Bangladesh Med Res Counc Bull 2023; 49: 150-156 DOI : 10.3329/bmrcb.v49i3.67912

RESEARCH PAPER

Cell Phone Use and Self-reported Wellbeing among Teenage Students of Bangladesh

Saida Ahmed[1*], Md. Fuad Al Fidah[1], Syeda Sumaiya Efa[1], Saida Sharifun Naher[2], Muhammad Kamrul Amin[3]

[1]National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh, [2]Bangladesh Bank Medical Centre, Motijheel, Dhaka, Bangladesh, [3]Department of Community Medicine, National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh

Abstract

Background: Though cell phone is an essential instrument for modern communication, increasing use of it can cause detrimental effects on the health and well-being of adolescents and young adults.

Objectives: Present study aimed to determine the association between cell phone use and self-reported wellbeing among teenage students of Bangladesh.

Methods: This cross-sectional study was conducted from January-December 2021, among 382 teenagers who had been using cell phone for >6 months. Teenagers were selected by convenience sampling technique from selected schools of Dhaka city. Data were collected by face-to-face interviews using a semi-structured questionnaire. Data analysis was done by IBM SPSS software and quality of data was ensured in all steps of the study. Ethical issues were maintained strictly.

Results: Out of the 382 teenagers, 55.5% were female. Mean age of the teenagers was 15.82 years. Most frequently reported symptoms were fatigue (16.2%), headache (11.3%), and sleeping problems (10.7%). Statistical analysis indicated that fatigue was significantly increased in female teenagers (AOR=1.84, *p*=0.042) and teenagers from middle and upper social class (*p*=0.005), headache was significantly associated with female teenagers (AOR= 3.42, *p*=0.002), and sleeping problem was associated with duration of CP use e"6 hours/day (AOR=3.36, p=0.003). Palpitation was associated with duration of CP use/day (For 4-5 hours: AOR=4.05, *p*<0.001; and for e"6 hours: AOR=3.28, *p*<0.005) and depression was associated with years of CP usage >1 year (AOR=2.43, *p*=0.015).

Conclusion: The study revealed factors that were associated with potential negative effects of cell phone use on well being of teenagers. Guardians should pay adequate attention to the teenager to mitigate those negative effects of cell phone use. Further comprehensive research is needed in this area.

Keywords: teenage, cell phone use, Bangladesh, Self-reported wellbeing.

Introduction

In Bangladesh, cell phones (CP) have made significant strides in the field of information and communication technology. They have dramatically transformed social and communication behaviour since their debut in 1993. The number of cell phone users in Bangladesh has surged from 70.963 million in March 2011 to 176.41 million as of June 2021. However, the negative aspects of technology are one aspect of this revolution that cannot be ignored.[1]

***Correspondence:** Saida Ahmed, National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh.*
email: fuadml@gmail.com
ORCID ID: 0000-0002-0050-4802

The total number of teenagers in the world is over 1.2 billion, and 89% of them reside in developing nations.[2] In Bangladesh, adolescents make up more than one-fifth of its total population, and at least fifty percent of them are equipped with Smartphone. Alarming trends of adopting unhealthy and sedentary lifestyles are putting people at grave risk of developing severe ailments and mental disorders.[3] While research on the correlation between children's cell phone usage and their overall well-being has not yielded definitive conclusions, studies show a link between exposure to radiofrequency and electromagnetic fields, and symptoms in children and adolescents. Specifically, those with higher exposure to such fields reported significantly higher levels of irritation or headache

intensity.[4] Moreover, children exposed to CP radiation were found to have a higher likelihood of developing migraines and headache-related symptoms.[5]

The COVID-19 pandemic has forced educational institutions to shut down, causing a mass distribution of electronics to adolescents by the parents.[6] However, a concerning phenomenon is emerging as adolescents are becoming addicted to cell phones instead of engaging in sports. This excessive and intensive CP use is raising concerns about potential behavioural or concentration problems.[6] This phenomenon is causing to excessive reliance on cell phones, potentially leading to detrimental health effects such as autism, depression, mood swings, and even suicidal tendencies. Shockingly, data from the US Centres for Disease Control and Prevention reveal that on average, children spend about 8 hours a day on electronic screens, causing potential productivity challenges and lack of sleep.[7] Studies have also found that excessive cell phone use during early childhood or teenage years can have negative impacts on both psychological and physiological health causing Attention Deficit Hyperactivity Disorder (ADHD), obesity, myopia, dryness, blurring vision, and headaches.[3,7]

