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# Smartphone addiction and Smartphone use - Digital literacy among the students of Allied Health Sciences in Indore

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**ABSTRACT**

**Background**: Smartphone addiction is a lack of control of smartphone use with negative consequences and is considered a technological or behavioural addiction. Smartphone addiction has been positively correlated with mental distress, such as depression, anxiety, loneliness, stress and boredom in empirical studies and linked to poor sleep quality, impaired learning and acquisition and premature cognitive decline. Adverse physical effects have also been reported, such as dry eye, musculoskeletal pain, hypertension, body dysfunction and weakened immunity. These conditions are associated with a decrease in psychological well-being and reduced life satisfaction. Digital literacy combines both technical and cognitive abilities; it consists of using information and communication technologies to create, evaluate and share information. Smartphone is essential tool in today's life as well it has some hazardous effects so it is essential to know about the digital literacy of students to guide them for proper use of smartphone.

**Method:** The students studying in various allied health science courses were assessed for their smartphone addiction using Smartphone Addiction Scale – Short Version (SAS-SV) after their consent. The demographic data of 335 smartphone addicted participants was collected and they were assessed for their mobile usage type and duration. Data was entered in to Microsoft excel sheet and analysed using JAMOVI software to describe the participants' demographic features and type of their mobile use

**Results**: Among 335 smartphone addicted participants 267 participants were female and 68 participants were male. The mean age for all participants was 22.3 years, 99 participants were aged less than 20 years, 199 participants aged 21-25 years and 37 participants aged more than 25 years. The mean height for all participants was 159.99 cm, the mean body weight for all the participants was 53.44kg and mean BMI for all participants was 20.93. The total mean time of smartphone usage in smartphone addicted students is 431.75 minutes and they use smartphone for 133.42 min for educational activities, 95.73 min for entertainment activities, 20.85 min for gaming activities, 96.82 min for social media activities, 30.58 min for aimless surfing and 54.34 min for music listening. Total mobile use per day did not significantly differ between genders ($p = 0.825$), patterns of use varied. Females spent significantly more time on educational activities (141.95 ± 104.08 min) than males (99.93 ± 62.45 min, $p = 0.002$). Conversely, males spent significantly more time on gaming (36.03 ± 54.14 min) than females (16.99 ± 32.83 min), with a highly significant p-value of 0.001. No statistically significant gender differences were observed in entertainment, social media, aimless surfing, or music listening. Total daily usage time increased slightly with age but was not statistically significant ($p = 0.240$). Older participants (>25 years) investing more time (153.11 ± 135.24 min) than younger participants (<20 years: 117.32 ± 82.16 min) for educational activities, although this difference also lacked statistical significance ($p = 0.222$). No significant differences were observed across age groups for entertainment, gaming, social media, aimless surfing, or music listening.

**Conclusions:** Smartphone addicted students spend more time on educational activities with decreasing order of smartphone usage in social media activities, entertainment activities, listening to music, aimless surfing and least time on gaming activities. The difference in total time spent for smartphone usage by males and females is statistically not significant but the pattern of smartphone use varies in both the gender. The decreasing pattern of smartphone usage in male is entertainment activities, social media activities, educational activities, listening to music, gaming activities and aimless surfing and in female the pattern is educational activities, social media activities, entertainment activities, listening to music, aimless surfing and gaming activities. It has been found that the students are aware about digital literacy; they spend more time on educational activities than others. Students can be make aware about the usage of smartphone and their interest and enthusiasm for smartphone usage can be diverted towards more educational activities thus their digital literacy regarding the smartphone usage can be enhanced.

