A Comparative Study Among Mobile Phone Users Leading To Insomnia And Depression Among Adolescent Students In A Tertiary Care Centre

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Introduction:

The usage of mobile phones among students and adolescent is rapidly increasing . According to the WHO 2015 in age group of 10-15years 90% of students are affected with depression and 80% of students were affected with insomnia . In 2021 in adolescent age group 97% affected with depression[1]. In Many mobile phone, calleda version is installed in smartphone. A smartphone has many useful important tool that enables students to access internet and social networks, message, viewing videos, and playing games. Therefore, comparatively more hours are spent on a smartphone than on a conventional phone [2,3,4]. In 2008, less than 40% of adolescents used mobile phones for more than 2 h per day [5,6], while in 2015 about 50% of adolescents used smartphones for more than 3 h per day [7,8,9]. The prevalence rate of smartphone usage can increase drastically in the upcoming days .The mobile phone is one of the important tool for health promotion and its applications offer effective ways to improve one's lifestyle but hazards of mobile phone usage can drastically hinders the physical and psychological health problems in the adolescent student when the usage time of phone is increased . It is reported that mobile phone usage during bed time cause disturbance in sleep [3,15,16]. due to exposure to bright light from electronic devices and affects the circadian rhythms [16–18]. The application in Mobile phone makes over usage and increase in risk of mobile phone addiction or smartphone addiction [4,14],thus contributing to poor sleep quality [13,14,19,20] and psychological problems such as depression and anxiety [13,21,22] there are only few studies denoting the comparison between mobile phone usage per day and health problems among adolescents. To highlight increase of hours of mobile phone usage per day and hours spent per purpose of use, the aim of this study was to investigate the associations between mobile phone overuse and insomnia and depression in adolescent school students.

Material and methodology :

A cross-sectional study was conducted from June 2022 to 2023 in Sree Balaji Medical College and Hospital among patients in the age group of 10-17 years who are visiting the psychiatric department for treatment. a total of 100 students engaged in the study after getting informed consent from the students who are willing to participate in the study and they were divided in to 2 group of adolescent students, A group was 30 students who do not use smartphone or high phones and group B another

group 70 students who use the cell phone regularly. A questionnaire with question items on (1) personal data; (2) lifestyle;(3) social support; (4) mobile phone use; (5) insomnia; and (6) depression were given to the students or adolescent and the questionaries were analysed. Of the 100 students,100 (100%) agreed to participate in this study. The students affected with insomnia or depression, 70 (82.9%) were analyzed. Depression was evaluated using the Japanese version of the Center for Epidemiological Studies-Depression (CES-D) scale and Insomnia was evaluated using the Japanese version of the Athens Insomnia Scale (AIS) This study was approved by the research and ethics committee of the Sree Balaji Medical College and Hospital.

Statistical Analysis:

Differences between mobile phone use, insomnia, depression, other health problems were statistically tested using the Mantel–Haenszel test for trend and the Kruskal–Wallis test. Associations between mobile phone use and insomnia or depression were examined using multiple logistic regression analyses. The dependent variable was insomnia (0 = no problem [AIS score <6]and 1 = insomnia [AIS score≥6]) or depression (0 = no problem [CES-D score <6] and 1 = depression [CES-D score≥16)]). Odds ratio (OR) was calculated from the logistic regression, adjusting for age, sex, and factors associated with the dependent variable. In the logistic regression, the variables of hours of mobile phone use per day and hours spent on E-mail, SNS, online chat, internet, playing games, and viewing videos were each included as predictors. Co-efficient of correlation between variables. The values result were 11 of the time were not high (r:−0.025 to 0.569). p-values < 0.05 were considered statistically significant. All statistical analyses were performed using SPSS 20.0 (IBM Japan, Tokyo, Japan) for Windows

Results:

Table No 1: Correlation Of Time Of Usage Of Cell Phone With Respect To Psychological Disorders

Sl.no	Time Hrs/day	Depression	Insomnia	Sensitivity	Specificity	P value
1	3hrs	Never	No problem	1.0234	1.023	<0.087
2	5hrs	Rarely	subthreshold	1.0345	1.045	<0.076
3	6hrs	Sometimes	Mild	1.086	1.056	<0.067