In Bangladesh, cell phones have become a common tool among adolescents. However, adolescents in Bangladesh face additional challenges such as loneliness, lack of close friends, substance abuse, smoking etc.[8] Despite these prevalent issues, there has been limited research conducted on adolescents in Bangladesh.[9,10,11] This study aimed to determine the association between cell phone use and self-reported wellbeing among teenage students of Bangladesh.

Materials and Methods

This cross-sectional study was conducted from January to December 2021. It was conducted in two selected schools of Dhaka city. The study population was both male and female teenager (13-19 years) students of selected schools who use cell phones for at least six months. The sample size was 382. Teenagers were selected by convenience sampling technique. After taking informed written consent from guardians and assents from every participant, data were collected by face-to-face interview by a semi-structured questionnaire. The level of well-being was determined using Self-reported Well-being Scale based on five-point response Likert score questionnaire of HBSC survey to assess the self-reported well-being.

Teenagers: In this study, teenagers were considered as individuals aged from 13 to 19 years.

Self-reported well-being: In this study, Self-reported well-beings had been operationalized based on the reported symptoms headache, dizziness, fatigue, sleeping disturbances, feeling low and palpitation. It was assessed on a 5-point Likert scale (nearly daily, several times a week, nearly every week, about once a month, seldom or never). According to this, the maximum score is 30 and the minimum score was 6. The Cronbach's á coefficient of the well-being items was 0.814.

Data were checked and verified at both field and central level to ensure quality. Incomplete and missing data were sorted out and verified. Data were coded, categorized, cleaned, and entered into IBM SPSS software. Descriptive statistics were estimated as frequency distribution, percentage, mean, and standard deviation. Continuous data were presented as mean and standard deviation, while categorical variables were represented as counts and percentages. For inferential statistics, we used the Chi-square test to find any association between categorical variables. We developed a logistic regression model with all significant variables identified by chi-square tests to find the strength of association. A p-value <0.05 was considered statistically significant. All statistical tests were two-sided and performed at a significance level of á=0.05.

We considered the variable of never owning an CP as using CP 0 year, and the variable of the years of CP usage was split into using an CP for d"1 year and using a CP for >1 year. In addition, a symptom was considered to be present if it was reported 'almost every week' or more frequently. Based on the suggestions of Mamun MA et al.,[12] family income was utilized as an index of social class: <10,000 BDT (lower class), 10,000 - 20,000 BDT (middle class), and >20,000 BDT (upper class).

Results

Out of 382 teenagers, the majority (64.1%) was within the age group 15-16 years; mean (±SD) age was 15.82 (±1.123) years. Most (55.5%) of the teenagers were female. Out of the teenagers, 39.8% were from Class X, 37.7% were from Class XI, 12% were from Class XII and rest (10.5%) from Class IX. In present study, 65.2% of the teenagers were from upper social class,

33.5% from middle social class and 1.3% was from lower social class. The majority of the teenagers used cell phone for <3 hours each day (58.6%). Mean (±SD) use of cell phone per day was 4.03 (±3.42) hours. Among teenagers, 47.1% had their own cell phone. Most of the teenagers' (70.7%) daily duration of calls is 0-10 minutes per day. Majority of the teenagers were (78.3%) using cell phone for ≤1 year.

The most frequently reported symptom was fatigue (16.2%), followed by headache (11.3%), sleeping problems (10.7%) and depression (10.2%). Palpitation was found in 9.7% teenagers and the dizziness was found in only (5.8%) teenagers (Figure 1).

