question "How does your child use his/her mobile phone", 53.8% (n:509) of parents answered with "direct contact with ear", 14.2% (n:135) with "using earphones", and 32% (n:303) with "both of them".

For the question "Did your child's level of physical exercise (sports, bicycling, and etc.) decreased after he/she started using mobile phone", 39.70% (n:376) of participants answered "yes", whereas 52.79% (n:500) answered no and 7.49% (n:71) answered "I don't know".

The percentage of parents having problem with his/her child about the use of mobile phones was 55.96% (n:530) and 44.03% (n:417) of parents haven't had any problem about this subject. The percentage of parents, who are pleased with his/her child's mobile phone use, was 42.34% (n:401) but 57.65% (n:546) of parents were not. The reasons for 546 parents' displeasure regarding the use of mobile phones are presented in the table below (Table 4).

**Table 3.** Relationship between various situations and the ban on the use of mobile phone in the schools

|                                                                         |                                  | What do you think about the ban on the use of mobile phones in schools?                         |      |                                                                                   |      |                                |      |       |       | Chi-Square Analysis |       |
|-------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|--------------------------------|------|-------|-------|---------------------|-------|
|                                                                         |                                  | Once the families give education on the proper use of mobile phones, they should be freely used |      | It should be partially banned (for instance, it might be used in the lunch break) |      | It should be completely banned |      | Total |       |                     |       |
|                                                                         |                                  | n                                                                                               | %    | n                                                                                 | %    | n                              | %    | n     | %     |                     |       |
| Gender of parent                                                        | Male                             | 61                                                                                              | 17.1 | 141                                                                               | 39.6 | 154                            | 43.3 | 356   | 100.0 | 3.02                | 0.221 |
|                                                                         | Female                           | 131                                                                                             | 19.7 | 282                                                                               | 42.5 | 251                            | 37.8 | 664   | 100.0 |                     |       |
|                                                                         | Total                            | 192                                                                                             | 18.8 | 423                                                                               | 41.5 | 405                            | 39.7 | 1020  | 100.0 |                     |       |
| The type of mobile phone that the child uses                            | Smart/touch-screen mobile phone  | 157                                                                                             | 17.9 | 374                                                                               | 42.6 | 347                            | 39.5 | 878   | 100.0 | 1.2                 | 0.528 |
|                                                                         | Classical touchtone mobile phone | 16                                                                                              | 23.5 | 27                                                                                | 39.7 | 25                             | 36.8 | 68    | 100.0 |                     |       |
|                                                                         | Total                            | 192                                                                                             | 18.8 | 423                                                                               | 41.5 | 405                            | 39.7 | 1020  | 100.0 |                     |       |
| Have you ever had a problem you're your child about using mobile phone? | Yes                              | 71                                                                                              | 13.4 | 217                                                                               | 40.9 | 242                            | 45.7 | 530   | 100.0 | 28.2                | 0.000 |
|                                                                         | No                               | 102                                                                                             | 24.5 | 184                                                                               | 44.1 | 131                            | 31.4 | 417   | 100.0 |                     |       |
|                                                                         | Total                            | 192                                                                                             | 18.8 | 423                                                                               | 41.5 | 405                            | 39.7 | 1020  | 100.0 |                     |       |
| Are you pleased you're your child's mobile phone usage?                 | Yes                              | 97                                                                                              | 24.2 | 185                                                                               | 46.1 | 119                            | 29.7 | 401   | 100.0 | 32.3                | 0.000 |
|                                                                         | No                               | 76                                                                                              | 13.9 | 216                                                                               | 39.6 | 254                            | 46.5 | 546   | 100.0 |                     |       |
|                                                                         | Total                            | 192                                                                                             | 18.8 | 423                                                                               | 41.5 | 405                            | 39.7 | 1020  | 100.0 |                     |       |

