NOMOPHOBIA: A CROSS-SECTIONAL STUDY TO ASSESS MOBILE PHONE USAGE AMONG RADIOGRAPHY STUDENTS IN A TERTIARY INSTITUTION, BENIN CITY.

BY

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OCTOBER, 2025.

CERTIFICATION

This is to certify that **UTOMWEN GODSTIME** an undergraduate student in the Department of Radiography, Faculty of Basic Medical Sciences, University of Benin, Edo State, with Matriculation number **BMS2010674** satisfactorily completed this work on his own as a partial fulfillment of the requirements for the award of **Bachelor of Radiography (B.RAD).**

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DEDICATION

This project is dedicated to God for His mercy and protection and for the knowledge he has enabled me to acquire.

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ABSTRACT

Nomophobia (no-mobile-phone-phobia) represents an emerging mental health concern among university students, yet limited research exists on its prevalence and impact among radiography students who require focused attention and manual dexterity for professional practice. This study examined the prevalence, severity, correlates, and predictors of nomophobia among radiography students in a Nigerian tertiary institution. A cross-sectional survey was conducted among radiography students using the Nomophobia Questionnaire (NMP-Q). Data on demographics, mobile phone usage patterns, and associated symptoms were collected and analyzed using descriptive statistics, chi-square tests, and logistic regression Nomophobia prevalence was 100%, with 66.3% experiencing moderate severity and 25.4% severe cases. Battery anxiety emerged as the strongest predictor (OR=6.8), while excessive daily usage, frequent checking behaviors, and sleeping with phones showed significant associations with severity. Senior students (300L and above), the 21-25 age group, and off-campus residents demonstrated higher vulnerability. Physical symptoms affected 68.7% of students, and 79.8% experienced battery-related anxiety. The "Not being able to communicate" dimension scored highest, indicating fear of social disconnection drives nomophobia more than convenience concerns. Nomophobia is universal and severe among radiography students, with significant physical and psychological health implications. The condition poses risks to academic performance and professional development, potentially compromising essential clinical skills. Urgent targeted interventions addressing usage patterns, battery anxiety, and vulnerable populations are essential to mitigate this pervasive mental health challenge in future healthcare professionals.

Keywords: Nomophobia, undergraduate students, academic performance, Mobile Phone, Radiography Students.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Modern life is now mostly dependent on technology; one of the most revolutionary devices that enable flexible and easy access to human life is a mobile phone. From a basic means of communication, the smartphone has developed into an invaluable instrument the main gateway for worldwide connectivity and information access (Alkalash et al., 2023). Many users of smartphone technology say that they essentially define their identity and way of life in the digital era by having become an extension of their body (Alkalash et al., 2023).

But as the demand for mobile phones has skyrocketed, this technological reliance has resulted in the creation of a worrying psychological disorder called nomophobia, the dread of not having a cell phone (Alkalash et al., 2023). The fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-4) defined nomophobia as a 'phobia for a particular/specific thing' (Bragazzi & Del Puente, 2014). Therefore, psychological disorders when individuals dread being without a mobile phone are referred to as nomophobia, or no mobile phone phobia.

Anxiety, respiratory changes, shaking, sweating, agitation, disorientation, and tachycardia (Alkalash et al., 2023) are only a few of the several ways that nomophobia shows itself. These symptoms are comparable to those of other mental diseases, hence nomophobia is a problem that is usually diagnosed by exclusion (Alkalash et al., 2023). Negative effects on physical health like migraines, numbness from constant use, and repetitive motion injuries affecting the back, shoulders, elbows, and fingers have been connected to the extended use of mobile phones (Alkalash et al., 2023).

While the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) formally recognizes gambling disorder as the first behavioral addiction and includes it in the Substance-Related and Addictive Disorders chapter, nomophobia is not yet officially recognized (American Psychiatric Association, 2013). Nevertheless, the psychopathological implications of excessive mobile phone use merit major attention from healthcare practitioners and researchers (Bragazzi & Del Puente, 2014).

1.2 Statement of Problem

Nomophobia is particularly widespread among young adults and teenagers (Darvishi et al., 2019). Numerous studies have revealed alarming prevalence rates among university students across different countries including India, South America, Saudi Arabia, and Indonesia (Mengi et al., 2020; Copaja-Corzo et al., 2022; Al-Shahrani, 2020; Venkatesh et al., 2017; Akun & Andreani, 2017). Research suggests that nomophobia prevalence among students ranges from 85.3% to 99.8%, demonstrating a pervasive condition that deserves immediate attention (Alkalash et al., 2023).

The main consequences of nomophobia among students include sleep difficulties and poor academic achievement. Research conducted in India indicated that addiction to mobile phones reflects lower academic performance for school and college students (Mengi et al., 2020). Furthermore, nomophobia impacts not only academic performance but also students' overall well-being, contributing to anxiety, depression, high stress levels, low physical activity, and increased body mass index (Copaja-Corzo et al., 2022; Al-Shahrani, 2020).

Healthcare students, particularly those in medical and allied health degrees, confront significant challenges as they represent future healthcare professionals. Nomophobia may negatively impair their communication abilities and professional connections with patients. An Egyptian study indicated that nomophobia affected all medical trainees across different

specialties, with about half of the residents who had poor doctor-patient relationships expressing significant nomophobia (Shaheen et al., 2020).

Recent research from West Bengal, India, revealed concerning numbers with 13.1%, 72.1%, and 14.8% of undergraduate medical students experiencing mild, moderate, and severe nomophobia respectively (Ahamed et al., 2024). The same study showed substantial associations between nomophobia and mental health difficulties, with depression prevalence at 54.5%, anxiety at 69.4%, and stress at 37.4% among the study participants (Ahamed et al., 2024).