Table I: Distribution of teenagers by background characteristics (n=382)

Background characteristics	Category	f (%)
Age (Years)	≤14 years	41 (10.7)
	15-16 years	245 (64.1)
	>17 years	96 (25.1)
	Mean (±SD)	15.82 (±1.123)
Sex	Male	170 (44.5)
	Female	212 (55.5)
Current level of education	Class IX	40 (10.5)
	Class X	152 (39.8)
	Class XI	144 (37.7)
	Class XII	46 (12.0)
Social class (based on monthly family income)	Lower class	5 (1.3)
	Middle class	128 (33.5)
	Upper class	249 (65.2)
CP use per day	≤3 hr	224 (58.6)
	4-5 hr	75 (19.6)
	e"6 hr	83 (21.7)
	Mean (±SD)	4.03 (±3.42)
CP ownership	Do not own a CP	180 (52.9)
	Own a CP	202 (47.1)
Daily duration of calls	0-10 min/day	270 (70.7)
	≥10 min/day	112 (29.3)
Years of CP usage	≤1 year	299 (78.3)
	>1 year	83 (21.7)

f: frequency; %: Percentage; SD: Standard deviation; CP = Cell phone.

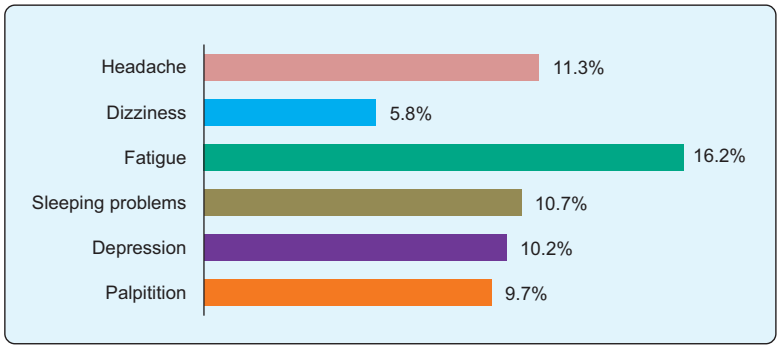

Figure 1: Distribution of self-reported symptoms (n=382)

Statistical analysis indicated that fatigue was significantly associated with both sex (p=0.016) and social class (p=0.005) of the teenagers. Headache was significantly associated with sex (p<0.001). Sleeping problem was found to be associated with owning CP (p<0.005), CP use per day (p<0.001) and years of CP usage (p<0.001). Palpitation (p<0.001) and depression (p=0.012) were also associated with years of CP usage.

Binary logistic regression shows that Females had 1.84 times more odds of developing fatigue than males (AOR=1.84, 95% CI=1.02-3.33). Teenagers of middle social class (AOR=0.06, 95% CI=0.01-0.56) and upper social class (AOR=0.06, 95% CI=0.01-0.54) had less chance of having fatigue than lower social class. Regarding headache, it was found that Females had 3.42 times higher odds of developing headache than males. Regarding sleeping problem, teenagers who used cell phone for e"6 hours had 3.36 times more chance of having sleeping problem than teenagers who used cell phone for ≤3 hours (AOR=3.36, 95% CI=1.49-7.56). Also, teenagers who used cell phone for 4-5 hours per day had 4.05 times higher odds of having depression than teenagers who used cell phone for ≤3 hours (AOR=4.05, 95% CI=1.78-9.22) and teenagers who used cell phone for ≥6 hours per day had 3.28 times higher odds of having depression than teenagers who used cell phone for ≤3 hours (AOR=3.28, 95% CI=1.43-7.52). Regarding palpitation, teenagers who used cell phone for >1 year had 2.43 times higher odds of developing palpitation than teenagers who used cell phone for d"1 year (AOR=2.43, 95% CI=1.19-4.98).