**Table 4.** The reasons for parents' displeasure regarding the use of mobile phone

| If you're not pleased with your child's use of mobile phone, why?             | n          | %          |
|-------------------------------------------------------------------------------|------------|------------|
| He/she plays game with the phone                                              | 194        | 35.5       |
| He/she doesn't study his/her lessons sufficiently                             | 115        | 21.06      |
| He/she is on the Internet for too long (for instance facebook, twitter, etc.) | 109        | 19.9       |
| Impaired sleeping routine                                                     | 57         | 10.4       |
| Talking for too long on the phone                                             | 36         | 6.5        |
| Texting too much                                                              | 35         | 6.4        |
| All                                                                           | 162        | 29.6       |
| <b>Total</b>                                                                  | <b>546</b> | <b>100</b> |

Of children using mobile phone, 46.8% (n:443) clean his/her phone, whereas 46.8% (n:318) don't and 19.62% (n:186) of parents do not know if their child cleans his/her phone. The level of parents' knowledge of the diseases that may develop as a result of the intense use of mobile phones for a long time was also examined, and the results are summarized below (Table 5).

**Table 5.** The level of parents' knowledge of the diseases or conditions that may develop as a result of intense use of mobile phone for a long time

| Please check the ones among the diseases or conditions you know, which may develop as a result of the intense use of mobile phones for a long time? | n           | %          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|
| Damage on the brain tissue                                                                                                                          | 237         | 23.2       |
| I don't know, I didn't hear any                                                                                                                     | 204         | 20.0       |
| Weakening memory                                                                                                                                    | 163         | 16.0       |
| Brain tumors (for ins.: gliomas, temporal lobe tumors, and etc..)                                                                                   | 132         | 12.9       |
| Cardiac problems                                                                                                                                    | 94          | 9.2        |
| Irreversible hearing impairments                                                                                                                    | 73          | 7.2        |
| Damage on the genetic structure                                                                                                                     | 18          | 1.8        |
| Decrease in the number sperms                                                                                                                       | 14          | 1.4        |
| Cervical disc hernia                                                                                                                                | 1           | 0.1        |
| All                                                                                                                                                 | 467         | 45.8       |
| <b>Total</b>                                                                                                                                        | <b>1020</b> | <b>100</b> |

The conditions, which develop among the children because of the use of mobile phones, are specified in the table below (Table 6).

**Table 6.** The conditions developing among children because of the use of mobile phones

|                                       | n          | %            |
|---------------------------------------|------------|--------------|
| None                                  | 431        | 45.51        |
| Headache                              | 226        | 23.86        |
| Loss of concentration and distraction | 169        | 17.85        |
| Reduction in visual space             | 155        | 16.37        |
| Sense of intense stress and fatigue   | 103        | 10.88        |
| All                                   | 20         | 2.11         |
| Increase in skin temperature          | 4          | 0.42         |
| Reversible loss of hear               | 2          | 0.21         |
| Tinnitus                              | 2          | 0.2          |
| Electricity burns                     | 1          | 0.1          |
| Epileptic attack (epilepsy crisis)    | 1          | 0.1          |
| <b>Total</b>                          | <b>947</b> | <b>100.0</b> |

## Discussion

There are different approaches to the students' use of mobile phones in different countries. For instance; in France, the use of mobile phone by students (until university) is forbidden since the educational year 2018-2019. In our country, according to the Ministry of National Education's Circular Nr. 2018/10, the students may bring mobile phone to the school, but the use of mobile phone is forbidden in "the fields, where the educational activities are performed, such as classrooms, laboratories and etc." [3].

In a study carried out by Cho S et al., it was reported that approximately half of the students (46.2%) have used smartphone for multiple times and approximately one-fourth of survey participants (24.7%) have been distracted during the clinical

practice because of the use of smartphone [4]. In a study examining the effect of the law banning the use of mobile phones by young drivers, it was determined that, although 64% of young drivers stated that they obey the law, only 39% of parents confirmed them regarding this subject. However, the opposite applies to the support to ban and 95% of young drivers and 74% of parents support the ban [5]. In this study, 81.2% of parents stated that the use of mobile phones in the school should be prohibited (39.7% completely, 41.5% partially). However, the parents having problem with their children's use of mobile phones and the parents, who are pleased with their children's use of mobile phone, statistically significantly want the use of mobile phone to be banned ( $p < 0.05$ ).