**Key words:** Smartphone addiction, SAS-SV, Smartphone use, Digital literacy.

## INTRODUCTION

Smartphones have changed daily activities and behaviours dramatically. Various applications allow communication with others, e-mail access, enjoyment of music, videos, films, game playing and schedule management. Smartphones are beneficial for expanding horizons, promoting safety, alleviating stress, maintaining relationships and finding useful information[1-3] which has contributed to their indispensability[4]. However, the improper smartphone use leads towards unintentional time-wasting and immoderate use carries the risk of smartphone addiction with an impact on physical and mental health.[5]

Smartphone addiction is a lack of control of smartphone use with negative consequences[5] and is considered a technological or behavioural addiction. Smartphone addicts may display the six core performances of addiction: salience, mood modification, tolerance, withdrawal, conflict and relapse[1,6]. Smartphone addiction has been positively correlated with mental distress, such as depression, anxiety, loneliness, stress and boredom in empirical studies[7-10] and linked to poor sleep quality, impaired learning and acquisition and premature cognitive decline[11]. Adverse physical effects have also been reported, such as dry eye[12], musculoskeletal pain[13], hypertension[14], body dysfunction and weakened immunity[15]. These conditions are associated with a decrease in psychological well-being[16] and reduced life satisfaction[17].

The ability to read and write is the concept of being literate. Paul Glister first coined the term digital literacy in 1997 and UNESCO defines digital literacy as the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies which includes smartphones, tablets, laptops and desktops for employment, decent jobs and entrepreneurship. Digital literacy combines both technical and cognitive abilities; it consists of using information and communication technologies to create, evaluate, and share information.[18] Smartphone is essential tool in today's life as well it has some hazardous effects so it is essential to know about the digital literacy of students to guide them for proper use of smartphone.

## OBJECTIVE

The objective of this research is to gain insight into the type of smartphone usage among the students of allied health sciences to investigate their digital literacy.

## MATERIALS AND METHODS

### Study Design

This is a community based cross sectional descriptive study

### Study area and population

This study has been conducted at the MGM Allied Health Sciences Institute, MGM Medical College, Indore. The population included are the students of various allied health sciences courses.

### Sample size

The students studying in various allied health science courses were assessed for their smartphone addiction using Smartphone Addiction Scale – Short Version (SAS-SV) selected after their consent. The prevalence of smartphone addiction is 68.1%[19]. Sample size is decided using formula Sample Size = $\frac{Z^2 * p * q}{d^2}$

Z = Confidence interval at 95%, standard value is 1.96
p = prevalence = 61.4%
q = 1-p
d = margin of error = 5%
335 smartphone addicted participants were selected.

### Data Collection

The students studying in various allied health science courses were assessed for their smartphone addiction using Smartphone Addiction Scale – Short Version (SAS-SV) after their consent. Smartphone Addiction Scale short version (SAS-SV) has been widely used. SAS-SV is considered simple, easy and efficient[19] with good reliability and validity in different cultural contexts. It has been translated into English[20], Turkish[21], Chinese[22], Italian[23], Iranian[24], Moroccan[25], Brazilian[26], Spanish and French[27]. An interesting outcome of SAS-SV-based research is the gender difference in smartphone addiction severity. Cut off value for a boy is 31 and a girl is 33. The score above cut off value is considered as smartphone addiction. The internal consistency and concurrent validity of SAS-SV was verified (Cronbach's alpha=0.967). The demographic data of 335 smartphone addicted participants was collected and they were assessed for their mobile usage type and duration.

### Data Analysis

Data was entered in to Microsoft excel sheet and analyzed using JAMOVI software. Continuous data was expressed in terms of mean and SD. Categorical data was expressed in form of proportions and percentage. The result was obtained using various descriptive and analytical statistics. The descriptive analysis aimed to describe the participants' demographic features and type of their mobile use.

**Ethical Approval**
The study was approved by Committee for advance studies and research, Nims University, Jaipur and Ethics and scientific committee, MGM Medical College & M Y Hospital, Indore.