Table II: Association between selected attributes (only significant factors) and self-reported symptoms (n=382)

Symptom	Attributes	No,f (%)	Yes,f (%)	p-value(÷^{2} test)
Fatigue	Sex			
	Male	151 (47.2)	19 (30.6)	0.016
	Female	169 (52.8)	43 (69.4)	
	Social Class			
	Lower class	1 (0.3)	4 (6.5)	0.005*
	Middle class	108 (33.8)	20 (32.3)	
	Upper class	211 (65.9)	38 (61.3)	
Headache	Sex			
	Male	161 (47.5)	9 (20.9)	<0.001
	Female	178 (52.5)	34 (79.1)	
Sleeping problems	Owning CP			
	Yes	170 (49.9)	32 (78.0)	<0.001
	No	171 (50.1)	9 (22.0)	
	CP use per day			
	≤3 hr	211 (61.9)	13 (31.7)	<0.001
	4-5 hr	67 (19.6)	8 (19.5)	
	≥6 hr	63 (18.5)	20 (48.8)	
	Years of CP usage			
	≤1 year	277 (81.2)	22 (53.66)	<0.001
	>1 year	64 (18.8)	19 (46.34)	
Depression	CP use per day			
	≤3 hr	212 (61.8)	12 (30.8)	<0.001
	4-5 hr	61 (17.8)	14 (35.9)	
	≥6 hr	70 (20.4)	13 (33.3)	
Palpitation	Years of CP usage			
	≤1 year	276 (80.00)	23 (62.16)	0.012
	>1 year	69 (20.00%)	14 (37.84%)	

P-value obtained using χ^2 test, %: Percentage; χ^2: Chi-square test; * = Fisher's exact; p<0.05: Significant at 95% CI; CP = Cell phone; hr = Hour; Selected attributes were age (years), sex, class, residence, CP use per day, social class, CP ownership, daily duration of calls, years of CP usage.

Table III: Logistic regression model of association between selected attributes and self reported symptoms

Symptom	Attributes	AOR (95% CI)	*p*-value
Having fatigue	Sex		
	Male	Reference	
	Female	1.84 (1.02-3.33)	0.042
	Social Class		
	Lower class	Reference	
	Middle class	0.06 (0.01-0.56)	0.014
	Upper class	0.06 (0.01-0.54)	0.012
Having headache	Sex		
	Male	Reference	
	Female	3.417 (1.59-7.34)	0.002
Having sleeping problems	Owning CP		
	No	Reference	
	Yes	1.88 (0.75-4.71)	0.176
	CP use per day		
	≤3 hr	Reference	
	4-5 hr	1.34 (0.51-3.52)	0.555
	≥6 hr	3.36 (1.49-7.56)	0.003
	Years of CP usage		
	≤1 year	Reference	
	>1 year	1.96 (0.88-4.34)	0.099
Having depression	CP use per day		
	≤3 hr	Reference	
	4-5 hr	4.05 (1.78-9.22)	<0.001
	e”6 hr	3.28 (1.43-7.52)	0.005
Having palpitation	Years of CP usage		
	≤1 year	Reference	
	>1 year	2.43 (1.19-4.98)	0.015

AOR = Adjusted Odds-ratio; Adjusted for age (years), sex, class, residence, CP use per day, social class, CP ownership, daily duration of calls, years of CP usage. $p<0.05$: Significant at 95% CI; CP = Cell phone; hr = Hour;

Discussion

Cell phones have become an integral part of our lives regardless of age, gender, or occupation. As a result, teenagers are starting to use cell phones at earlier ages, resulting in longer exposure which had a detrimental effect on their physical and mental health. Present study aimed to determine the association between cell phone use and self-reported wellbeing among teenage students of Bangladesh.

The mean age of the study participants was 16 years (SD ±1.12), which is higher than the mean age found in the study conducted in China (10.6±0.6 years), and in Sylhet (15.26 ± 1.77 years).[13,15] The discrepancy between present study and the other two studies could be attributed to the difference in age groups of the study participants. In terms of gender distribution, the study had almost equal proportion of female (55.5%) and male (44.5%) teenagers, which is somewhat similar to the study conducted in Sylhet, Bangladesh (51.1% and 48.9% for males and females, respectively).[13] Both the findings indicated that cell phone uses in teenagers are increasing day by day irrespective of their gender.

In present study, the rate of cell phone ownership among teenagers was 59.9%, which was similar to a study conducted in Korea (64.5%), but lower than the

findings from China (72.9%).[14,15] This difference may be due to the fact that China is more technically and economically advanced country than Bangladesh and Korea. So, cell phones' are more affordable and available to the teenagers of China.

