International Journal of Community Medicine and Public Health
Patki MB et al. Int J Community Med Public Health. 2020 Aug;7(8):2993-3001
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20203058

Original Research Article

Mobile phone usage and its perceived ill health effects: a cross sectional study in Chennai, India

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Received: 18 June 2020
Revised: 02 July 2020
Accepted: 03 July 2020

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ABSTRACT

Background: Smart phone usage is on the rise in India. Previous studies have attributed mobile phone usage to certain health problems. Not many studies have been done in the community in Chennai pertaining to ill health effects of mobile phone usage.
Methods: This was a cross sectional study done on 213 participants of age >14 years of urban and rural field practice area of Tagore Medical College and Hospital in Chennai. The duration of the study period was from January to March 2019. Participants were interviewed by using a pretested questionnaire. House to house survey was done for data collection. Descriptive statistics and chi square test were done to compare the various variables.
Results: Nearly 52% were females. Mean age was 30 years. The most common perceived ill health effects were eye symptoms (63%), headache (40%), and feeling irritable (25%).The major differences among urban and rural population in mobile phone usage were, playing games (50% vs 35%: p=0.019), listening to music (77.7% vs 54.5% : p=0.000), taking selfies (48.5% vs 36.4% : p=0.048). Urban people in the study were found to use mobile phones more for internet (77.7%), WhatsApp (77.7%), and Facebook (70%), than rural people which was found to be internet (61.8%), WhatsApp (58.2%), and Facebook (40%) and their respective p values were 0.009, 0.002, 0.000.
Conclusions: Authors strongly recommend undertaking health education and health awareness activities regarding the ill health effects of mobile phone usage in the community.

Keywords: Smartphone, Adverse effects, Ill health, Chennai, Mobile phones

INTRODUCTION

Global scenario: Mobile phone usage is constantly on rise since the inception of mobile phones in the community. The worldwide mobile users has increased from 4.15 billion in 2015 to 4.57 billion in 2018 and the expected users in 2020 will be around 4.78 billion.[1]

Indian scenario: Mobile phone users in India have also increased from 581 million in 2014to estimated 800 million mobile phone users in 2019.[2] Smart phone users in India have increased from 251 million users in 2016 to 339 million users in 2018 and it is expected to reach 401 million users by 2020.[3] According to the Internet and Mobile Association of India (IAMAI) there were 478 million mobile internet users by June 2018. In Urban- 291 million mobile internet users and in rural- 187 million rural users by June 2018. 46 per cent of urban users and 57 per cent of rural users are below the age of 25.[4] Young students turned out to be the "most prolific users of most services", while middle-aged and older men show greater propensity of using social networking and browsing.[4]

India also leads mobile internet usage among G2O Nations.[5] Indians accessed the internet through their mobiles nearly 80% of the time. Indians spend 70% of mobile internet time on social media, and in entertainment.[6]

With the rapid rise of new innovative devices and advances in virtual communication involving Laptops, tablets and smart phones are causing changes in individuals' behaviour and daily habits. Besides the advantages it can also lead to many type of social problems like social isolation, financial problems like constant EMI worries and larger debts incurred to buy or use smartphones. It can also result in physical and psychological pathologies like damages related to electromagnetic field radiation, car accidents, distress linked to the phobia of not being able to use new technological devices.[7]

Mobile phones (smartphones) have multiple functions apart from calling, which include mobile gaming, streaming music, photo and video sharing on social networks like Facebook, Twitter, WhatsApp, Instagram, etc. In developing countries like India, the number of smartphone users is showing a rapidly increasing trend, especially in young more so in urban populations, with nearly one in three mobile phone users is expected to be a Smartphone user by 2021.[8]

A study was done on the health effects of mobile phone usage amongst students pursuing professional courses in colleges in an urban setting by Acharya et al showed that almost all the students (96.1%) possessed cell phones, and used the device for a greater part of the day.[9] The most common symptom reported was Headache (51.47%) followed by anger/irritability (50.79%). Other common mental symptoms seen were lack of concentration and poor academic performance, insomnia, anxiety etc. Among physical symptoms like body pains (32.19%), eye strain (36.51%), digital thumb (13.8%) were found to be frequent.