**RESULTS**
Among 335 smartphone addicted participants 267 participants were female and 68 participants were male. The mean age for all participants was 22.3 years, 99 participants were aged less than 20 years, 199 participants aged 21-25 years and 37 participants aged more than 25 years. The mean height for all participants was 159.99 cm, the mean body weight for all the participants was 53.44kg and mean BMI for all participants was 20.93. The total mean time of smartphone usage in smartphone addicted students is 431.75 minutes and they use smartphone for 133.42 min for educational activities, 95.73 min for entertainment activities, 20.85 min for gaming activities, 96.82 min for social media activities, 30.58 min for aimless surfing and 54.34 min for music listening.

Table 1: Gender distribution of participants

| Gender | Frequency | Percentage (%) |
|---|---|---|
| Male | 68 | 20.3 |
| Female | 267 | 79.7 |
| Total | 335 | 100 |

Figure 1: Gender distribution of participants

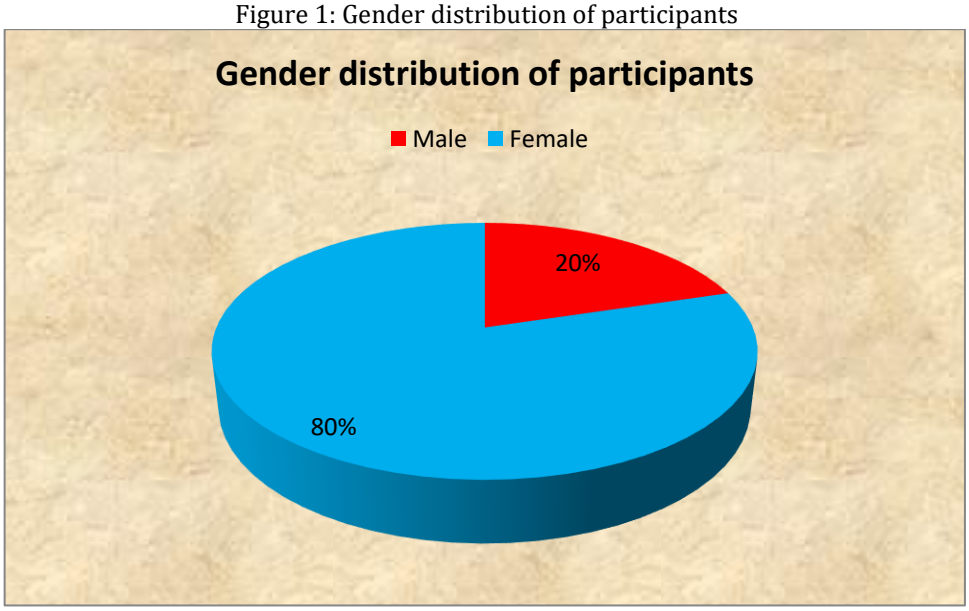



Table 2: Age wise distribution of participants

| Age | Frequency | Percentage (%) |
|---|---|---|
| < 20 years | 99 | 29.6 |
| 21-25 years | 199 | 59.4 |
| >25 years | 37 | 11 |
| Total | 335 | 100 |