4	7hrs	Often	Moderate	1.109	1.078	<0.054
5	8hrs	Always	severe	1.108	1.054	<0.044

AIS Depression scale : Never=1 ,Rarely =2,Sometimes = 3, Often =4, Always=5

AIS Insomnia scale: no problem=0, subthreshold =2-8, mild = 9-14, moderate=15=21, severe=22-28

Table No 2: Comparison of Age , Sex And Time Of Usage Of Cell Phones

Age group yrs	Time hrs /day	Male	female	Sensitivity	Specificity	P value
10-11	3hrs	7	4	0.1023	0.102	<0.003
11-12	4hrs	10	6	0.1045	0.103	<0.007
12-13	5 hrs	13	10	1.006	1.006	<0.007
13-14	6hrs	10	15	1.048	1.009	<0.054
14-15	7hrs	20	18	1.054	1.008	<0.084

Table No 3: Comparison Between Phone Application With Age

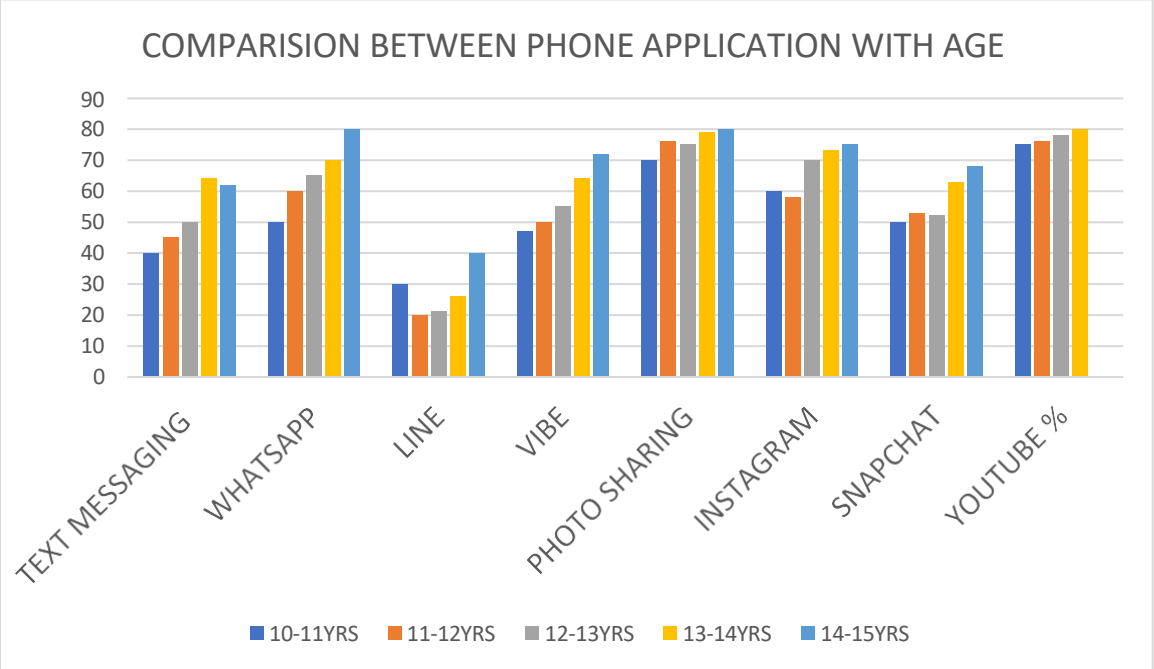
Age group	Text messaging(%)	Whatsapp (%)	Line (%)	Viber (%)	Photo sharing	Instagram (%)	Snapchat (%)	Youtube (%)
10-11	40	50	30	47	70	60	50	75
11-12	45	60	20	50	76	58	53	76
12-13	50	65	21	55	75	70	52	78