The most commonly reported physical symptom in this study was fatigue (16.2%), followed by headache (11.3%) and sleeping problems (10.7%). This finding contrasts with the study conducted in China, where sleeping problems were reported as the most common physical symptom, followed by fatigue and dizziness.[15] This difference in symptoms occurrence may be influenced by cultural and societal factors that affect how these symptoms are perceived and reported. Fatigue emerged as the most commonly reported physical symptom in our study.

In this study, Females were found to be 1.84 times more likely to experience fatigue compared to males, may be due to in addition to studying, female belonging to the teenage age group often has to undertake additional responsibilities at home which leads to stress. Additionally, teenagers from lower socio-economic classes were found to be more susceptible to fatigue compared to those from middle and upper classes. One possible explanation for this observation is the lack of alternative sources of entertainment, which may lead to increased cell phone usage and chronic stress among individuals in lower socio-economic classes. Furthermore, excessive cell phone use can disrupt sleep patterns and negatively impact sleep quality, which may be particularly true for females who tend to spend more time indoors due to household responsibilities in lower socio-economic classes.

In present study, it was found that only gender was significantly associated with headache. It may be due to the fact that headache is more frequent in females than in males.[16] Other studies have found headache to be significantly associated with duration of phone call, and exposure to CP. In the study conducted in Sylhet, no statistically significant correlation was found between gender and self-reported physical symptoms.[13] This lack of significance may be attributable to a number of factors, including the age range of the teenagers (12 to 20 years) and the inclusion of a total of 10 symptoms. It is plausible that younger children and older adults who are not experiencing significant puberty changes may perceive and report symptoms differently. In addition, the incorporation of multiple symptoms in the study may have led to differences in the reporting of physical symptoms between genders.[13]

Other symptoms like sleeping problem and developing depression increased with increasing duration of cell phone use per day. Palpitation was associated with increasing years of cell phone use. These findings revealed that increasing cell phone use had detrimental effect on the health and well being of the teenagers. So, teenagers should be encouraged to take part in more physical and outdoor recreational activities and to minimize the time of cell phone use.

One limitation of this research was the use of a cross-sectional study design, which may not provide conclusive evidence of causality between factors. Another limitation was the lack of validity data for the Bangla version of the HBSC questionnaire used in the study. Additionally, the inclusion of only 6 symptoms in the analysis may have limited the scope of the findings. Therefore, further comprehensive research is needed to better understand the associations between CP usage and well-being in children.

Conclusion

Present study demonstrated how common cell phone use is among teenagers, along with the physical symptoms that go along with it. Teenagers from lower socioeconomic levels and women were shown to be more prone to feeling fatigued than other individuals. Females also had headaches more frequently. These results implied that cell phone use may have higher effect on physical health of teenage girls than boys.

It is crucial to remember that present study had some limitations. So, further comprehensive research is needed. Despite these drawbacks, our work contributes to the growing body of research on the effects of cell phone use on well being of teenagers. According to the findings, socioeconomic level and gender may be crucial variables to take into account when attempting to comprehend the connection between cell phone use and physical symptoms. The identification of these risk variables can help interventions and regulations that can encourage healthy cell phone usage among teenagers and reduce potential negative effects on physical health.

Acknowledgement

The authors are indebted to all study participants and their guardians for their participation.

Conflict of interest: The authors have no relevant conflicts of interest to declare

Funding: This research did not receive any grant from funding agencies in the public, commercial or not-for-profit sectors.