Figure 2: Age wise distribution of participants

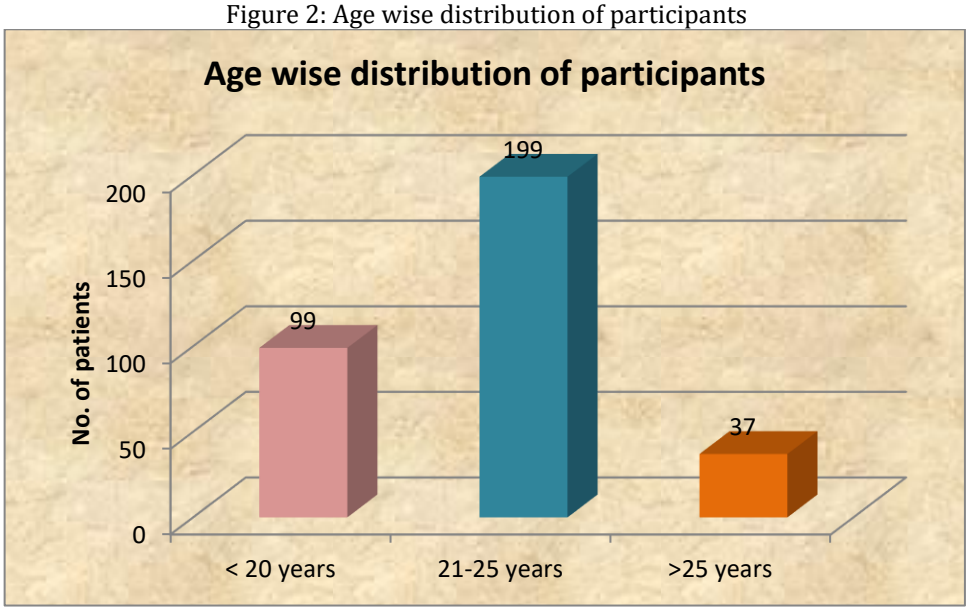



Table 3: Demographic details of participants

| Particulars | Mean ± Sd |
|---|---|
| Age(years) | 22.19 ± 2.604 |
| Height(cm) | 159.99 ± 10.25 |
| Weight(kg) | 53.449 ± 10.53 |
| BMI | 20.932 3.91 |
| Mobile uses per day (min) | 431.75 ± 237.53 |
| Educational activities (min) | 133.42 ± 98.470 |
| Entertainment activities (min) | 95.73 ± 75.66 |
| Gaming activities (min) | 20.85 ± 38.80 |
| Social media activities (min) | 96.82 ± 77.23 |
| Aimless surfing (min) | 30.58 ± 47.53 |
| Listening to music | 54.34 ± 58.85 |