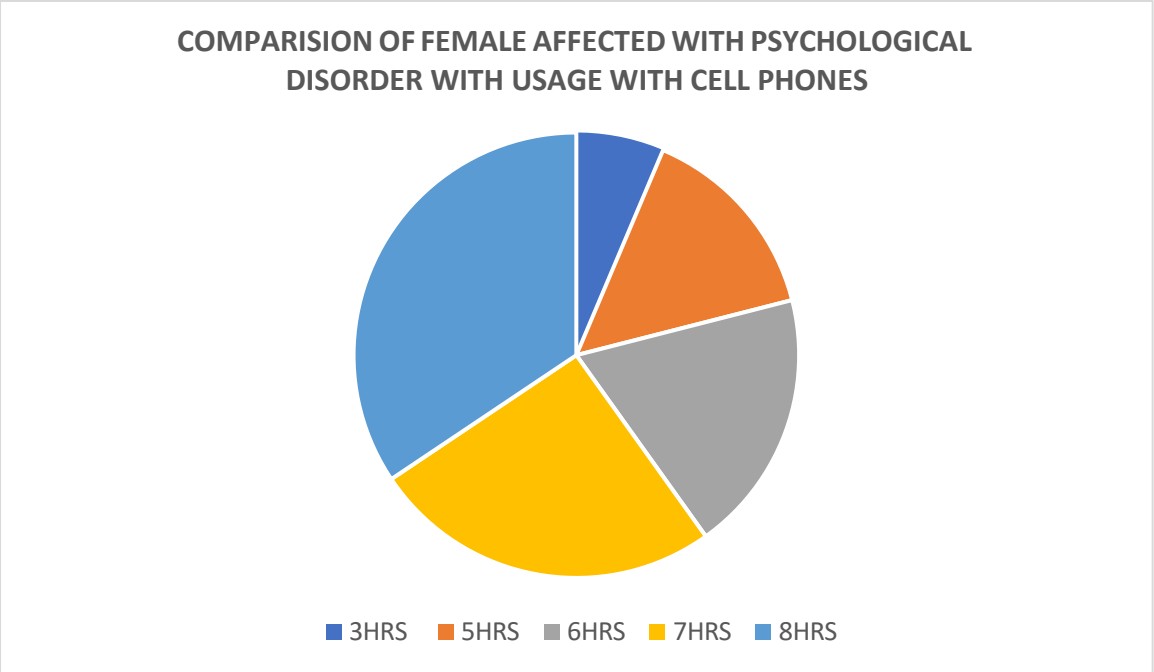
13-14	64	70	26	64	79	73	63	80
14-15	62	80	40	72	80	75	68	83

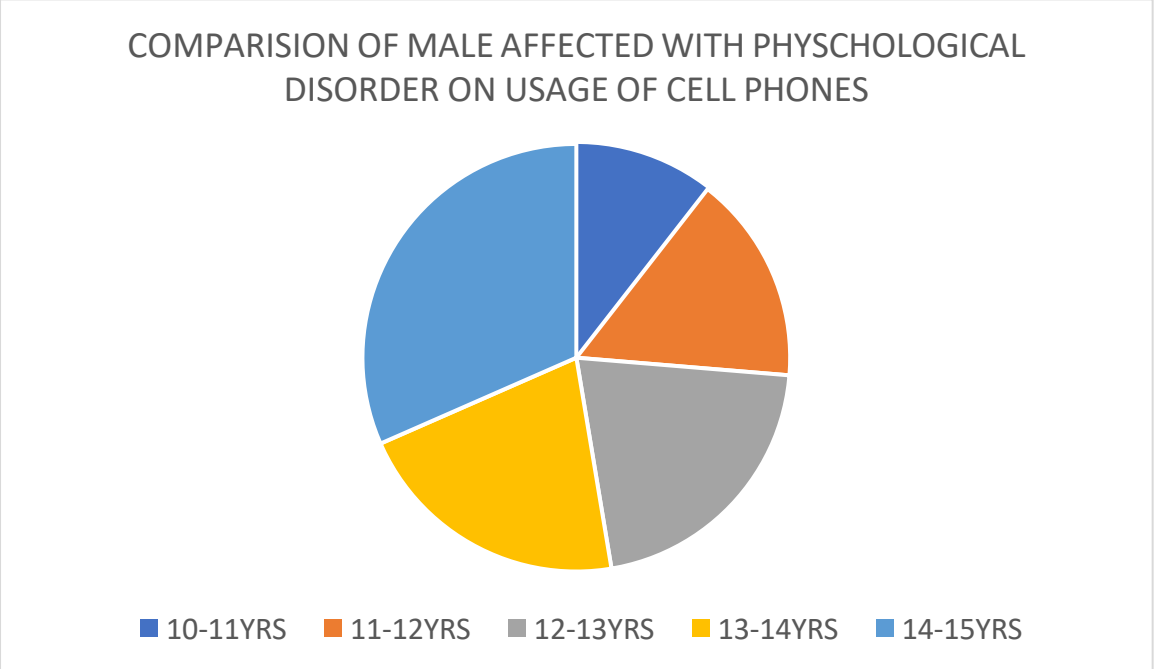
Table no 4: Smartphone addiction prevalence among males and females students.