Excessive mobile phone use has been found to be associated with health problems such as headache, eye pain, ear pain, fatigue, headaches, dizziness, skin symptoms, a burning sensation in eye, discomfort, anxiety, neck pain, digital thumb, sleep disturbances owing to night time use, irritability and many were addicted to their mobile phones.[10-13] Inappropriate use of mobile phone by students present many deleterious effects, for example, usage of phones during lectures causes disturbances in classrooms affecting students' academic performances, and accidents while driving.[7,13,14]

Aims and objectives

Aims and objectives of the study were to determine the pattern of mobile phone usage, to estimate the prevalence of various perceived ill health effects attributed to mobile phone usage and to compare the pattern of mobile phone usage and perceived ill health effects among urban and rural field practice area of a private medical college and hospital, Chennai.

METHODS

Period of study

A cross-sectional study was conducted for the period of January to March 2019.

Study settings

A cross-sectional study was conducted at urban and rural field practice area of Tagore Medical College and Hospital in Chennai.

Data collection

A pretested and validated questionnaire was used. The questionnaire was administered by the interns in the community using House to house survey method for data collection.

Sampling method

Simple random sampling was by house to house survey.

Sampling technique

The rural field practice area of the Tagore Medical College and Hospital in Chennai covers a population of 28494 which includes 7 villages. Out of the 7 villages, one village was randomly selected by simple random sampling. The list of eligible participants was obtained from the rural health and training centre records. By using random number table, the study population was selected until a desired sample size of 100 is reached.

In the urban field practice area from a population of 40669 which includes 10 wards or streets, a sample of 103 was selected by using random number table, atleast 10 samples were selected from each street to avoid bias.

Inclusion criteria

Age group >14 years using mobile phones were included.

Exclusion criteria

To reduce confounding bias subjects with diabetes and hypertension were excluded. Individuals aged greater than 60 years were also excluded to avoid old age related health problems in the community. Individuals not using mobile phones were also excluded.

Sample size calculation

Based on the prevalence of 35% in Stalin et al study, absolute precision of 10%, confidence interval of 95%

and non-response rate of 10%.[10] Minimum required sample size computed as 100. It was decided to collect 100 samples each from urban and rural health centre. Investigators were able to collect 110 from rural and 103 samples from urban centre.

Ethical clearance

The study was presented to Institutional Ethical Committee (IEC) and was subsequently cleared by IEC. Written consent was obtained from all study participants.

Statistical analysis

The data collected were entered into excel and analysed using SPSS Version 20. Descriptive frequency tables were computed for all collected variables like socio demographic, pattern of usage, perceived ill health effects, accidents and social problems. Chi square test was applied to compare the various pattern of usage and perceived ill health effects in urban and rural population. P value of <0.05 was considered as significant findings.

RESULTS

The baseline characteristics of the various socio demographic variables are shown in Table 1. The majority of the study population were females (52%) and <30 years of age (60.6%). Majority of present study population belonged to social class 4 (36.6%). Majority (36%) of the study population had completed UG level education (Table 1).

Table 1: Baseline characteristics (n=213).

Variables	Numbers	Percentage
Sex		
Male	103	48.4
Female	110	51.6
Age group (in years)		
≤30	129	60.6
>30	84	39.4
Location		
Rural	110	51.6
Urban	103	48.6
Educational status		
Primary	12	5.6
Middle School	28	13.1
Secondary	59	27.7
Diploma	25	11.7
UG	76	35.7
PG	11	5.2
Illiterate	2	0.9
Occupational status		
Skilled	104	48.8
Semiskilled	72	33.8
Unskilled	34	16
Marital status		
Married	126	59.2
Divorced	1	0.5
Unmarried	85	39.9
Widow	1	0.5
Social class		
Class 1	1	0.5
Class 2	50	23.5
Class 3	53	24.9
Class 4	78	36.6
Class 5	31	14.6
Type of family		
Joint	47	22.1
Nuclear	164	77
Three generation	2	0.9

Table 2: Pattern of mobile phone usage (n=213).