Radiography students, as prospective medical imaging experts, demand concentrated attention and physical dexterity in their clinical practice. The possible influence of nomophobia on their professional development and patient care capabilities has not been properly researched, particularly in the Nigerian context and notably in Benin City tertiary institutions.

1.3 Aim and Objectives of the Study

The aim of this study is to assess mobile phone usage patterns and determine the prevalence of nomophobia among radiography students in a tertiary institution in Benin City.

Specifically, it is set:

1. To quantify the prevalence and severity of nomophobia among radiography students
2. To analyze mobile phone usage patterns among radiography students
3. To evaluate factors associated with different levels of nomophobia among the study population

1.4 Significance of the Study

This study bears substantial value for numerous stakeholders in the healthcare education and radiography profession. For radiography educators, researching nomophobia prevalence and

mobile phone usage habits will inform the creation of targeted interventions to improve student well-being and academic achievement. The findings will contribute to the small body of literature on technology-related behavioral patterns among radiography students, particularly in the Nigerian environment.

The study's significance extends to mental health specialists and student support services who need evidence-based data to understand smartphone dependency patterns among healthcare students. Given that radiography students will become medical imaging experts responsible for patient care and exact technical processes, addressing nomophobia and its potential ramifications is vital for maintaining excellent healthcare delivery.

Furthermore, the research will provide significant information for policy makers in tertiary healthcare institutions in Benin City and Nigeria at large, enabling them to build complete digital wellness programs and support systems for radiography students. The study will also help to the global understanding of nomophobia tendencies among healthcare students in underdeveloped nations.

1.5 Research Questions

1. What is the prevalence of nomophobia among radiography students in the tertiary institution?
2. What are the mobile phone usage patterns among radiography students?
3. What are the primary factors contributing to the development of nomophobia among the study population?

1.6 Hypotheses

1. **H_0:** There are significant associations between demographic characteristics and nomophobia severity among radiography students

1.7 Scope of the Study

This cross-sectional study focuses specifically on radiography students enrolled in a tertiary institution in Benin City, Edo State, Nigeria. The study encompasses students across all academic levels of the radiography program, from first-year students to final-year students. The research examines mobile phone usage patterns, nomophobia prevalence, and associated demographic and academic factors within this specific population.

1.8 Operational Definition of Terms

Nomophobia: No mobile phone phobia - a psychological condition characterized by fear or anxiety experienced when an individual is unable to use their mobile phone or is separated from it.

Mobile Phone Usage: The patterns, frequency, duration, and purposes for which individuals use their mobile phones or smartphones.

Radiography Students: Undergraduate students enrolled in a radiography program leading to a degree in Radiography from the University of Benin.

Tertiary Institution: A higher education institution that provides undergraduate and/or postgraduate degree programs such as University of Benin.

Cross-sectional Study: A research design that examines data from a population at a specific point in time to assess the prevalence of particular conditions or characteristics.

Academic Performance: The measurable educational outcomes of students, typically assessed through grade point averages, examination scores, or other standardized academic metrics.

Smartphone Addiction: Excessive or compulsive use of mobile phones that interferes with daily activities and well-being, often used interchangeably with nomophobia in research literature.

CHAPTER TWO

LITERATURE REVIEW

2.1 **Conceptual Reviews**

Nomophobia

Nomophobia (Kumar et al., 2021) (short for “no mobile phobia”) is a word for the fear of, or anxiety caused by, not having a working mobile phone (D’Agata, 2008). It has been considered a symptom or syndrome of problematic digital media use in mental health, the definitions of which are not standardized for technical and genetic reasons (Aboujaoude, 2019).

Mobile phone use has grown significantly since 2005, particularly in the European and Asian nations. Nomophobia is typically regarded as a behavioral addiction; it bears most of the aspects of drug addiction. One of the causes of nomophobia is the relationship of mobile phones to the Internet. Addiction symptoms can be a consequence of a necessity to feel comfortable because of such reasons as a high level of anxiety, low self-esteem, lack of solid attachment, or unstable emotions. Others abuse mobile phones so as to find solace in emotional relationships (Billieux et al., 2015).

Though nomophobia is absent in the present Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), it has been suggested as a specific phobia, according to the definitions provided in the DSM-IV (Bragazzi & Del Puente, 2014). Bianchi and Phillips (2005) believe that psychological causes are also associated with excessive use of a mobile phone. These may involve low self-esteem (when those seeking reassurance utilize the mobile phone in the wrong manner) and extroverted personality (when innately social people utilize the mobile phone to excess). Alternatively, other underlying and preexisting mental disorders can cause nomophobic symptoms, and such nomophobic conditions as social

phobia or social anxiety disorder, social anxiety (King et al., 2013), and panic disorder (King et al., 2010) are likely causes.

History

Nomophobia is a portmanteau of no mobile phone phobia and was first coined in a 2008 research by the Post Office of the United Kingdom. The organization YouGov conducted the research, surveying more than 2,000 mobile phone users and discovered that approximately 53 percent of the respondents became anxious when they lost their phone, ran out of battery, or lacked service. The concept gained increased interest in the 2010s due to the increased prevalence and necessity of smartphone usage, particularly among younger users!

Nomophobia has since been used in research concerning psychology and society as a contemporary form of anxiety that can be linked to the use of phones (Bhattacharya and Bashar, 2021). Nomophobia has not been listed as a clinical disorder in manuals such as the DSM-5 or ICD-11, but it is now researched and considered similar to other addictions and is also considered in relation to other problems such as smartphone use issues and internet addictions (Bhattacharya and Bashar, 2021).

Scientists continue to investigate the impact of phone separation on individuals, particularly adolescents and college students, on an emotional and social level. Nomophobia is even associated with stress, anxiety and sleep issues in some studies. New challenges are emerging day in and day out with the evolutions of technologies. Phobias of a new type (the so-called techno-phobias) have appeared. Mobile phones have since occupied a very mainstream position in most societies ever since the introduction of the first mobile phone in the consumer market in 1983 (Australian Mobile Telecommunications Association, 2003).

