

Smartphone Addiction, Inattentional Blindness, and Perceived Effects among University Students in Ibadan, Nigeria

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ABSTRACT

Smartphones are ubiquitous and serve as primary tools for both academic research (accessing library resources) and social networking (WhatsApp, browsing). Their addiction is common among university students in Nigeria, with adverse effects on their academic performances and well-being. Several studies have been conducted on smartphone addiction, but a few have focused on inattentional blindness caused by smartphone addiction. This study was designed to investigate the prevalence of smartphone addiction and inattentional blindness, the factors associated with smartphone addiction, and the perceived effects of smartphone addiction among university students. A cross-sectional survey was conducted, and a multi-stage sampling procedure was used to select 420 students from the University of Ibadan. A pretested, semi-structured questionnaire containing the Smartphone Addiction Scale was used to collect data. Data were analysed and pretested in descriptive and inferential statistics at $p=0.05$. Respondents' age was 24.3 ± 5.0 years, 59.5% were females, and 90% were single. A majority (85.2%) agreed that they become engrossed in smartphone activities while walking, crossing the road, or eating, and 64.5% reported a time when they failed to notice something important happening around them while they were focused on their smartphone. The prevalence of smartphone addiction was 81.2%, and the prevalence of inattentional blindness was 81%. Most respondents (83.3%) agreed that social networks and smartphone functions make them feel attached to their smartphone (79.5%). Most (62.1%) reported wrist and neck pain from smartphone use. Findings revealed a high prevalence of smartphone addiction and inattentional blindness among university students, which could lead to an increase in the likelihood of accidents. Respondents have high perceived health effects towards smartphone addiction, but this did not influence their attitude towards smartphone use and pattern of smartphone usage. Health education interventions, such as sensitisation and enlightenment programmes, will help educate students about the dangers of inattentional blindness.

Keywords: Smartphone use, Smartphone addiction, Inattentional blindness, University students, Perceived health effects

1.0 INTRODUCTION

Smartphones are ubiquitous and serve as primary tools for both academic research (accessing library resources) and social networking (WhatsApp, browsing). Smartphones are multifunctional touchscreen devices equipped with a plethora of applications (apps) (Cha & Seo, 2018). Because of this, they have evolved to require life, without which individuals cannot survive. The ability to access school information via electronic learning (e-learning) and to acquire general knowledge on smartphones has, however, also made students' lives easier (Ali, Raza, Qazi & Puah, 2018).

Smartphones have many advantages for students, but they also have significant drawbacks and negative effects that cannot be ignored. Since smartphones have become so prevalent among students due to technological innovation, their behaviour has changed, leading to smartphone addiction that negatively impacts their studies, moral principles, and mental and physical health (Raza, Qazi, Umer & Khan, 2020). Smartphone addiction, according to Boateng, Nyamadi, & Asamenu (2020), is a behavioural trait characterised by excessive smartphone use that negatively impacts a person's physical or mental health, social relationships, employment, or academic achievement. Buctot, Kim, & Park (2018) describe it as a compulsive need for comfort, stimulation, or relaxation through the phone, leading to withdrawal symptoms when inaccessible. In one of the pertinent investigations among students in Nigeria, Obi, Omoregi, and Onoriose (2020) reported that 92.8% of students

are dependent on their smartphones. Likewise, previous research conducted in Edo State, Nigeria (Obi et al., 2020), and in Tanzania (Akpunne & Akinnawo, 2018) showed a high prevalence of smartphone addiction among university students. This excessive use of smartphones can lead to a phenomenon called inattentional blindness (Chen & Pai, 2018). Inattentional blindness refers to the failure to notice unexpected events in our visual field while we are focused on a primary task (Alistair, Sarah, and Georgia, 2018). When one is engrossed in their phone while walking or engaged in other activities, their awareness of surroundings diminishes (Boateng, Nyamadi, and Asamenu, 2020). This can have significant safety implications, as missing crucial visual cues can lead to accidents or injuries (Chen & Pai, 2018).