Variables	Numbers	Percentage
Type of phone used		
Android	149	70
Basic	58	27.2
Android and basic	6	2.8
Number of phones used		
1 phone	195	91.5
2 phones	16	7.5
3 phones	1	0.5
4 phones	1	0.5
Number of sim used		
1 sim	103	48.4
2 sims	100	46.9
3 sims	7	3.3
4 sims	2	0.9
5 sims	1	0.5
Time of usage		
More during day time >4 hrs	115	54
More during night >4 hrs	98	46
Number of years used		
≤5 years	130	61
>5 years	83	39
Total hours used per day		
≤5 years	128	60.1
>5 years	85	39.9
Reasons for using mobile phones		
Calling	213	100
Browsing internet	149	70
Listening to music	140	65.7
Setting up of alarm	123	57.7
Messaging	98	46
Playing games	91	42.7
Taking selfies	90	42.3
Taking pictures	83	39

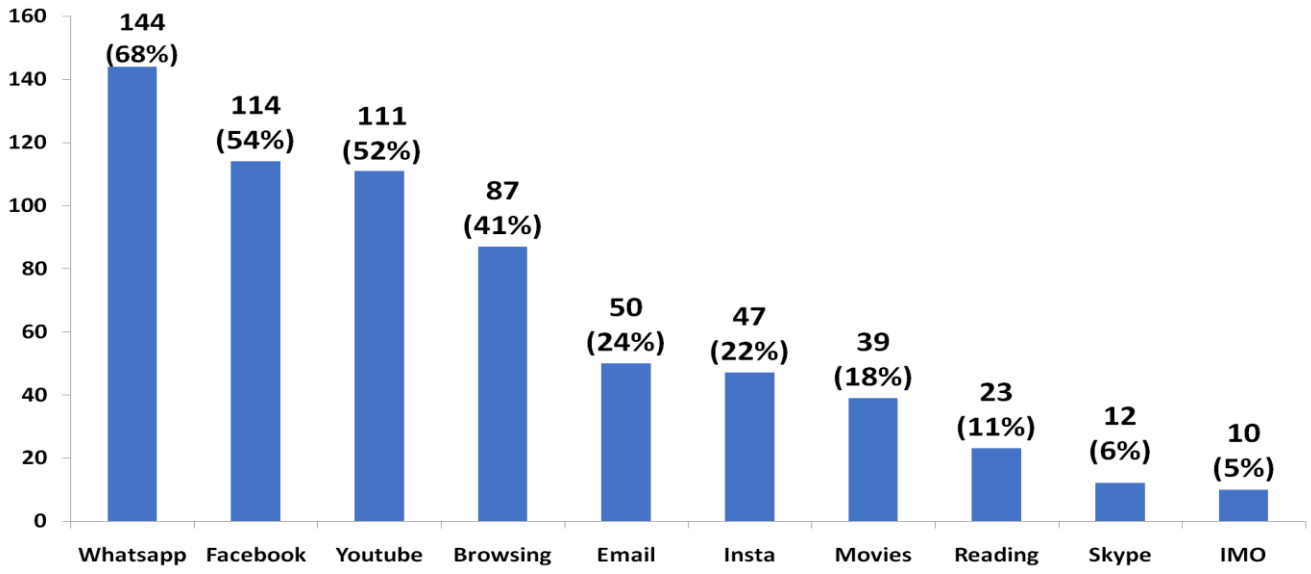

Figure 1: Reasons for using mobile internet.

Pattern of mobile phone usage

Table 2 shows the various pattern of mobile phone usage. 70% were android phone users, 91.5% had only single phone, nearly 47% had 2 sims, usage >4 hours were more during day time (54%) and nearly 60% were using phones <5 years of duration (Table 2).

Various reasons for using mobile phones

Table 2 shows the various reasons for using mobile phones.100% of the study subjects told they use for calling purpose, followed by listening to music (65.7%) and setting up of alarms (57.5%).