According to a study carried out in 2013, the minimum year of having a mobile phone is 9 years in Denmark and Romania. However, in Turkey, the age of starting using mobile phone is 10 years [6]. In the present study, the age at which the child had a phone for the first time, was found to be 12.1 years, which is higher than the mean value in Turkey. It is thought that the educational level in the study area plays a role in this preference.

In a study in England, the rate of having a problem due to the use of mobile phones was found to be 10% among the students aged between 11 and 18 years [7]. In TURKSTAT's Family Structure Survey 2016, it was determined that 14.4% of young people had problem because of the use of mobile phone. According to that survey, following the smoking and the friend selection, the use of mobile phone is the third most frequent problem that the parents have with young people [8]. In the present study, contrary to previous studies, the rate of problem arising from the use of mobile phone was found to be at a higher level (56%). The rate of parents, who are unpleasant with their children's use of mobile phone, was found to be 58%.

It was determined that some of the applications used in mobile phones increased the physical activity at a low or moderate level [9]. Contrary to this, in a study carried out on university students, it was determined that the ones, who frequently use mobile phones, have developed more sedentary behavior styles [10]. In a study carried out in Korea, it was observed that the smartphone users, who are at a high risk level in terms of Internet use, perform a lower level of physical activity [11]. In the present study, similar to the literature, it was observed that the level of physical activity decreased among 40% of children after starting the use of mobile phone.

Using mobile phone (texting, wearing earphones, talking, etc.) distracts the pedestrians [12]. In the present study, 14.2% of participants use mobile phone with earphones and 32% with both earphone and direct contact. These values should be considered regarding the events that may occur because of distraction.

Since the mobile phones are not properly cleaned, they may cause severe diseases among the children. In a previous study, 24 fungus forms were detected in the mobile phones of students studying at vocational high schools [13]. In the present study, it was determined that 46.8% of children do not properly clean their mobile phones. Thus, the risk of exposure to severe infections increases.

In a study carried out in Denmark, when compared to those having no exposure, the incidence of migraine was found to be

1.30 and that of symptoms related with headache was found to be 1.32 among the individuals being exposed to mobile phone in prenatal and postnatal period [14]. The headache, concentration problems, sleep disorders, and sense of heat in the ear were found to be dose-dependent [15]. In the present study, the most frequent complication arising from the use of mobile phone was found to be "headache" (23.86%).

In a study carried out by Zhou KY et al., 6 factors causing attention deficit disorder with hyperactivity (ADHD) were detected. One of the most important factors is the mobile phone addiction [16]. In a study carried out by Zheng F et al. on Chinese adolescents, a significant relationship was found between the duration of mobile phone use and ADHD [17]. In the present study, 17.85% of the participants stated that their children had loss of concentration and attention. Accordingly, many parents stated that their children's level of academic success decreased, and they experienced learning disabilities.

In a review study carried out by Zorena K et al., it was reported that the smaller font sizes used while reading SMS and etc. in smartphones cause visual impairment, xerophthalmia, dizziness, and neck muscle strain [18]. In the present study, similar to the study, the reduction in visual field because of the use of mobile phone was reported in 16.37% of children.

In a study carried out on adolescents in England, it was observed that 1/3 (32.2%) of participants reported that they use mobile phone in darkness, and they sleep for a too short duration [19]. In a study carried out by Lee JE et al., it was determined that 3 of 10 children in Korea are addicted to mobile phone addict and the sleep quality of mobile phone addicts was found to be low [20]. In a study carried out by Schoeni A et al., it was determined that the use of mobile phone at nights may cause fatigue, quick exhaustion, headache, and physical diseases among adolescents [21]. In the present study, similar to the literature, it was reported that 10.88% of parents stated that their children had "severe stress and fatigue" because of mobile phone use.

In a systematic review carried out by Keykhosravi A et al., it was reported that increase in skin temperature, oversensitivity to temperature, facial dermatitis, angiosarcoma in scalp, and sense of burning (on face, skin, behind and around the ear) may develop because of the use of mobile phone and tablet [22]. In the present study, these rates were found to be at lower levels.