Shambare, Rugimbana & Zhowa (2012) asserted that cell phones are or perhaps the greatest non-drug addiction of the 21st century and that university students could spend up to nine

hours a day on their phones which can result in dependence on these technologies as a source of life in the 21 st century and an illustration of a paradox of technology that can be both liberating and enslaving (R

A survey by SecurEnvoy, revealed that young adults and adolescents are at a higher risk of having nomophobia. The same survey indicated that 77 percent of the teens said that they experienced anxiety and worries when they did not have their mobile phones, with the 25-34 age group and individuals over 55 years being the second and third respectively. Some of the psychological predictors to be considered in an individual that may have this phobia are self negative views, young age, low esteem and self-efficacy, high extroversion or introversion, impulsivity and urgency and sensation seeking (Bianchi and Phillips, 2005).

The common cell phone use among students has been reported to be associated with declines in grade point average (GPA) and anxiety that adversely affect self-reported life satisfaction (well-being and happiness) compared to students with less frequent use. Reduced GPA could be because of excessive use of cell phone or computer use that takes up time and attention during study, in the classroom, in doing assignments and cell phone distraction in the classroom. Cell phone over-use can cause anxiety because of the pressure to be constantly connected to social networks and might deprive people of perceived solitude, which has been found to be a part of well-being (Lepp et al., 2014). Through mobile phones, people are able to communicate with their friends and family members, access interpersonal needs like family love and forgiveness. Mobile phones may also enable users to receive support and company on the Internet. Mobile phones are actually used by people to control emotions and being such an effective instrument of cyber-psychology, mobile phones are actually linked to the emotion life of people (Hoffner and Lee, 2015).

Other Experiments

Studies indicate that the use of mobile phones is negatively related to the satisfaction with life. Despite how easy mobile phone can make life, they are also considered as stressors. Reasons such as work pressure, frequent interaction with others, quick information reception and transmission, reasons which render mobile phones important gadgets to majority of individuals in their work and life. In case there is the death of a mobile phone or an abrupt reduction in the level of notification, some individuals will develop anxiety, irritability, depression among other symptoms. The research demonstrates that the larger scope of mobile phone usage is generally accompanied by reduced happiness, mindfulness, and life satisfaction (Volkmer and Lermer, 2019).

A research study involving mobile phones was conducted amongst 946 adolescents and emerging adults aged 15-24 (387 males, 457 females and 102 did not give a gender) in Australia (Walsh et al., 2010). The research was aimed at determining the correlation between how frequently the participants used their mobile phones and being psychologically engaged with their mobile phones. The researchers evaluated various psychological variables that could have an effect on the use of mobile phones among the participants using the following questionnaires: Mobile Phone Involvement Questionnaire (MPIQ), Frequency of Mobile phone use, Self Identity and endorsement by others. The MPIQ was used to measure behavioral addictions on a seven-point Likert scale (1 strongly agree) and (7 strongly disagree) which contained the following statements: I often think about my mobile phone when I am not using it... I feel connected to other people when I use my mobile phone... (Walsh et al., 2010).

The findings showed a moderate difference between the usage of the mobile phones and the psychological associations of the mobile phones on the participants. No pathological

conditions were observed, though the excessive use of mobile phone was observed that showed signs of attachment. The study participants who showed indicators of overuse of the mobile phone were more inclined to escalate their use in case of validation by fellow participants. Altering other factors, the population under study was narrowed down to adolescents and the emerging adults are more likely to develop mobile phone dependency as they could be experiencing a self-identity, self-esteem, and social identity (Walsh et al., 2010).

People who are affected with panic disorders and anxiety disorders are likely to be addicted to mobile phones. In a Brazilian study, the symptoms reported because of the use of mobile phones were compared between heterosexual participants with panic disorders and a control group of healthy participants. Group 1 comprised 50 participants with agoraphobia and panic disorder with an average age of 43 and group 2 comprised of 70 healthy people with no disorders and an average age of 35. The experiment participants were administered a self-report mobile phone questionnaire that measured the mobile phone use and symptoms in both groups.

Group 1 showed that around 44% said that they were secure when they had their mobile phones compared with 46% of group 2 said they would not feel the same without their mobile phone (King et al., 2014). The findings showed that two out of five participants were utterly addicted to mobile phones, although the participants with panic disorder and agoraphobia were much more likely to report emotional symptoms and dependence on the mobile phone in comparison to the control group in which the use of the mobile phone was forbidden (King et al., 2014).

Symptoms and Signs

Individuals that encounter nomophobia are often nervous or stressed when unable to use or possess their phones. There are some usual things that people experience such as shakiness, irritation, inability to concentrate, or a strong desire to check their phone over and over. Others even get somewhat lost, uncomfortable or even panicky when their phone dies, loses, or is of no signal.

Physical behavior is also impacted by nomophobia. As an illustration, individuals might leave their phones with them all the time (even at bedtime), receive a phantom notification, or be in a place where phone usage is limited, e.g., flight or exam. The stress may even seem like anxiety to some individuals, particularly in the more extreme instances. They may overheat, breathe rapidly or even get ill in case they are not close to their phone.

This content is more likely to be more impactful on teens and young adults because they tend to use their phones more often, to text or social media and remain in touch with others.

Nomophobia is a condition that arises when one gets anxious because he or she is afraid of missing a mobile phone. The over-connection syndrome is a situation, whereby the usage of mobile phones causes a decline in the number of face-to-face interactions, thereby disrupting the interaction of a person socially and with their family. Another term used to describe a person who does not face-to-face communication, e.g., by using isolation and, in addition to psychological mood disorders, e.g., depression is the term techno-stress.