Figure 3: Type of smartphone use in participants

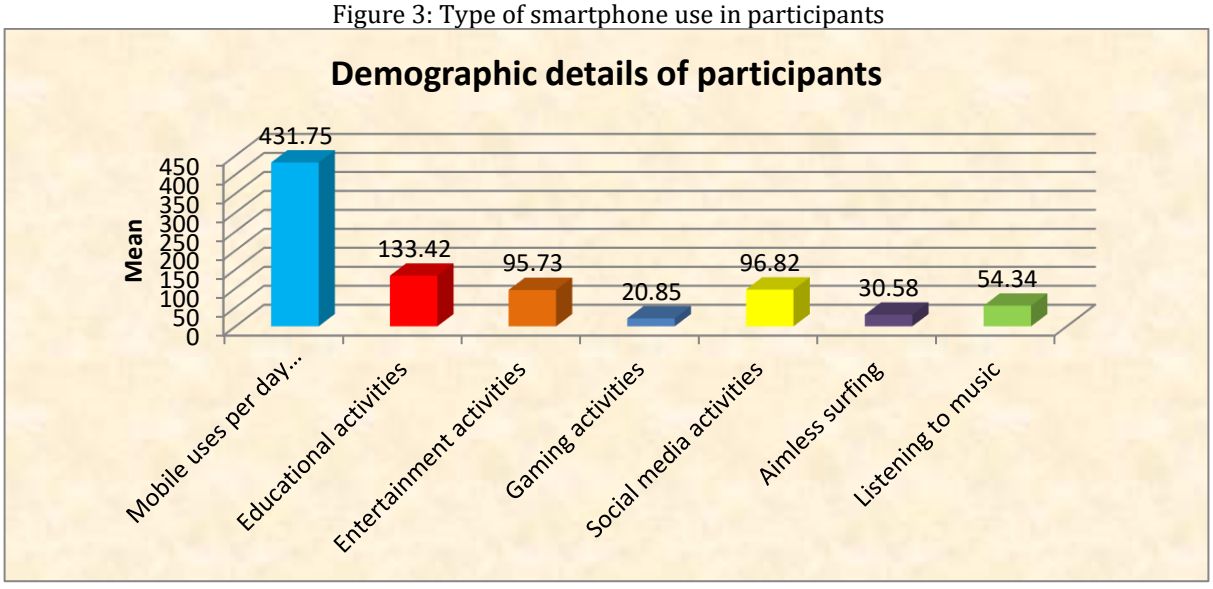


Table 4: Details of mobile use in smartphone addicted adults as per gender

| Particulars | Gender | | P – value |
|---|---|---|---|
| | Male | Female | |
| Height(cm) | 170.84 ± 7.91 | 157.20 ± 8.85 | **0.0001** |
| Weight(kg) | 62.90 ± 10.67 | 51.04 ± 9.06 | **0.0001** |
| BMI | 21.57 ± 3.46 | 20.76 ± 4.009 | **0.043** |
| Mobile uses per day (min) | 442.06 ± 267.78 | 429.12 ± 229.67 | 0.825 |
| Educational activities (min) | 99.93 ± 62.45 | 141.95 ± 104.081 | **0.002** |
| Entertainment activities (min) | 112.13 ± 100.59 | 91.55 ± 67.47 | 0.333 |
| Gaming activities (min) | 36.03 ± 54.14 | 16.99 ± 32.83 | **0.001** |
| Social media activities (min) | 108.46 ± 85.27 | 93.86 ± 74.93 | 0.305 |
| Aimless surfing (min) | 25.81 ± 38.006 | 31.80 ± 49.66 | 0.616 |
| Listening to music (min) | 59.71 ± 59.75 | 52.98 ± 58.66 | 0.327 |

Table 4 presents a gender-wise comparison of various parameters related to smartphone use and associated musculoskeletal complaints among smartphone-addicted students. Statistically significant gender differences were observed in several variables.

Males had significantly greater height (170.84 ± 7.91 cm) and weight (62.90 ± 10.67 kg) compared to females (157.20 ± 8.85 cm and 51.04 ± 9.06 kg, respectively), with p-values of <0.0001. Though both genders fell within a similar BMI range, females exhibited a slightly lower BMI (20.76 ± 4.009) compared to males (21.57 ± 3.46), and this difference was statistically significant (p = 0.043).

Interestingly, while total mobile use per day did not significantly differ between genders (p = 0.825), patterns of use varied. Females spent significantly more time on educational activities (141.95 ± 104.08 min) than males (99.93 ± 62.45 min, p = 0.002), suggesting a more purpose-driven usage pattern among female students. Conversely, males spent significantly more time on gaming (36.03 ± 54.14 min) than females (16.99 ± 32.83 min), with a highly significant p-value of 0.001. No statistically significant gender differences were observed in entertainment, social media, aimless surfing, or music listening.