Reasons for using mobile internet

Figure 1 shows the various reasons for using mobile internet. The top three reasons for using mobile internet were WhatsApp (68%), Facebook (54%) and YouTube (52%).

Perceived ill health effects

The various perceived ill health effects observed among study participants are eye symptoms 63%, headache 40%, feeling irritable 25% and neck pain 21%. Symptoms like eye pain, eye strain and watering of the eyes were clubbed together in eye symptoms (Figure 2).

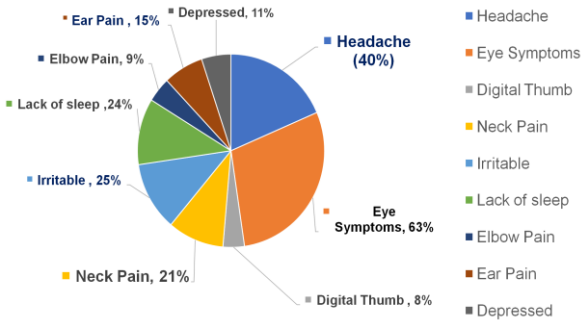

Figure 2: Perceived ill health effects.

Pattern of usage in rural and urban population

Study compared the various pattern of usage of mobile phones in rural versus urban area. The factors compared were age in years, total number of years of usage of mobile phones, total hours of usage per day and time of usage whether more during day time or night time.

The definition for using more is defined as using greater than 4 hours. Study found that the usage of mobile phones was more during night time (52.4%) in urban area versus rural (40%) and the findings were statistically significant (p=0.046) (Table 3). No significant difference was found in usage pattern of mobile phones pertaining to age, years of usage and total hours of usage.

Table 3: Comparison of pattern of usage in rural versus urban population.

Variables	Rural (n=110) N (%)	Urban (n=103) N (%)	P value	Chi square
Age in years				
≤30	67 (60.9)	62 (60.2)	0.513	0.11
>30	43 (39.1)	41 (39.8)		
Years of usage				
≤5	73 (63.4)	57 (55.3)	0.066	2.718
>5	37 (33.6)	46 (44.7)		
Total hours of usage				
≤5	70 (63.6)	58 (56.3)	0.171	1.190
>5	40 (36.4)	45 (43.7)		
Time of usage				
Day time (>4 hours)	66 (60)	49 (47.6)	0.046*	3.307
Night time (>4 hours)	44 (40)	54 (52.4)		

*Significant finding (p<0.05).

Table 4: Comparison of reasons for mobile phone usage in rural versus urban population.

Variables	Rural (n=110) N (%)	Urban (n=103) N (%)	P value	Chi square
Message				
Yes	50 (45.5)	48 (46.6)	0.488	0.028
No	60 (54.5)	55 (53.4)		
Games				
Yes	39 (35.5)	52 (50.5)	0.019*	4.911
No	71 (64.5)	51 (49.5)		

Continued.

Variables	Rural (n=110) N (%)	Urban (n=103) N (%)	P value	Chi square
Music				
Yes	60 (54.5)	80 (77.7)	0.000*	12.627
No	50 (45.5)	23 (22.3)		
General pictures				
Yes	45 (40.9)	38 (36.9)	0.323	0.361
No	65 (59.1)	65 (63.1)		
Selfie pictures				
Yes	40 (36.4)	50 (48.5)	0.048*	3.324
No	70 (63.6)	53 (51.5)		
Setting alarm				
Yes	56 (50.9)	67 (65)	0.025*	0.039
No	54 (49.1)	36 (35)		

*Significant finding (p<0.05).

Table 5: Comparison of social media usage among rural and urban population.