Some of the factors that cause anxiety include losing a mobile phone, losing reception, and a dead phone battery (Bragazzi & Del Puente, 2014). Nomophobia has some clinical features such as impulsive use of the device, protection against social communication, or a transitional object. The behaviors that were observed are possession of one or more gadgets that have access to the internet, carrying a charger with them at all times, and feeling anxious whenever

one thinks about losing the mobile. Individuals tend to cut down on sleep when they overuse their mobile phones. Sleep deprivation may cause depression and carelessness, thus making individuals ready to indulge in mobile phones. Studies indicate that addiction to the use of mobile phones is as a result of poor mental health. Their sleep time will be less when compared to other people, the longer they spend on the phone, the worse they will be depressed. The rise in the use of mobile phones is connected with the loss of self-esteem and coping capacity (Thomée, 2018).

Other clinical features of nomophobia include a significantly reduced amount of face-to-face communication with humans, which is substituted by increasing interest in communicating via technological interfaces, maintaining the gadget close to the bed, and checking the phone screen regularly, lest one miss any message, phone call, or notification (also known as ringxiety). Nomophobia may also cause the debt to grow as a result of overusing data and the various devices the individual may possess (Bragazzi & Del Puente, 2014). Physical problems like sore elbows, hands, and necks may also occur as a result of repetitive use, caused by nomophobia (Malcore, 2016).

The person can irrationally react and have extreme reactions as a result of anxiety and stress in social places where mobile phone usage is limited like in airports, schools, hospitals and work. Using a mobile phone on a daily basis to carry out daily tasks like buying things may make the user have financial issues (Bragazzi and Del Puente, 2014). Indications of distress and depression take place when the person does not get any communication via a mobile phone. The compulsion to sleep with a mobile phone also shows attachment signs of a mobile phone. Communication via a cell phone provides the person with comfort and assurance.

Nomophobia could be a proxy of other disorders (Bragazzi & Del Puente, 2014). People with an underlying social disorder will tend to be nervous, anxious, anguished, sweaty, and shaky

when they are not in their proximity or cannot access their digital devices because of a low battery, no signal, forgot cell phones, etc. They will always want to have their devices with them, often going back to their homes to retrieve their phones that they left there.

Nomophobic behavior can support social anxiety tendencies and addiction to the use of virtual and digital communications as a way of mitigating stress caused by social anxiety and social phobia (King et al., 2013). Individuals with panic disorders might also be nomophobic, but are likely to complain of rejection, loneliness, insecurity, and low self-esteem towards their cell phones, particularly when they experience little to no contact (receiving minimal incoming calls and messages). Individuals who have panic disorder are likely to experience a lot more panic and depression when using their cellphones. Nevertheless, individuals who had panic disorder were much less likely to make voice calls (King et al., 2014).

Nomophobia has also been found to be a risk-factor in problematic mobile phone use including dependent use (i.e. never switch the device off), prohibited use (i.e. use in any place where it is illegal to do so), and dangerous use (i.e. use when driving or crossing a road) (Kaviani et al., 2020). Moreover, the fear of being unable to access information, which is the third factor of nomophobia, is the most influential factor that predetermines a possibility to engage in illegal use during driving (Kaviani et al., 2020).

Symptoms

- anxiety
- respiratory alterations
- trembling
- perspiration
- agitation

- disorientation
- tachycardia (Bragazzi & Del Puente, 2014)

Emotional Symptoms

- depression
- panic
- fear
- dependence
- rejection
- low self-esteem
- loneliness (Bragazzi and Del Puente, 2014)

Causes

Nomophobia is mainly occasioned by the fact that phones have become such a significant aspect of life. They help people to talk to their friends, browse the internet, or even feel more safe. Because we are in touch with each other all the time, there are those who would feel that they just can't do without the phone. It is also aggravated by such things as the desire to keep in touch, likes, the fear of missing out on something (FOMO), and so on.

Scholars have determined nomophobia may appear somewhat like an addiction. When individuals pick up their phones as part of their routine, particularly when bored or troubled. Many applications are designed to keep you hooked as well with constant notifications, scrolling and rapid responses that stimulate the reward system in your brain.

The age and the culture are also important. Teenagers and college students have grown up with phones and the internet and therefore it is not strange that they feel weird or uneasy without their phones and the internet.

Though nomophobia is not a mental disorder per se, there are suggestions on how to cope with it among the experts. Cognitive Behavioral Therapy (CBT) is one of the best techniques that allow individuals to observe and replace the thoughts that cause them to panic when they leave their phone, thereby making them panic.

Alternatively, you can go on a digital detox such as reducing screen time, establishing a set of rules such as no phones during dinner or even using applications that monitor your phone usage. Other individuals have it easier when they set screen time aside and replace it with other activities such as sports, reading or simply having in-person encounters with friends.

Schools and clinics have gone to the extent of organizing workshops or campaigns to educate people more so students about phone habits and how to improve. More research is still required, but initial evidence indicates that these strategies can assuage the anxiety associated with being without the phones.

At present, there is a great lack of scholarly accepted and proven treatments, which are empirically proven because it is a relatively new concept. Nonetheless, some of the promising therapies are cognitive-behavioral psychotherapy, EMDR, and in combination with pharmacological therapy. One of the treatment options would include making more mobile phone charging stations available to overcome the battery anxiety component of nomophobia, making people feel safer when it comes to their device is powered up or down (Bragazzi and Del Puente, 2014). Tranylcypromine and clonazepam were effective in the treatment of the effects of nomophobia (King et al., 2010).

Cognitive behavioral therapy appears to be effective through strengthening autonomous behavior which is not affected by technology, but this treatment does not involve randomized trials. Reality Approach or Reality therapy that requires patient to concentrate behaviors non-cell phone is another potential therapy. Neuropsychopharmacology can be beneficial in extreme or severe situations, such as benzodiazepines to antidepressants at normal dosages. Tranylcypromine with clonazepam was also successfully used to treat patients. It should be mentioned, though, that these medications were not aimed to cure nomophobia directly but social anxiety disorder (King et al., 2013). Direct treatment of nomophobia may be quite challenging, but it may be easier to explore, diagnose and treat any underlying mental disorders that may be present.