Ethical approval: The research protocol was approved by the Ethical Review Committee of the National Institute of Preventive and Social Medicine (NIPSOM)

Submitted: 05 June 2023

Final revision received: 05 November, 2023

Accepted: 09 October 2023

Published: 01 December 2023

References

1. Hoque AS. Digital device addiction effect on lifestyle of generation Z in Bangladesh. *Asian People Journal*. 2018;1:21-44.
Available from https://journal.unisza.edu.my/apj/index.php/apj/article/view/68
2. Taghizadeh Moghaddam H, Bahreini A, Ajilian Abbasi M, Fazli F, Saeidi M. Adolescence Health: the needs, problems and attention. *International Journal of Pediatrics*. 2016;4:1423-38.
DOI: 10.22038/ijp.2016.6569
3. Hegde AM, Bhandary M, Balraj K. Negative impacts of electronic gadgets on school going children in Dakshina Kannada District. *Journal of Advanced Medical and Dental Sciences Research*. 2019;7:66-8.
Available from: https://jamdsr.com/uploadfiles/15ElectronicGadgetsVOL7issue11pp66-68.20191118012044.pdf
4. Heinrich S, Thomas S, Heumann C, von Kries R, Radon K. Association between exposure to radiofrequency electromagnetic fields assessed by dosimetry and acute symptoms in children and adolescents: a population based cross-sectional study. *Environmental health*. 2010: 9:1-9.
DOI: 10.1186/1476-069X-9-75
5. Sudan M, Kheifets L, Arah O, Olsen J, Zeltzer L. Prenatal and postnatal cell phone exposures and headaches in children. *The open pediatric medicine journal*. 2012;6:46.
DOI: 10.2174/1874309901206010046
6. Mannan M. PUBG and Free Fire games must be stopped completely [Internet]. PUBG and Free Fire games must be stopped completely | *theindependentbd.com.* 2022 [cited 2022 Nov 1].
Available from: https://m.theindependentbd.com/post/272497
7. Sundus M. The impact of using gadgets on children. *Journal of depression and anxiety*. 2018;7:1-3.
DOI: 10.4172/2167-1044.1000296.
8. Statista. Number of Smartphone Users Worldwide 2014-2020 | Statista [Internet]. *Statista.* Statista; 2022 [cited 2022 Nov 14].
Available from: https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/
9. Ybarra ML, Mitchell KJ. Exposure to Internet pornography among children and adolescents: A national survey. *Cyberpsychology & behavior*. 2005;8:473-86.
DOI: 10.1089/cpb.2005.8.473
10. Wajcman J, Bittman M, Jones P, Johnstone L, Brown J. The impact of the mobile phone on work/life balance; 2007 [cited 2022 Nov 14].
Available from: kiwanja. net/database/document/report_mobiles_work_life. pdf.
11. Ferdous MZ, Islam MS, Sikder MT, Mosaddek AS, Zegarra-Valdivia JA, Gozal D. Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh: An online-based cross-sectional study. *PloS one*. 2020;15:e0239254.
DOI: 10.1371/journal.pone.0239254
12. Mamun MA, Rafi M, Al Mamun AH, Hasan M, Akter K, Hsan K, Griffiths MD. Prevalence and psychiatric risk factors of excessive internet use among northern Bangladeshi job-seeking graduate students: a pilot study. *International Journal of Mental Health and Addiction*. 2021:19:908-18.
DOI: 10.1007/s11469-019-00066-5
13. Ferdous J. Mobile phone usage and awareness of health hazards among the adolescents in Sylhet city. *Imperial Journal of Interdisciplinary Research.* 2017;3:325-30.
14. Byun YH, Ha M, Kwon HJ, Choi KH, Burm E, Choi Y, Lim MH, Yoo SJ, Paik KC, Choi HD, Kim N. Epidemiological characteristics of mobile phone ownership and use in Korean children and adolescents. *Environmental health and toxicology*. 2013;28.
DOI: 10.5620/eht.2013.28.e2013018
15. Zheng F, Gao P, He M, Li M, Tan J, Chen D, Zhou Z, Yu Z, Zhang L. Association between mobile phone use and self-reported well-being in children: a questionnaire-based cross-sectional study in Chongqing, China. *BMJ open*. 2015;5:e007302.
DOI: 10.1136/bmjopen-2014-007302
16. Scher AI, Stewart WF, Liberman J, Lipton RB. Prevalence of frequent headache in a population sample. Headache: *The Journal of Head and Face Pain*. 1998;38:497-506.
DOI: 10.1046/j.1526-4610.1998.3807497.x.