Figure 4: Details of mobile use in smartphone addicted adults as per gender

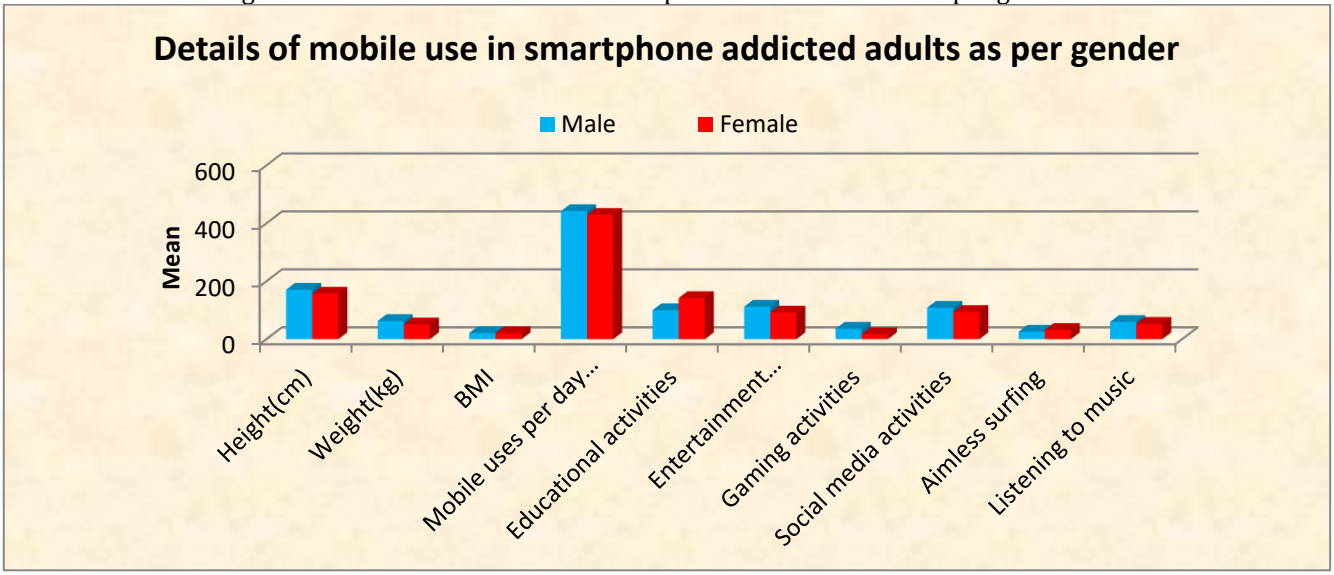



Table 5: Details of mobile use in smartphone addicted adults as per age

| Particulars | Age | | | P – value |
|---|---|---|---|---|
| | <20 years | 21-25 years | >20 year | |
| Height(cm) | 159.33 ± 9.13 | 159.87 ± 10.66 | 162.38 ± 10.812 | 0.242 |
| Weight(kg) | 50.181 ± 9.01 | 53.812 ± 10.27 | 60.243 ± 12.27 | **0.0001** |
| BMI | 19.735 ± 2.92 | 21.199 ± 4.288 | 22.710 ± 3.17 | **0.0001** |
| Mobile uses per day (min) | 396.36 ± 208.45 | 445.53 ± 238.93 | 452.30 ± 293.73 | 0.240 |
| Educational activities (min) | 117.32 ± 82.16 | 137.76 ± 97.305 | 153.11 ± 135.24 | 0.222 |

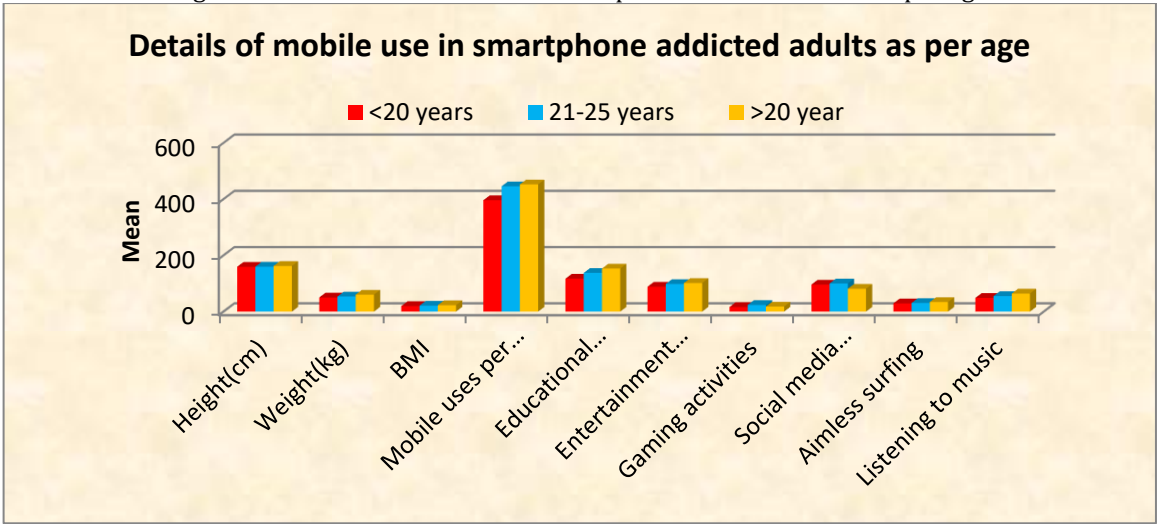
| | | | | |
|---|---|---|---|---|
| Entertainment activities (min) | 88.54 ± 77.263 | 98.19 ± 75.917 | 101.76 ± 70.36 | 0.430 |
| Gaming activities (min) | 16.46 ± 35.97 | 23.57 ± 40.278 | 17.97 ± 37.702 | 0.413 |
| Social media activities (min) | 96.01 ± 73.83 | 100.13 ± 81.407 | 81.22 ± 61.20 | 0.498 |
| Aimless surfing (min) | 29.19 ± 46.98 | 30.63 ± 47.755 | 34.05 ± 48.95 | 0.717 |
| Listening to music (min) | 48.84 ± 48.20 | 55.25 ± 60.509 | 64.19 ± 74.082 | 0.791 |