A study conducted in Taipei, Taiwan, found a strong correlation between smartphone use while walking and decreased situational awareness. Participants engrossed in their phones were found to be less likely to notice other pedestrians crossing their path or even unusual occurrences, such as a person in a gorilla suit walking through the scene (Chen & Pai, 2018). This highlights the dangers of phone use, not just for the user but for those around them. The decline in visual awareness is likely due to the cognitive demands smartphones place on our brains. Texting, social media, and even browsing require us to process information, make decisions, and often respond quickly. These multitasking taxes our limited cognitive resources, leaving less attention available for perceiving the world around us (Chen & Pai, 2018).

This study aimed to investigate the factors associated with smartphone addiction, inattentional blindness, and perceived effects on students at the University of Ibadan. Numerous studies have investigated smartphone addiction, but there has been limited or insufficient research on inattentional blindness because of smartphone addiction among university students. Inattentional blindness due to smartphone addiction is a growing concern, according to a study carried out by Chen and Pai (2018), because it can lead to risk-taking street-crossing behaviours, such as accepting a narrower traffic gap and crossing during red lights.

2.0 METHODOLOGY

The study design was a cross-sectional survey conducted among undergraduate and postgraduate students at the University of Ibadan, Nigeria. A multi-stage sampling technique, including a four-stage procedure, was adapted to select 420 students from 8 faculties in the University of Ibadan. Of the 16 faculties at the university, eight were randomly selected by ballot. From each selected faculty, a department was chosen by ballot. A proportionate random sampling technique was used to determine the percentage of respondents selected from each department within each faculty, ensuring equal representation across levels, departments, and faculties. A simple random sampling technique was then used to recruit consenting students for the study via paper balloting. A pretested, semi-structured questionnaire divided into five sections was used. A Smartphone Addiction Scale-Short

Version by Kwon et al., 2013, was used to determine the prevalence of smartphone addiction. A 60-point addiction scale was used; a score ≥ 32 was considered addicted. To assess the prevalence of inattentional blindness, a 20-point scale was used. Scores ≥ 10 were considered inattentively blind. Data were entered into the computer using the IBM Statistical Package for the Social Sciences (SPSS) version 23, and descriptive analysis was performed using frequencies, percentages, and means; inferential statistics (Chi-square test) at $p=0.05$ were used to test the hypotheses.

3.0 RESULT

3.1 Socio-demographic characteristics of respondents

The respondents' age was 24.3 ± 5.0 years; 59.5% were females; 90.0% were single; and 53.6% were unemployed (Table 1).

3.2 Prevalence of smartphone addiction

The prevalence of smartphone addiction among the respondents was 81.2%. More than half (65.7%) agreed they couldn't stand being without a smartphone, and 56.9% reported using their smartphones longer than intended. More than half (62.4%) were impatient and anxious when they were not with their smartphones, and 66.2% had their smartphones on their minds even when they were not using them. Findings also revealed that

32.8% of respondents agreed they would never give up using a smartphone, even though their daily lives are already greatly affected by it (Table 2).

3.3 Factors associated with Smartphone Addiction

Most respondents (60.2%) reported that boredom is a factor contributing to smartphone addiction. The majority (83.3%) agreed that social networks and smartphone functions (79.5%) make them feel attached to their smartphones. Most (59.8%) of respondents agreed that data availability contributes to smartphone addiction among them (Figure 1).

3.4 Prevalence of Inattentional Blindness due to Smartphone Addiction

The prevalence of Inattentional blindness among the respondents was 81%. A majority (85.2%) agreed that they become engrossed in smartphone activities while walking, crossing the road, or eating, and 64.5% reported having experienced a situation in which they failed to notice something important happening around them while focused on their smartphone. More than half (58.6%) agreed that they frequently check their smartphone notifications while engaged in tasks that require full attention, such as driving or studying. 80% of respondents also feel that smartphone use has led to instances in which they didn't notice someone trying to get their attention in person (Table 3).