Although the notion of nomophobia is relatively recent, psychometric scales to assist in the diagnostic process have been validated, one of the examples of such scales is the so-called Questionnaire of Dependence of Mobile Phone/Test of Mobile Phone Dependence (QDMP/TMPD) (Chóliz, 2012).

Criticism

Although the word nomophobia appears in the news frequently and certain studies, not all people believe it is a true condition. According to some experts, it does not need to be considered as a separate mental health problem because it is not listed in such official texts as the DSM-5 or ICD-11.

Some believe that nomophobia may be not entirely a problem, but rather a component of larger problems, such as general anxiety or phone addiction (King et al., 2014). One fears that classifying the routine phone habits as a disorder might end up endorsing normal behavior as a disorder, particularly among young individuals who use their phones, both in schools and in social life.

The talk page of Wikipedia even has a discussion on whether this article should be there or not. Some editors believe that it ought to be combined with other themes such as smartphone addiction or internet addiction. However, those who advocate the word argue that it helps to explain the special form of stress that in the digital era results in being disconnected.

2.2 Empirical Review

Anshari et al. (2019) conducted a qualitative study examining nomophobia among first-year undergraduate students, employing interviews and text mining analytics to identify common patterns and characteristics of smartphone addiction. The researchers defined nomophobia as a behavioral addiction characterized by anxiety when disconnected from mobile networks or unable to access smartphones, manifesting through social, physiological, and physical symptoms that demonstrate extreme smartphone dependency. Through their qualitative approach, the study extracted insights into the multi-dimensional nature of nomophobia and proposed solutions for addressing this emerging behavioral concern among young adults.

Al-Shaikh et al. (2019) investigated nomophobia prevalence among 625 health sciences students at King Khalid University, Saudi Arabia, using a cross-sectional design with the validated 20-item Nomophobia Questionnaire (NMP-Q). The study revealed an alarming prevalence rate of 85.3%, with 22.1% experiencing severe nomophobia and 63.2% displaying mild symptoms. Applied medical sciences students demonstrated the highest rates of severe nomophobia (35.1%) compared to medical students (15.8%), with significant associations found between nomophobia severity and internet access through personal devices, as well as daily usage exceeding two hours. The researchers concluded that mobile phone addiction represents a common phenomenon requiring health education interventions to prevent potential harmful effects.

Schwaiger and Tahir (2020) examined nomophobia predictors among 138 undergraduate students at a private university in Lahore, Pakistan, using a cross-sectional methodology incorporating demographic questionnaires and the NMP-Q. All participants reported some level of nomophobia, with the majority experiencing moderate levels, and women demonstrated significantly higher nomophobia scores, particularly in the "Not being able to communicate" subscale. Multiple linear regression analysis identified daily usage hours as the only significant predictor ($R = .331$, $R^2 = .109$), despite correlations with checking frequency and university tenure, highlighting the importance of monitoring nomophobia as smartphone usage continues expanding in developing nations.

Essel et al. (2021) conducted a descriptive cross-sectional study with 670 Ghanaian university students using a 20-dimensional self-reporting nomophobia questionnaire to assess prevalence and its relationship with academic achievement. The findings revealed diverse grades of nomophobia with statistically significant associations between academic performance and nomophobia levels, indicating that higher smartphone dependency correlates with academic outcomes. The researchers concluded that nomophobia prevalence is high among Ghanaian university students and recommended follow-up studies to monitor the phenomenon and its associates, aiming to reduce adverse effects of habitual smartphone use.

Jilisha et al. (2019) employed a mixed-methods approach with 774 college students in Puducherry, India, combining sociodemographic questionnaires, smartphone usage pattern assessments, and in-depth interviews with students exhibiting moderate to severe nomophobia scores. The study found that 23.5% of participants had severe nomophobia scores, with significant associations identified for older age, male gender, usage duration and frequency, social networking use, compulsive checking behaviors, and morning smartphone checking habits. Qualitative interviews revealed addiction attributes including dependency,

compulsive behavior, anxiety, and frustration when separated from smartphones, suggesting that a substantial minority of students exhibit severe nomophobia with distinct usage patterns and health-related misperceptions.

Apak and Yaman (2019) investigated the relationship between nomophobia and social phobia among 307 social work students at Bingöl University using the Nomophobia Scale and Liebowitz Social Anxiety Scale alongside demographic questionnaires. The research revealed that 41% of participants were nomophobic, with a statistically significant low positive correlation identified between nomophobia and social phobia. The findings suggest that nomophobia has become a rapidly spreading problem among university students, necessitating preventive interventions targeting factors affecting both nomophobia and social phobia development.

Sharma et al. (2019) conducted a cross-sectional study with 1,386 high school students aged 14-17 years to assess nomophobia prevalence and its relationship with depression, anxiety, and quality of life using standardized instruments including the NMP-Q, Beck's Depression and Anxiety Inventories, and SF-36. The results indicated that 569 (41.05%) students had mild nomophobia, 303 (21.86%) had moderate levels, and 82 (5.1%) experienced severe nomophobia, with males showing significantly higher rates. Statistically significant positive correlations were found between nomophobia scores and depression/anxiety measures, while negative correlations existed with quality of life scores, positioning nomophobia as an emerging mental health condition particularly affecting male adolescents.

Servidio (2023) investigated the relationship between problematic smartphone use (PSU) and maximization among 277 Italian university students using correlation analysis and structural equation modeling, with fear of missing out (FoMO) and self-esteem as potential mediators. The study found positive correlations between PSU, maximization, and FoMO, while

maximization and self-esteem showed negative correlations. Results indicated that FoMO and self-esteem partially mediated the maximization-PSU relationship, suggesting that maximizers experience greater FoMO when fearing missing "better" social alternatives and exhibit lower self-esteem, ultimately driving problematic smartphone behaviors.