In a study carried out by Tombini et al., it was shown that the electromagnetic fields of mobile phones may cause interaction with focal epileptic focus and increase the excitability [23]. However, in the study carried out by Nagarjunakonda et al., it was reported that the use of mobile phone did not affect the number of epileptic attacks. Moreover, the number of drug-resistant epilepsy was found to be lower among the mobile phone users [24]. In the present study, the epileptic attack was observed in only 1 case.

In a study carried out by Fernández C et al., it was reported that, when compared to an adult brain, a child's brain is more sensitive to radiation and some regions absorb the high radiation doses [25]. In the present study, 23.2% of parents believe that it may damage the brain tissue.

In CERENAT case-control study, the risk of gliomas and temporal tumors due to occupational and urban use of mobile phone was found to be high. There is a relationship between excessive use of mobile phone and brain tumors [26]. Only 12.9% of the study participants believe that mobile phones cause brain tumor; however, because of the duration limitation, it wasn't possible to determine if mobile phone causes brain tumor.

In a study carried out by Wilmer et al., it was found that smart phones damage the memory of user. The effects of the long-term use of this technology on our brain are not exactly known yet [27]. The results obtained in a different study suggest that the electromagnetic radiofrequency field effect (RF-EMF) developing due to the use of mobile phone has potential negative effect on the cognitive functions of relevant brain regions during the use of phone [28]. In the present study, 16% of the parents are aware of this fact

In a study carried out by Misek J et al., it was determined that exposure to RF-EMF because of the use of mobile phones reduced the cardiac rate related with parasympathetic nerve stimulation, especially while lying [29]. In another study, it was observed that RF-EMF of mobile phone prolonged the QT interval and affected the voltage criteria in ECG among male patients with myocardial ischemia [30]. In the present study, 9.2% of participants were aware that the mobile phones may cause cardiac problems.

In a study carried out by Medeiros LN et al., it was determined that the use of mobile phone may damage the hearing and cause worsening in tinnitus [31]. In the present study, 7.2% of parents have an idea about the hearing problems.

In a review on the electromagnetic field, it was stated that the electromagnetic field exposure creates significant changes in the protein structure of cell and these changes might have several adverse effects on the cellular proliferation and nervous system development [32]. In the present study, 1.8% of participants know that the genetic structure would be harmed, but they were not aware of how this may result in.

In a study carried out by Kesari et al., the devices emitting radiation at different rates such as mobile phone, laptop, microwave, and Wi-Fi cause the formation of free oxygen radicals by increasing the oxidative stress and, thus, may increase the infertility development among males by reducing the sperm quality [33]. In the present study, 1.4% of parents knew that mobile phones may cause infertility. It should be noted that the mobile phones might have played role in the male infertility gradually increasing in recent years.

In a study carried out by Fares et al., it was determined that the use of mobile phone and tablet by children and adolescents may cause downslope of head and consequently neck pain with muscular and skeletal origin [34]. In the present study, 0.1% of the participants were aware that it may cause cervical disc hernia.

It was determined that 45.8% of parents answered that the mobile phones may cause all of the long-term complications. One fifth (20%) of parents were not aware of none of the complications that may develop as a result of long-term use of mobile phone. This is a very high rate and indicates that the information campaigns are

necessary for this purpose.

One of the limitations of this study is that the limited duration of study prevented the analysis of long-term effects of mobile phones on the followed patients. Another limitation is that the regional differences couldn't be sufficiently detected because the study was carried out in the limited number of centers. Further studies should consider these issues in order to achieve more accurate results.

## Conclusion

In conclusion, most parents are opposed to the use of mobile phones in schools. It is recommended to prohibit the use of mobile phones at the sections of schools, where the lessons are taught actively. The children may be allowed to use mobile phone within specific rules. Thus, the development of acute and chronic complications may be prevented.

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## Conflict of interest

*The authors declare that they have no competing interest.*

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## Ethical approval

*Ethical approval was received from the local Human Non-invasive Clinical Research Ethics Committee.*

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