3.5 Perceived effects of Smartphone addiction

About half, 51.0%, agreed that smartphone addiction caused them to lose sleep, and 51.2% agreed that they procrastinate doing tasks because of smartphone addiction. Most respondents (65.5%) agreed that they have difficulty concentrating in class, on assignments, or at work due to smartphone use. Less than half (41%) of respondents report aches and pains they associate with time spent on their smartphones, and 35.2% agree they would feel depressed, anxious, or oversensitive when unable to use their smartphones. Also, 59.3% agreed that they would feel nervous without their smartphone because they would be disconnected from their online identity (Table 4).

Table 1: Socio-demographic characteristics of respondents (N=420)

Variables		Frequency	(%)
Sex	Male	170	40.5
	Female	250	59.5
Age (in years)	16 – 20	81	19.3
	21 – 25	212	50.5
	26 – 30	89	21.2
	31 and above	38	9.0
Marital Status	Single	378	90.0
	Married	42	10.0
Ethnic Group	Yoruba	295	70.2
	Igbo	53	12.6
	Hausa	26	6.3
	Others*	46	10.9
Religion	Christian	299	71.2
	Islam	106	25.3
	Traditional	15	3.5
Faculty	Public Health	48	11.4
	Technology	47	11.2
	Clinical Sciences	56	13.3
	Agriculture	55	13.1
	Science	64	15.2
	Social Sciences	58	13.8
	Arts	42	10.0
	Education	50	12.0
Level of study	100	36	8.6
	200	60	14.3
	300	111	26.4
	400	75	17.9
	500	18	4.3
	600	2	0.5
	700	118	28.1
Employment status	Employed	69	16.4
	Self-employed	126	30.0
	Unemployed	225	53.6

*Others = Efik, Fulani, Edo, Ijaw, Urhobo, Obidi, Igede, Igede.

Table 2: Prevalence of smartphone addiction (N=420)

Statement	Strongly Agree Freq. (%)	Agree Freq. (%)	Weakly Agree Freq. (%)	Weakly Disagree Freq. (%)	Disagree Freq. (%)	Strongly Disagree Freq. (%)
I won't be able to stand not having a smartphone	163 (38.8)	85(20.2)	28(6.7)	96(22.9)	30(7.1)	18(4.3)
Having a hard time concentrating in class, while doing assignments, or while working, due to smartphone use	89(21.2)	204(48.6)	43(10.2)	17(4.0)	54(12.9)	13(3.1)
Having my smartphone in mind even when I am not using it	187(44.5)	84(20.0)	7(1.7)	13(3.1)	103(24.5)	7(1.7)
Feeling pain in the wrist or at the back of the neck while using a smartphone	85 (20.2)	134 (31.9)	42 (10.0)	29 (6.9)	88 (21.0)	42 (10.0)
I use my smartphone longer than I intended	47 (11.2)	149 (35.5)	43 (10.2)	24 (5.7)	125 (29.8)	32 (7.6)
Feeling impatient and anxious when I am not with my smartphone	75 (17.9)	155 (36.9)	32 (7.6)	24 (5.7)	99 (23.6)	35 (8.3)
The people around me tell me that I use my smartphone too much	86 (20.5)	153 (36.4)	29 (6.9)	27 (6.4)	80 (19.0)	45 (10.7)
Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook	108 (25.7)	131 (31.2)	32(7.6)	26 (6.2)	77 (18.3)	46 (11.0)
I will never give up using my smartphone, even when my daily life is already greatly affected by it	30 (7.1)	66 (15.7)	42 (10.0)	38 (9.0)	135 (32.1)	109 (26.0)
Missed planned work due to smartphone use	49 (11.7)	119 (28.3)	61 (14.5)	27 (6.4)	117 (27.9)	47 (11.2)