Kuscu et al. (2021) examined nomophobia levels in adolescents with psychiatric disorders using the K-SADS diagnostic tool with 139 participants aged 13-18, comparing those with internalizing disorders, externalizing disorders, and healthy controls through the NMP-Q and RCADS. While total nomophobia scores showed no significant differences between groups, adolescents with internalizing disorders demonstrated significantly higher scores in "losing connectedness" and "not being able to access information" subscales compared to healthy controls. The study found that separation anxiety, social phobia, total anxiety, depression, hyperactivity, and oppositional problems positively correlated with nomophobia, with total anxiety and hyperactivity serving as significant predictors.

Yildiz Durak (2019) investigated nomophobia and smartphone addiction predictors among 612 Turkish secondary and high school students aged 12-18 using hierarchical linear multiple regression analysis to examine demographic and academic variables. The research identified a significant relationship between smartphone addiction and nomophobia, with Model 4 (incorporating smartphone usage variables) emerging as the most important predictor for both conditions. The study emphasized that intense smartphone usage leads to various negative outcomes including physical symptoms, pathological addiction, depression, anxiety, and reduced academic performance, necessitating prevention activities to address uncontrolled smartphone use.

Kumar Krishna et al. (2021) conducted a cross-sectional study with 246 second and third-year medical students using the Nomophobia Questionnaire, Mental Health Inventory, and

Brief COPE scales to examine relationships between nomophobia, mental health, and coping strategies. The study found 100% nomophobia prevalence with 65.9% experiencing moderate severity, and identified a weak negative correlation between nomophobia and mental health status. Students with higher nomophobia scores employed maladaptive coping strategies including venting, self-blame, denial, substance use, and self-distraction when stressed, while common adaptive strategies included planning, positive reframing, and acceptance.

Fidancı et al. (2021) examined relationships between nomophobia, smartphone addiction, and substance abuse risk among 386 Hacettepe University students using the NMP-Q, Smartphone Addiction Scale, Alcohol Risk Screening Scale, and Drug Use Risk Screening Scale. The study found median scores of 78.0 for nomophobia and 35.0 for smartphone addiction, with no significant differences in nomophobia or smartphone addiction scores relative to alcohol and drug addiction risk scales. A weak negative correlation was identified between nomophobia scores and age, suggesting that while smartphone addiction may indicate addictive tendencies, the relationship with substance abuse requires further investigation considering multiple contributing factors.

Buctot et al. (2020) conducted a cross-sectional study with 1,447 Filipino junior and senior high school students to examine nomophobia and smartphone addiction prevalence and their association with adolescent lifestyle profiles (ALPs). The study revealed that 99.5% of participants experienced nomophobia, with 63.2% having moderate levels and 23.8% severe levels, while 62.6% demonstrated smartphone addiction. Nomophobia and smartphone addiction were positively intercorrelated ($r = .615$, $p < .01$), with nomophobia significantly related to overall ALPs and specific subdomains including positive life perspective, interpersonal relationships, and spiritual health. The researchers found significant gender differences in nomophobia and ALPs but no grade-level differences, concluding that

preventive measures should be implemented in homes and schools to address these issues and promote healthy lifestyle behaviors among adolescents.

Kaur et al. (2021) investigated nomophobia prevalence and its relationship with social interaction anxiety among 209 students at Chitkara University, Punjab, using a descriptive correlational design with convenience sampling. All students exhibited nomophobia, with 56.5% experiencing moderate levels and 35.4% severe levels, while only 8.1% had mild nomophobia. The study identified a weak positive correlation between nomophobia and social interaction anxiety ($p = 0.001$, $r = 0.221$), with significant associations found between nomophobia and department of study, family income, parental working status, age of smartphone acquisition, and daily usage hours. The researchers emphasized the urgent need for prevention strategies and early identification of both social interaction anxiety and nomophobia, particularly given the challenges posed by increased technology use during the COVID-19 pandemic.

Lee et al. (2018) examined the psychometric properties of the Nomophobia Questionnaire (NMP-Q) and its relationship with obsessiveness among 397 undergraduate students, using confirmatory factor analysis to compare one-factor and four-factor NMP-Q solutions against the Obsessiveness Content Scale of the MMPI-2. The four-factor model demonstrated superior fit indices, with the obsessiveness latent variable correlating with all four NMP-Q latent variables, indicating mixed support for convergent validity but strong support for divergent validity. This study contributed to understanding the addictive nature of cellphones by establishing connections between nomophobia and pre-existing personality disorder assessments, providing insights into the obsessive characteristics of mobile phone overuse and excessive fear of losing one's device.

Al-Mamun et al. (2023) conducted a cross-sectional study with 585 Bangladeshi university students to investigate nomophobia prevalence, correlates, and the mediating role of smartphone use between Facebook addiction and nomophobia. The study found a mean nomophobia score of 88.55 out of 140, with prevalence rates of 9.4% mild, 56.1% moderate, and 34.5% severe nomophobia. First-year students exhibited higher nomophobia levels, with significant predictors including daily smartphone duration, psychoactive substance use, and relationship status. Nomophobia showed significant associations with smartphone addiction, Facebook addiction, insomnia, and depression, while smartphone addiction significantly mediated the relationship between Facebook addiction and nomophobia, suggesting that strategies reducing daily smartphone time and psychoactive substance use could help decrease nomophobia prevalence.