	Males n=40	Females n=60	Total n=100	P value
SAS-SV score				
X+SD	23.65+ 3.0	25.17+9.1	24.69+43	0.032
Median (min-max)	22(10-15)	25(10-13)	24(10-13)	
Smartphone addiction				
Addiction	35(87.1)	58(91.8)	93(88.5)	0.575
Not addicted 23	5(12.1)	7(18.4)	12(21.6)	

SAS -SV smartphone addiction scale- short version , X,Mean: SD standard deviation; P value for students t-test; p value foe chi square test. Bold value indicate statistical significance




COMPARISION OF FEMALE AFFECTED WITH PSYCHOLOGICAL DISORDER WITH USAGE WITH CELL PHONES
3HRS
5HRS
6HRS
7HRS
8HRS


COMPARISION OF MALE AFFECTED WITH PHYSCHOLOGICAL DISORDER ON USAGE OF CELL PHONES
10-11YRS
11-12YRS
12-13YRS
13-14YRS
14-15YRS

As shown in Table 1, the 100 students consisted of 60 (58.6%) boys and 40 (41.4%) girls, with them an (standard deviation: SD) age of 13.2 (0.9) years (range: 10 to 17). Mobile phones were owned by 98.6% of participants (n= 70), and 92.9% (n= 70) owned a smartphone. Concerning hours of mobilephone use, 58.6% of participants used them for more than 2 h per day, and 10.5% used them for over 5 h per day.

Table 1. Characteristics of students. Parameters Mean SD Age 16.2 , Athens Insomnia Scale (range 0–20) 4.1 3.2CES-D (range 2–47) 16.2 8.5 Parameters n% School grade 10th 102 35. 11th 96 33., 12th ,93 .32. according to Sex Men 173. 58 and Women 122. 41.4Own a mobile phonesmartphone 274 92.9the conventional phone 17 5.8None 4 1.4Total hours of mobile phone use (h/day)None 8 2.7<1 h 32 10.81 to <2 h 82 27.82 to <3 h 80 27.13 to <4 h 38 12.94 to <5 h 24 8.1≥5 h 31 10.5E-mail (min/day)None 144 49.1<30 min 85 29.030 to <60 min 33 11.360 to <120 min 16 5.5≥120 min 15 5.1SNS (minutes/day)None 114 38.8<30 min 72 24.530 to <60 min 48 16.360 to <120 min 40 13.6≥120 min 20 6.8Online chat (min/day)None 18 6.1<30 min 77 26.130 to <60 min 67 22.760 to <120 min 68 23.1≥120 min 65 22.0

Int. J. Environ. Res. Public Health 2017,14, 701 5 of 11Table 1. Cont.Parameters Mean SDInternet search (min/day)None 33 11.2<30 min 148 50.330 to <60 min 83 28.260 to <120 min 20 6.8≥120 min 10 3.4Play games (min/day)None 53 18.0<30 min 75 25.430 to <60 min 98 33.260 to <120 min 49 16.6≥120 min 20 6.8Watch videos (min/day)None 40 13.6<30 min 97 32.930 to <60 min 81 27.560 to <120 min 38 12.9≥120 min 39 13.2Insomniano problem 215 72.9insomnia 80 27.1Depressionno problem 182 61.7depression 113 38.3Data are expressed as mean (SD) and frequency (%). SD:

Standard deviation; CES-D: Center for EpidemiologicalStudies-Depression scale; SNS: Social networking sites.Relationships between overall hours of mobile phone use per day and lifestyle, social support,insomnia, and depression were shown in Table 2. More hours per day of overall mobile phone usewas associated with female sex (p< 0.001), non-participation in the school's club activities (p< 0.001),late bedtime (p= 0.001), short hours of sleep (p= 0.006), and occasionally skipping breakfast (p= 0.007).Insomnia and depression were also associated with longer total hours of mobile phone use (p= 0.025and p= 0.022, respectively)

Discussion:

The present study showed that excessively long hours of mobile phone use was associated with insomnia, particularly in students using mobile phones for 5 h or more per day compared with thoseusing mobile phones for less than 1 h per day. On the other hand, no association was found

betweentotal hours of mobile phone use and depression. However, interestingly, long hours of mobile phoneuse for SNS or online chat were related to depression, particularly in students who spent 120 min ormore on SNS and online chat, while hours spent using a mobile phone for internet searching, playinggames or viewing videos was not associated with depression.This study showed that long hours of mobile phone use was a risk factor for insomnia. It is alsosuggested that overuse of 5 h and more a day could be a marker of a higher risk of insomnia. To ourknowledge, there are only two studies examining the association between sleep disturbances andhours of mobile phone use. Among adolescents in Hong Kong, long hours of mobile phone use werecorrelated with short sleep duration, poor sleep quality, and excessive daytime sleepiness [20]. Anotherstudy in Japanese high school students reported that long hours of mobile phone use was associatedwith short sleep time and fatigue [23]. Both findings support an association between long hours ofmobile phone use and sleep disturbances, as shown in this study. In this study, among adolescents

Int. J. Environ. Res. Public Health 2017,14, 701 8 of 11using mobile phones for 5 h or more a day, 61.3% reported a bedtime after 00:00, and 67.8% had asleeping time of less than 6 h per day. Thus, mobile phone overuse was linked to disturbances in sleephabits, which is known to be a risk factor for insomnia [37]. It is, therefore, considered that mobilephone overuse can cause impaired sleep habits, thus contributing to insomnia.In the present study, depression was not associated with total hours of mobile phone use. However,long hours spent using mobile phones for SNS and online chat was related to depression, while hoursspent using mobile phones for internet searching, playing games or viewing videos was not linkedwith depression. The SNS (e.g., Facebook, Twitter or Instagram) and online chat (e.g., Line, Skype,Kakao Talk) are popular online communication tools among adolescents [38]. Some earlier studies haveindicated that their use is associated with mental health problems [39–42]. Additionally, it is reportedthat internet addiction can be predicted by the use of SNS and chat rooms [39,40]; and that the use ofSNS contributed to psychological distress, suicidal ideation and attempts [41,42]. Sampasa-Kanyingaand Lewis [42] reported that using SNS for more than 2 h every day was independently associated with poor self-rating of mental health, high levels of psychological distress and suicidal ideation. The present study confirmed that 2 h and more a day spent using mobile phones for SNS and online chat could increase risks of depression. SNS and online chat enable one to communicate and interact with a largenumber of people. Hence, young users may spend more time on them [43]. However, the overuseof SNS and online chat sometimes undermines well-being and life satisfaction [44], increases risk ofcyberbullying victimization [41], and can also relate to depression in adolescents.The present study showed that female adolescents used mobile phones for longer hours per daythan males. Previous studies also indicated that women tended to overuse online applications forsocial function or communication, such as e-mail, chat, and SNS [45–47]. Moreover, overuse of

onlinecommunication was more likely to cause sleep disturbances and stress among women [48]. Thus,female adolescents in particular should be careful to prevent mobile phone overuse.The Japanese government has concerns about various problems such as bullying, crime oraddiction among adolescents through the use of the internet, and insists on educating school studentsabout appropriate mobile phone use, including the restriction on hours of mobile phone use [49].The present findings may suggest that appropriate use of mobile phones in adolescents needs tobe considered.The present study had some limitations. The present subjects were limited to participants in asingle high school in central Japan, so the findings from this study cannot be largely generalized toother areas and countries. Another limitation was that the information on hours of mobile phone usewas not very precise because the information was obtained using a self-administered questionnaire.Therefore, “5 h and more” is a rough criterion for overuse. Finally, this was a cross-sectional study.Hence, the present findings do not show a causal relation. Even so, this study showed meaningfulfindings. Mobile phone overuse could be linked to impaired sleep habits, and consequently to insomnia.It was suggested that 5 h and more of phone use in particular could increase risks of insomnia.Additionally, the overuse of mobile phones—120 min or more—for SNS and online chat might berelated to depression among adolescents. Appropriate use of mobile phones should be considered

Conclusions: In the present study the time duration of usage of high phone or smart phone is directly propotional to psychological problems. The study signifies that the mobile phone usage(more than 5 hrs) is associate with insominia and depression and long hours in using mobile phones for SNS or online

chat was related to depression. The use of mobile phones should be considered in order to prevent sleep disturbances and the impairment of mental health among adolescent students.

Limitations : The study duration was limited to 1 year and the sample size was small.

Acknowledgement and Declaration of Patient Consent :The authors certify that they have obtained all appropriate student consent forms. In the form the student(s) has/have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity.

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Conflicts of Interest : There are no conflicts of interest.

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