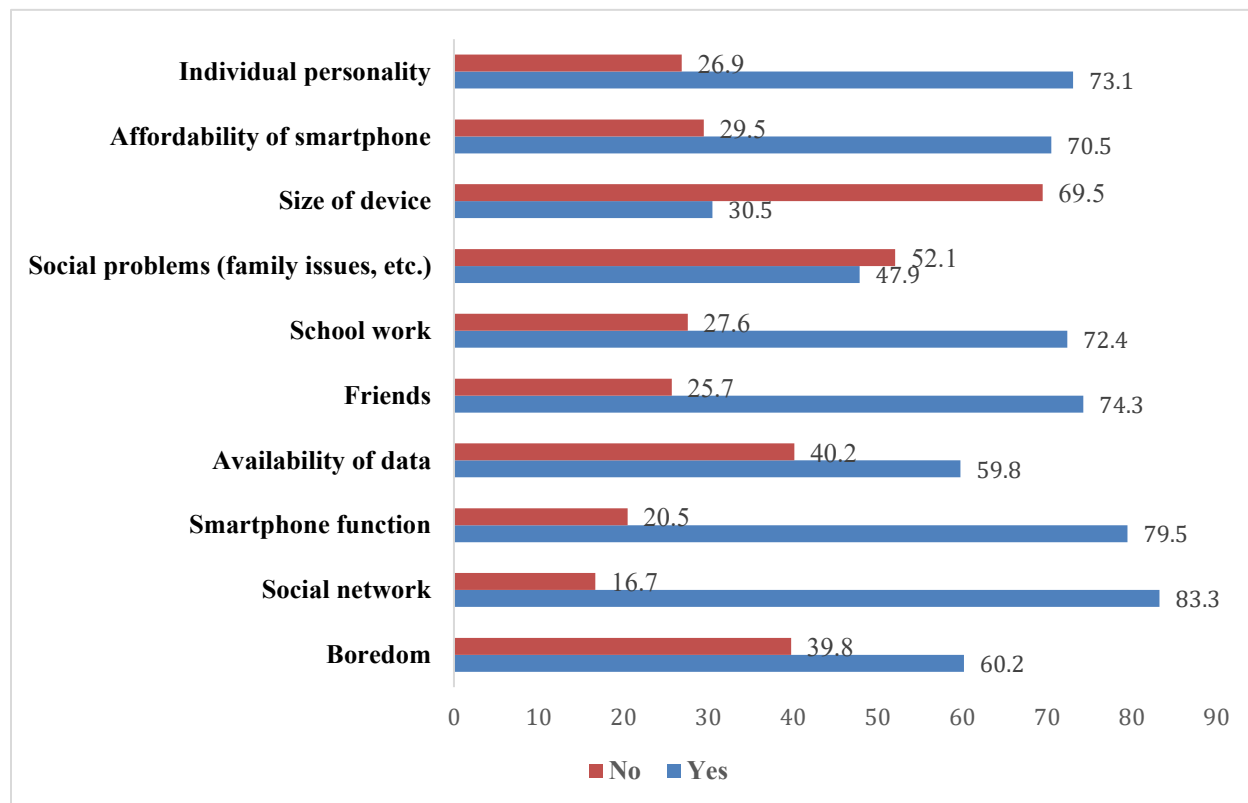


Figure 1: Factors associated with smartphone addiction (N=420)

Table 3: Prevalence of Inattentional Blindness due to Smartphone Addiction (N=420)

Variable	Yes Freq. (%)	No Freq. (%)
I find myself engrossed in your smartphone activities while walking, crossing the road, or eating.	358 (85.2)	62 (14.8)
I missed something important happening around me because I was focused on my smartphone.	271 (64.5)	149 (35.5)
I have missed important information in a lecture or class because I was distracted by my smartphone.	299 (71.2)	121 (28.8)
The fear of missing out (FOMO) leads you to engage with your smartphone, which in turn leads to inattentional blindness.	222 (52.9)	198 (47.1)
I have been involved in or witnessed an accident or near-miss caused by someone who was distracted by their smartphone.	208 (49.5)	212 (50.5)
I feel that my smartphone usage has negatively impacted my ability to concentrate on tasks for extended periods.	196 (46.7)	224 (53.3)
The anticipation of receiving likes, comments, or reactions on social media affects my focus on the real world.	175 (41.7)	245 (58.3)
I frequently check my smartphone notifications while engaged in tasks that require my full attention, such as driving or studying.	246 (58.6)	174 (41.4)
I feel that your smartphone usage has led to instances where I didn't notice someone trying to get my attention in person.	336 (80.0)	84 (20.0)
Smartphone addiction contributes to inattentional blindness among students in general	272 (64.8)	148 (35.2)