Variables	Rural (n=110) N (%)	Urban (n=103) N (%)	P value	Chi square
Internet				
Yes	68 (61.8)	80 (77.7)	0.009*	6.304
No	42 (38.2)	23 (22.3)		
Facebook				
Yes	44 (40)	70 (68)	0.000*	16.718
No	66 (60)	33 (32)		
YouTube				
Yes	49 (44.5)	62 (60.2)	5.22	0.16
No	61 (55.5)	41 (39.8)		
Reading				
Yes	11 (10)	12 (23)	0.150	0.433
No	99 (90.0)	91 (88.3)		
Instagram				
Yes	14 (12.7)	33 (32)	0.001*	11.536
No	96 (87.3)	70 (68.0)		
WhatsApp				
Yes	64 (58.2)	80 (77.7)	0.002*	9.224
No	46 (41.8)	23 (22.3)		
Email				
Yes	23 (20.9)	27 (26.2)	0.226	0.833
No	87 (79.1)	76 (73.8)		
Online shopping				
Yes	17 (15.5)	27 (26.2)	0.038*	3.757
No	93 (84.5)	76 (73.8)		
Browsing				
Yes	31 (28.8)	56 (54.4)	0.000*	15.097
No	79 (71.8)	47 (45.6)		
Movies				
Yes	18 (16.4)	21 (20.4)	0.280	0.576
No	92 (83.6)	82 (79.6)		
IMO calling				
Yes	6 (5.5)	4 (3.9)	0.416	0.293
No	104 (94.5)	99 (96.1)		

*Significant finding (p value<0.05)

Table 6: Comparison of perceived ill health effects between urban and rural population.

Variables	Rural (n=110) N (%)	Urban (n=103) N (%)	P value	Chi square
Headache				
Yes	36 (32.7)	50 (48.5)	0.013*	5.527
No	74 (67.3)	53 (51.5)		
Eye pain				
Yes	22 (20)	23 (22.3)	0.402	0.173
No	88 (80)	88 (77.7)		
Eye strain				
Yes	25 (22.7)	24 (23.3)	0.525	0.010
No	85 (77.3)	79 (76.7)		
Eye watering				
Yes	16 (14.5)	15 (14.6)	0.072	2.673
No	94 (85.5)	88 (85.4)		
Ear pain				
Yes	16 (14.5)	15 (14.6)	0.575	0.000
No	94 (85.5)	88 (85.4)		
Digital thumb				
Yes	12 (10.9)	5 (4.9)	0.083	2.655
No	98 (89.1)	98 (95.1)		
Elbow pain				
Yes	9 (8.2)	10 (9.7)	0.440	0.153
No	101 (91.8)	93 (90.3)		
Wrist pain				
Yes	10 (9.1)	9 (8.7)	0.560	0.008
No	100 (90.9)	94 (91.3)		
Neck pain				
Yes	15 (13.6)	30 (29.1)	0.005*	7.659
No	95 (86.4)	73 (70.9)		

*Significant finding (p value <0.05).

Reasons for usage in rural versus urban population

The Table 4 shows the comparison between the rural and urban area in terms of various reasons for mobile phone usage. It was observed that playing games in mobile phones was more in urban (50.5%) when compared with rural (35.5%) (p=0.019). Listening to music using mobile phones was also more in urban (77.7%) when compared with rural (54.5%) (p=0.000).

Taking selfies was also more in the urban (48.5%) as opposed to rural (36.4) (p=0.048). Setting alarm using mobiles was also more in urban (65%) when compared with rural (36.4%) (p=0.025). So, the reasons for usage like playing games, listening to music, taking selfie pictures and alarm setting was more in urban and was also statistically significant.

The Table 5 shows the comparison of social media usage between rural and urban population. It can be seen from the above table factors like internet usage, Facebook, Instagram, WhatsApp, online shopping, and browsing were more in urban population when compared with rural population and the findings were also statistically significant

Perceived ill health effects in rural and urban population

Table 6 shows the perceived ill health effects like headache and neck pain were more common among urban population and was also statistically significant.