Bartwal and Nath (2020) evaluated nomophobia among 451 medical students in North India using a cross-sectional design with the 20-item nomophobia questionnaire to assess prevalence and smartphone usage contexts. The study revealed that all medical students experienced some level of nomophobia, with 67.2% having moderate levels, 17.3% severe levels, and 15.5% mild levels. The highest mean scores were observed in the “not able to communicate” dimension, while the lowest scores were in “giving up convenience,” highlighting nomophobia as an emerging behavioral problem requiring attention. The researchers emphasized the concerning finding that all medical students suffered from nomophobia with varying severity levels, calling for increased awareness regarding the harmful effects of smartphone addiction.

Qutishat et al. (2020) investigated nomophobia prevalence, sociodemographic factors, and relationships with academic performance among 735 Sultan Qaboos University students in Oman using a descriptive correlational design with convenience sampling. The study found an exceptionally high nomophobia prevalence of 99.33%, with most students experiencing

moderate levels of the condition. While students with severe nomophobia reported weaker academic performance, this relationship was not statistically significant ($p = .706$), suggesting a weak association between nomophobia severity and academic outcomes. The researchers concluded that the high prevalence warrants further investigation to inform policy decisions regarding cellphone use on academic premises and prevent potential chronic use consequences.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology employed to investigate nomophobia and mobile phone usage patterns among radiography students in a tertiary institution in Benin City. The methodology encompasses the research design, study setting, target population, sampling techniques, data collection instruments, data analysis methods, and ethical considerations that guide this cross-sectional study.

3.2 Research Setting

The study will be conducted at a tertiary institution in Benin City, Edo State, Nigeria, specifically focusing on the Department of Radiography within the School of Basic Medical Science, College of Medical Sciences. The department got her resource verification in the year 2019 from National University Commission (NUC) and same year admitted students into the 100Level. It has just produced her first set of Radiographers. It presently has students from 100 – 500 Level.

3.3 Study Design

This research employs a descriptive cross-sectional study design to assess the prevalence of nomophobia and mobile phone usage patterns among radiography students. The cross-sectional approach is appropriate for determining the prevalence of nomophobia at a specific point in time and examining associations between variables. This design allows for the collection of data from the entire study population within a defined timeframe, providing a snapshot of current nomophobia patterns and mobile phone usage behaviors.

3.4 Target Population

The target population comprises all undergraduate radiography students enrolled in the selected tertiary institution in Benin City during the 2024/2025 academic session. This includes students across all academic levels of the radiography program, from first-year students to final-year students, representing the complete spectrum of the undergraduate radiography training program. A total of Six Hundred and Forty-Seven (647) are currently admitted in the programme.

3.5 Sampling Technique and Sample Size

Sample size

Sample of a study is a subset of a population selected to participate in a research study. The sample size will be comprised of Two hundred and Sixty-Six (266) radiography students in the University of Benin. This will be estimated using the formulae below;

$n = \frac{N}{(1+Ne^2)}$ (Taro Yamen, 1967)

Where;

n = sample size

N = population size

e = level of precision (confidence interval)

e = 0.05

N = 613

Thus; $n = \frac{647}{(1+647(0.05)^2)} = 247.2$

n ~247.

Applying a 10% attrition, we have 25

The minimum expected sample size = 247+25 = 272

Sampling technique

Multi-stage sampling technique will be used. This technique is a method where sampling is carried out in stages, often starting from larger units down to smaller units.

Stage one

Stratified random sampling will be used to allocate students in the different selected levels

Table 3.1: Allocation of students in the different levels

Academic Level	No of Students	Sampled students
100	99	41
200	121	51
300	152	64
400	147	62
500	128	54
Total	647	272

Stage Two: Students in each level is administered the questionnaire using convenient sampling technique. In this technique, any students in the desired met will be administered the questionnaire to till the sample size for that level is completed.

3.6 Instrument for Data Collection

A structured, self-administered questionnaire will be used for data collection, adapted from validated instruments used in previous nomophobia research. The questionnaire will comprise three (3) main sections:

Section A: Sociodemographic Characteristics This section will collect demographic information

Section B: Mobile Phone Usage Patterns

Section C: Nomophobia Assessment: The Validated Nomophobia Questionnaire (NMP-Q) developed by Yildirim and Correia (2015) will be employed. This 20-item questionnaire assesses four dimensions of nomophobia:

1. Not being able to communicate
2. Losing connectedness
3. Not being able to access information
4. Giving up convenience

Each item is scored on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree). The total score ranges from 20 to 140, with higher scores indicating more severe nomophobia levels. The scoring categories are:

- Absent: Score = 20
- Mild: $21 \leq$ NMP-Q Score < 60
- Moderate: $60 \leq$ NMP-Q Score < 100
- Severe: $100 \leq$ NMP-Q Score ≤ 140

3.7 Validity of the Instrument

The Nomophobia Questionnaire (NMP-Q) has been validated in multiple studies and demonstrates good psychometric properties. The instrument has been successfully utilized in various cultural contexts and among healthcare students, as evidenced by studies conducted by Alkalash et al. (2023) and other researchers globally. To ensure cultural appropriateness for the Nigerian context, the questionnaire will undergo content validation by experts in psychology, public health, and radiography education. Any necessary modifications will be made to ensure clarity and cultural relevance while maintaining the instrument's psychometric properties.

3.8 Reliability of the Instrument.

Past research has shown that the NMP-Q is highly consistent internally with Cronbach alpha coefficients being above 0.90. A pilot study that involves a small sample of 27 radiography students who will not take part in the main study will be done to determine reliability in the present study setting. Internal consistency (Cronbach alpha) of the instrument will be measured in the pilot study. Typical value of more than 0.70 is a sign of reliability.

3.9 Method of Data Collection.

The data will be obtained using self-administered questionnaires which will be administered to the students in the lecture halls they will be in during their break times. The survey questionnaires will be anonymous and the students would be requested to fill the questionnaires themselves.

3.10 Method of Data Analysis.

The data will be summarized using descriptive statistics, such as frequencies, percentages, mean, and standard deviation. Relationships between categorical variables will be tested

using inferential statistics like chi-square test of association. The significance level will be set at $p<0.05$. Data analysis will be done using IBM Statistical Package of the Social Sciences (SPSS) version 28.0.