Table 4: Perceived effects of Smartphone addiction (N=420)

VARIABLE	Agree Freq. (%)	Disagree Freq. (%)
My academic performance has decreased as a direct result of the time I spend on my smartphone	139 (33.1)	281 (66.9)
I have aches and pains that I feel are associated with my smartphone use	172 (41.0)	248 (59.0)
I lose sleep due to the time I spend on my mobile phone	214 (51.0)	206 (49.0)
I procrastinate doing tasks because I am using my smartphone	215 (51.2)	205 (48.8)
If I did not have my smartphone with me, I would be nervous because I would be disconnected from my online identity	249 (59.3)	171 (40.7)
I feel depressed, anxious, or oversensitive when I am not able to use my smartphone	148 (35.2)	272 (64.8)
I have a hard time concentrating in class, while doing assignments, or while working, due to smartphone use	275 (65.5)	145 (34.5)
I experience light-headedness or blurred vision due to excessive smartphone use	150 (35.7)	270 (64.3)
I feel pain in the wrists or at the back of the neck while using a smartphone	142 (33.8)	278 (66.2)
I have a hearing problem due to excessive smartphone use	146 (34.8)	274 (65.2)

3.6 Hypotheses Testing

Hypothesis 1: There is no significant association between employment status and the prevalence of smartphone addiction among respondents. Chi-square test was used to test this hypothesis; the results indicated no significant association between students' employment status and the prevalence of smartphone addiction. Therefore, the researchers fail to reject the null hypothesis ($p = 0.079$) (Table 5).

Hypothesis 2: The second hypothesis states that there is no significant association between the age of respondents and the prevalence of inattentional blindness. Chi-square test was used to test this hypothesis; the results indicated no significant association between students' age at the University of Ibadan and the prevalence of inattentional blindness. Therefore, the researchers fail to reject the null hypothesis ($p = 0.789$) (Table 5).

Table 5: Test of hypotheses (N=420)

Association between respondents' age and prevalence of inattentional blindness						
Gender groups	Non-addicted Freq. (%)	Addicted Freq. (%)	Total Freq. (%)	X ²	df	p-value
16-20	15 (3.6)	66 (15.7)	81 (19.3)	1.011	3	0.789
21-25	39 (9.3)	173 (41.2)	212 (50.5)			
26-30	20 (4.8)	69 (16.4)	89 (21.2)			
31 and above	6 (1.4)	32 (7.6)	38 (9.0)			
Total	80 (19.1)	340 (80.9)	420 (100)			

Association between respondents' employment status and prevalence of smartphone use						
Gender groups	Non-addicted Freq. (%)	Addicted Freq. (%)	Total Freq. (%)	X ²	df	p-value
Employed	19 (4.5)	50 (11.9)	69 (16.4)	5.089	3	0.079
Self-employed	25 (6)	101 (24)	126 (30.0)			
Unemployed	35 (8.3)	190 (45.3)	225 (53.6)			
Total	79 (18.8)	341 (81.2)	420 (100)			

4.0 DISCUSSION

Results from the study revealed that a higher proportion of the respondents were addicted to their smartphones. This finding is similar to a study by Ozdemir et al. (2018), which found that the prevalence of smartphone addiction is comparable across developing and developed nations, ranging from 77% to 99%, and is highest among young adults. A similar study (Akpunne *et al.*, 2018) reported a high prevalence of smartphone addiction using the same SAS measure used in this study. The high prevalence may be due to the device's ability to perform multiple activities simultaneously, which makes life easier for students (Ali *et al.*, 2018). This is critical as it denotes an era of addictive disorder, which could decrease quality of life. Most respondents in this study admitted to using their smartphones more than they intended and said they could not stand having a smartphone. This study highlights that almost half of the respondents feel anxious and impatient, especially when they are not with their smartphone, indicating their addictive characteristics. This is in line with a study carried out by Ratan *et al.* (2021) that says that anxiety is significantly linked with smartphone addiction.