DISCUSSION

In the present study, the study population used mobile phones mainly for calling (100%) and browsing internet (70%). A similar study done by Stalin et al in Pondicherry gave lower mobile usage results for calling (95%) and internet (40%).[10] Only 46% of the study population used mobiles for messaging. Contrary to this study by Stalin et al reported that 68% of their study population preferred using mobiles for sending messages.[10]

These differences can be attributed to the difference in the time period of the two studies done. The Stalin et al study was done in January 2014, while this study was done in January 2019. There is almost a time gap of nearly 5 years. So, in this time gap of 5 years due to increase in number of mobile phones and increase in number of free mobile data by various service providers, which could

have made the customers to use more of internet facilities and social networking through mobile phones, indirectly reducing the usage of facilities like messaging.

In the present study, majority of the students experienced health problems like headache (40%), eye symptoms (63%) which includes symptoms like eye irritation and eye strain, sleep disturbances (24%) and neck pain (21%) due to prolonged mobile usage. A similar study done by Stalin et al in rural Pondicherry showed that most of the respondents complained of headache (35.2%), neck pain (17.3%), eye problems (10.7%) and sleep disturbances (10%).[10] This difference can be attributed to the increased usage of mobile phones in the increasing years.

Another study done in Chennai by Arumugam et al done among medical college students showed that majority of the students (64.3%) experienced health problems like headache, sleep disturbances, irritability and nearly 52% of the students responded that they were addicted to mobile phones.[11]

In a study done in Hyderabad it was reported that headache was found to be the most common symptom (51.47%) followed by irritability/anger (50.79%), body aches (32.19%), eye strain (36.51%), digital thumb (13.8%). Other common mental symptoms included lack of concentration and poor academic performance, insomnia, anxiety.[9]

A study done in Alexandria University, Egypt among staff and students of the university reported that majority of the respondents suffered from headache (43%), earache (38.3%), fatigue (31.6%), sleep disturbance (29.5%), difficulty in concentration (28.5%) and face burning sensation (19.2%). The difference and similarity between the studies can be attributable to socio demographic, cultural, sample size and the study population of the studies.[15] The lack of concentration due to mobile use in this study was 22.5%. This was comparable with a study done in Egypt.[15] The lack of concentration in Egypt study was 28.5%. The small difference can be due to majority of the population of the Egypt study were in and around Alexandria university whereas this study had considerable amount of >30 years of age people who might not have given importance to this factor.

In a study done by Rishabashree et al, among adolescents in Chennai showed that there were social or interpersonal problems among mobile phone users.[16] Present study also showed that there were decreased interaction (20.2%) with family and conflicts with family members and colleagues (15.5%). However, a study conducted by Cinel et al, in United Kingdom found that there was no association between mobile phone usage and subjective symptoms.[17] On the contrary, Stalin et al study found that mobile phone usage had a protective effect on hypertension which was similar to a study done in USA, which observed an inverse association between mobile phone use and self-reported hypertension.[10] Also a study by Suresh et al. in U.S.A. from NHIS population, has concluded that cell-phone usage was protectively associated with self-reported hypertension in a nationally representative sample of US adults.[18]

Present study has shown that the perceived ill health effects like headache and neck pain were increased among urban population when compared with rural population and was statistically significant. Factors like, decreased interaction with family members and conflict with family members were more in rural population and statistically significant. Usage of phones during night time, playing games, listening to music, alarm, internet, Facebook, WhatsApp, browsing and Instagram was more in urban population when compared with rural population. Taking selfies were also more in urban population when compared with rural population.

CONCLUSION

It is so evident from this study that the usage of internet and social media through mobile phones has increased in the community. Social networking like WhatsApp, Facebook, and YouTube was used more in urban population. Some of the perceived ill health effects are also common among urban population.

Recommendations

Based on this study findings authors strongly recommend for health education and health awareness campaigns regarding the ill health effects of mobile phone usage. Authors also recommend for health education to optimise the usage time of mobile phones in the community.

ACKNOWLEDGEMENTS

We acknowledge all the health centre related staffs and Interns for helping us in collecting data.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Patki MB, Arumugam B, Anusuya GS, Karthik RC, Mani E, Annamalai R. Mobile phone usage and its perceived ill health effects: a cross sectional study in Chennai, India. Int J Community Med Public Health 2020;7:2993-3001.