Table 5 stratifies smartphone-addicted students into three age groups: <20 years, 21–25 years, and >25 years, evaluating differences in smartphone use patterns and physical health parameters.

A significant trend was observed with age in terms of body weight and BMI. Older participants (>25 years) demonstrated significantly higher weight (60.24 ± 12.27 kg) and BMI (22.71 ± 3.17) compared to younger participants (<20 years: 50.18 ± 9.01 kg and BMI 19.73 ± 2.92), with both parameters showing p-values <0.0001. This pattern likely reflects age-related physiological changes and possibly decreased physical activity in older students.

Regarding smartphone usage patterns, total daily usage time increased slightly with age but was not statistically significant (p = 0.240). A similar trend was noted for time spent on educational activities, with older participants (>25 years) investing more time (153.11 ± 135.24 min) than younger participants (<20 years: 117.32 ± 82.16 min), although this difference also lacked statistical significance (p = 0.222). No significant differences were observed across age groups for entertainment, gaming, social media, aimless surfing, or music listening.

Figure 5: Details of mobile use in smartphone addicted adults as per age




**Discussion**

Smartphone usage is increasing globally. Rapid advancement of technology is not alarming but overuse and misuse of the gadget is alarming. A research done by Nokia reveals that an average person checks the phone every 6.30 minutes in a 16 hour waking cycle.[17] The prevalence rate of smart phone addiction among the school students were found to be 33%. The percentage of smart phone addiction among adolescents were 30.9% in Korea, 10 percent in England, 21 percent in the Philippines, and 18 percent in Hong Kong[28]. The discrepancies in the prevalence rate may also be due to different classification methods used in different studies and also difference among the participants and different geographical areas in the studies. The analysis of demographic data shows that the mean BMI for smartphone addicted students is 33.83 which is higher than the normal BMI range 18.5 to 24.9, it is because of more use of smartphone has reduced the physical activities. The total time spent by smartphone addicted adults on their smartphone is more than 7 hours among which they use smartphone for educational activity and study is more than two hours which is the positive use of smartphone for the development of career, more than one and half hour they spent for entertainment activities which can be reduced and diverted towards positive use of technology, 20 min they spend for gaming activities and 30 min they spend for aimless surfing which can be diverted for another activities, more than one and half hour they spent on social media activities like whatsapp, facebook, instagram and other app which if use for communication is good or if it is use for just entertainment it need to be reduced, they also spend 54 min for listening to music

**Conclusion**

The findings from this study provide valuable insight into the digital literacy and smartphone use among smartphone addicted students of allied health sciences in Indore. The smartphone addicted students have maximum use their smartphone for educational activities which plays important role in their learning, it helps students to develop knowledge and skills, make high contributions and develop careers. The aggregate time spent by smartphone addicted students for entertainment, gaming, social media and aimless surfing activities is more than educational activities. Based on the results drawn from this study students can be make aware about the usage of smartphone and their interest and enthusiasm for smartphone usage can be diverted towards more educational activities thus their digital literacy regarding the smartphone usage can be enhanced and they should restrict screen time for other activities to reduce hazardous effects of smartphone addiction.

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