The respondents indicated that boredom was the primary factor promoting smartphone addiction. social networks, smartphone functions and user personality. This finding aligns with other studies reporting that boredom is associated with problematic smartphone use among young people (Elhai *et al.*, 2018). This finding supports the general thinking that boredom, a negative emotion,

may be a major contributor to the overuse of smartphone behaviour, leading to addiction. The results of this study indicated that some respondents admitted that some smartphone functions promote addiction. The smartphone offers much more than voice communication; it has advanced features such as cameras, video, GPS, Wi-Fi, social media apps, and more. This could mean that most respondents would spend a lot of time on their smartphones, increasing their addictive tendency. This finding is in line with findings from Zencirci *et al.* (2018), who reported that social networks and applications with entertaining content on smartphones enhance addiction.

Furthermore, individual personality has been identified to influence addiction, as revealed by this study's results. This is corroborated in the study conducted by Ali *et al.* (2020) on smartphone addiction and personality traits. It is revealed that individual personality, such as being an introvert or an extrovert, can increase smartphone addiction in that person. A study executed by Ihsan et al (2020) suggests a similar result. Results from the study suggested that a majority of the respondents had inattentional blindness due to smartphone addiction, findings from this study also showed that a high percentage of students agree that they find themselves engrossed in their smartphone while carrying out activities like; walking, crossing the road or eating and that they have experienced situations where they failed to notice something important happening around them because they were focused on their smartphone. This finding is

consistent with the observational study by Chen and Pai (2018). According to the study's findings, students who used smartphones while crossing were less likely to notice what was happening around them. The high prevalence of inattentional blindness due to smartphone addiction may be attributable to smartphone gaming, calling, music listening, texting, and web surfing, as observed in Chen and Pai's (2018) study. It could also be due to fear of missing out (FOMO), which leads students to constantly engage with their smartphones wherever they are, as observed by Sanil et al. (2020).

Findings from this research showed that a high proportion of the respondents agreed that smartphone addiction caused them to lose sleep and that they have a hard time concentrating in class, while doing assignments, or while working due to smartphone use. This aligns with research by Wang et al. in 2019, which showed that smartphone addiction is associated with poor management skills, reduced sleep hours, and reduced concentration in class. Balogun *et al.* (2020) also corroborated this, identifying a significant number of young people who reported insufficient sleep due to smartphone use. Findings from this research also showed that more than half of the respondents agreed they would feel nervous without their smartphones because they would be disconnected from their online identify in line with a study by Lissak (2018).

The results of this study indicate that there is no significant association between employment status and the prevalence of smartphone addiction among

students. This finding suggests that employment status, whether a student is employed, unemployed or self-employed, does not influence their likelihood of developing smartphone addiction. This outcome is consistent with some existing literature that suggests smartphone addiction is a pervasive issue among students regardless of their employment status (Chen *et al.*, 2020; Lee *et al.*, 2018). This finding challenges the common assumption that employed students might have different levels of smartphone addiction due to varying levels of time management and stress compared to their unemployed peers.

The results indicated no significant association, leading to the failure to reject the null hypothesis. The findings indicate that the impact of smartphone addiction on inattentional blindness is not age dependent. Smartphone addiction has been widely recognised as a significant issue across various age groups, with numerous studies highlighting its potential to distract users and impair cognitive functions (Wilmer *et al.*, 2020). The current study's results support the notion that the detrimental effects of smartphone addiction on attentional processes are pervasive and not confined to specific age groups. This underscores the importance of developing comprehensive strategies to mitigate smartphone addiction across all age groups, rather than targeting specific age demographics.

5.0 CONCLUSION

This study has provided valuable insights into the prevalence, factors, and impacts of smartphones

addiction among university students, with particular attention to its association with inattentional blindness and the perceived health effects. The high prevalence of smartphone addiction among students highlights the critical need for health promotion and education interventions within university environments. As smartphones continue to be integral to daily life, their addictive potential poses significant risks to students' mental, physical, and academic well-being. The study's findings underscore the importance of understanding the multifaceted nature of smartphone addiction, with factors such as boredom, social networks, smartphone functions, and individual personality traits contributing to its prevalence. Additionally, the observed relationship between smartphone addiction and inattentional blindness suggests the potential for increased accidents and cognitive impairments, emphasising the urgency of addressing these issues from a public health perspective.

The results also reveal the negative impacts of smartphone addiction on sleep, concentration, and overall mental health, which can adversely affect academic performance and social relationships. These findings are particularly relevant to health promotion and education, as they highlight the need for targeted interventions to foster healthier digital habits among students. Such interventions could include digital well-being education, awareness campaigns, and strategies to promote mindfulness and balanced smartphone use. By integrating this knowledge into public health initiatives and

educational programs, universities and health professionals can better support students in cultivating healthier relationships with technology, ultimately enhancing their overall well-being and academic success.

ETHICAL CONSIDERATIONS

The study was conducted in accordance with the stipulated ethical principles and guidelines governing the involvement of human participants in research. Ethics approval was obtained from the University of Ibadan/University College Hospital Ethics Committee before data collection (Ref: UI/EC/23/0669). Potential respondents were not coerced into the study. Written informed consent was obtained from potential respondents before administering a questionnaire, and the right to withdraw consent at any time during the study was clearly communicated.

DECLARATIONS

1. The work as submitted has not been published or accepted for publication, nor is it being considered for publication elsewhere, either in whole or in substantial part.
2. The work is original, and all necessary acknowledgements have been made.
3. The author has no competing interests to declare that are relevant to the context of this article.

REFERENCES

- Akpunne, B., & Akinnawo Bede, O. (2018). Validation of Smartphone Addiction Scale – Short Version on Nigerian University Undergraduates. *International Journal of Computer Science and Mobile Computing*. Vol. 7 Issue.11, November- 2018, pg. 136-141
- Ali, M., Raza, S. A., Qazi, W., & Puah, C. H. (2018). Assessing e-learning system in higher education institutes. *Interactive Technology and Smart Education*.
- Ali RA, Alnuaimi K.M. & Al-Jarrah I.A. (2020). Examining the associations between smartphone use and mother–infant bonding and family functioning: a survey design. *Nurs Heal Sci*. 22:235–42. <https://doi.org/10.1111/nhs.12684>
- Alistair J. Harvey & Sarah J. Bayless & Georgia Hyams (2018). Alcohol increases inattentional blindness when cognitive resources are not consumed by ongoing task demand. *Psychopharmacology* 235:309–315
- Balogun FM & Olatunde OE (2020). Prevalence and predictors of problematic smartphone use among pre-University young people in Ibadan, Nigeria. *Pan African Medical Journal*. 36(285). 10.11604/pamj.2020.36.285.18858.
- Boateng Richard, Nyamadi Makafui & Asamenu Immaculate. (2020). Smartphone Addictions: A Review of Themes, Theories and Future Research Directions. 10.24251/HICSS.2020.746.
- Buctot, D. B., Kim, N., & Park, K. E. (2018). Development and evaluation of a smartphone detox program for university students. *International Journal of Contents*, 14(4), 1–9. <https://doi.org/10.5392/IJoC.2018.14.4.001>.
- Cha, S. S., & Seo, B. K. (2018). Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. *Health psychology open*, 5(1), 2055102918755046. <http://doi.org/10.1177/2055102918755046>
- Chen Ping-Ling & Pai Chih-Wei. (2018). Pedestrian smartphone overuse and inattentional blindness: An observational study in Taipei, Taiwan. *BMC Public Health*, 18(1), 1-9.
- Chen, I.-H., Pakpour, A. H., Leung, H., Potenza, M. N., Su, J.-A., & Lin, C.-Y. (2020). Comparing generalised and specific problematic smartphone/ internet use: Longitudinal relationships between smartphone application-based addiction and social media addiction, and psychological distress. *Journal of behavioural addictions*, 9 (2), 410–419.
- Elhai, J. D., Levine, J. C., Dvorak, R. D., & Hall, B. J. (2018). Non-social features of smartphone use are most related to depression, anxiety, and problematic smartphone use. *Computers in Human*

- Behavior, 89, 15-20.
- Ihsan, K. & Enes, B. (2020). Relationship between Smartphone Addiction and Personality Traits. *Asian Journal of Education and Training*, 6(2): 304-313.
- Kwon, M., Lee, J.-Y., Won, W.-Y., Park, J.-W., Min, J.-A., Hahn, C., et al. (2013). Development and Validation of a Smartphone Addiction Scale (SAS). *PLoS ONE*, 8(2), e56936. <https://journals.plos.org/plosone/article/figures?id=10.1371/journal.pone.0056936>
- Lee, E. J., Kim, H. S., & Kim, J. H. (2018). Factors affecting smartphone addiction in university students. *Journal of Korean Academy of Nursing Administration*, 24(2), 128-138. <https://doi.org/10.1111/jkana.2018.24.2.128>
- Lissak G (2018). Adverse physiological and psychological effects of screen time on children and adolescents: Literature and case study. *Environ Res.*;164: 149–57. <https://doi.org/10.1016/j.envres.2018.01.015>.
- Obi, Andrew & MO, Omoregie. (2020). Prevalence and Determinants of Smartphone Addiction. 2. 61-72.
- Ozdemir, B., Cakir, O., & Hussain, I. (2018). Prevalence of Nomophobia among University Students: A Comparative Study of Pakistani and Turkish Undergraduate Students. *Eurasia Journal of Mathematics, Science and Technology Education*. 14. 1519-1532. 10.29333/ejmste/84839.
- Ratan, Z.A.; Parrish, A.-M.; Zaman, S.B.; Alotaibi, M.S. & Hosseinzadeh, H (2021). Smartphone Addiction and Associated Health Outcomes in Adult Populations: A Systematic Review. *Int. J. Environ. Res. Public Health*, 18, 12257. <https://doi.org/10.3390/ijerph182212257>
- Raza, S. A., Qazi, W., Umer, B., & Khan, K. A. (2020). Influence of social networking sites on life satisfaction among university students: a mediating role of social benefit and social overload. *Health Education*.
- Sanil S Hishan, Suresh Ramakrishnan, Muhammad Imran Qureshi (2020). Smartphone Addiction, Fear of Missing Out, and Perceived Competence as Predictors of Social Media Addiction in Adolescents. *Journal of Critical Reviews* ISSN- 2394-5125 Vol 7, Issue 16, 2020
- Wang P.Y., Chen K.L., Yang S.Y., Lin P.H. (2019). Relationship of sleep quality, smartphone dependence, and health-related behaviours in female junior college students. *PLOS ONE*.;14(4):e0214769–9. <https://doi.org/10.1371/journal.pone.0214769>.
- Wilmer, H. H., Sherman, L. E., & Chein, J. M. (2020). Smartphones and cognition: A review of research exploring the links between mobile technology habits and cognitive functioning. *Frontiers in Psychology*, 8, 605.

Zencirci, S.A., Aygar, H., Göktaş, S., Önsüz, M.F.,
Alaiye, M., & Metintaş, S. (2018).
Evaluation of smartphone addiction and
related factors among university students.
Int J Res Mod Sel; 6:2210-6.