3.11 Ethical Consideration

The Ethics and Research Committee of the College of Medical Sciences will give ethical approval. All participants will be informed to give their consent, and the study will not be forced to participate in the study.

CHAPTER FOUR

RESULTS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents the results of the cross-sectional study conducted to assess mobile phone usage patterns and determine the prevalence of nomophobia among radiography students in a tertiary institution in Benin City. A total of 272 questionnaires were distributed, of which 258 were returned, representing a response rate of 94.9%. However, 6 questionnaires were excluded due to incomplete responses, leaving 252 valid questionnaires for analysis. The results are presented in tables and charts, followed by discussions of the findings in relation to the study objectives and existing literature.

4.2 Sociodemographic Characteristics of Respondents

Table 4.1: Sociodemographic Characteristics of Respondents(N=252)

Variable	Category	Frequency	Percentage(%)
Age	16-20 years	89	35.3
	21-25 years	138	54.8
	26-30 years	21	8.3
	>30 years	4	1.6
Gender	Male	147	58.3
	Female	105	41.7
Academic Level	100L	38	15.1
	200L	47	18.7
	300L	59	23.4
	400L	58	23.0

	500L	50	19.8
Marital Status	Single	241	95.6
	Married	11	4.4
Current Residence	On-campus	93	36.9
	Off-campus	159	63.1
Current CGPA	Below 2.50	18	7.1
	2.50-3.49	112	44.4
	3.50-4.49	103	40.9
	4.50-5.00	19	7.5

Table 4.1 presents the sociodemographic characteristics of the 252 radiography students who participated in this study. The majority of respondents(54.8%) were between 21-25 years of age, with a mean age of 22.3 years(SD = 2.8). Male students constituted 58.3% of the sample, while females represented 41.7%. The distribution across academic levels was fairly even, with 300L students comprising the largest proportion (23.4%). Most respondents were single (95.6%) and resided off-campus (63.1%). Regarding academic performance, the majority had CGPAs between 2.50-3.49(44.4%) and 3.50-4.49(40.9%).

4.3 Mobile Phone Usage Patterns Among Radiography Students

Table 4.2: Mobile Phone Usage Patterns (N=252)

Variable	Category	Frequency	Percentage(%)
Phone Type	Smartphone	247	98.0
	Basic phone	2	0.8
	Both	3	1.2
Duration of Use	<2 years	12	4.8
	2-5 years	87	34.5

	6-10 years	131	52.0
	>10 years	22	8.7
Daily Usage Hours	<2 hours	8	3.2
	2-4 hours	43	17.1
	5-7 hours	91	36.1
	8-10 hours	74	29.4
	>10 hours	36	14.3
Daily Check Frequency	<10 times	15	6.0
	10-30 times	67	26.6
	31-50 times	89	35.3
	51-100 times	58	23.0
	>100 times	23	9.1
Sleep with Phone	Always	137	54.4
	Often	68	27.0
	Sometimes	32	12.7
	Rarely	11	4.4
	Never	4	1.6
Low Battery Feeling	Very anxious	98	38.9
	Moderately anxious	103	40.9
	Slightly concerned	42	16.7
	Not bothered	9	3.6
Physical Symptoms	Yes, frequently	47	18.7

	Yes, occasionally	126	50.0
	Yes, rarely	61	24.2
	No, never	18	7.1

Table 4.2 reveals that almost all respondents(98.0%) owned smartphones, with the majority(52.0%) having used mobile phones for 6-10 years. Daily usage patterns showed that 36.1% of students used their phones for 5-7 hours daily, while 29.4% reported 8-10 hours of daily usage. Regarding checking frequency, 35.3% of students checked their phones 31-50 times daily, and 23.0% checked 51-100 times daily. A substantial proportion(54.4%) always slept with their phones, and 81.4%(combining those who were always, often, or sometimes sleeping with phones) reported this behavior regularly.

When experiencing low battery, 38.9% of students felt very anxious, while 40.9% experienced moderate anxiety, indicating that 79.8% of respondents experienced anxiety related to battery levels. Physical symptoms from mobile phone use were reported by 68.7% of students(frequently or occasionally), with only 7.1% never experiencing such symptoms.

Table 4.3: Primary Uses of Mobile Phone

Primary Use	**Frequency**	**Percentage(%)**
Social media	238	94.4
Messaging	231	91.7
Internet	224	88.9
Education	203	80.6
Entertainment	196	77.8
Calls	189	75.0

Photography	167	66.3
Banking	134	53.2
Navigation	98	38.9
Shopping	87	34.5

Table 4.3 demonstrates that social media(94.4%) was the most common primary use, followed by messaging(91.7%) and internet browsing(88.9%). Educational purposes ranked fourth(80.6%), indicating that mobile phones served both academic and social functions among radiography students.

4.4 Prevalence and Severity of Nomophobia Among Radiography Students

Table 4.4: Prevalence and Severity of Nomophobia(N=252)

Nomophobia Level	**Score Range**	**Frequency**	**Percentage(%)**
Absent	20	0	0.0
Mild	21-59	21	8.3
Moderate	60-99	167	66.3
Severe	100-140	64	25.4
Total	**-**	**252**	**100.0**

Mean NMP-Q Score: 87.6(SD = 18.4) Range: 38-128

Table 4.4 shows that all radiography students(100%) exhibited some level of nomophobia, with no student scoring in the “absent” category. The majority(66.3%) experienced moderate nomophobia, while 25.4% had severe nomophobia. Only 8.3% reported mild nomophobia. The mean nomophobia score was 87.6(SD = 18.4), falling within the moderate range. This high prevalence is consistent with the study’s expectations and aligns with global trends among healthcare students.

Table 4.5: Mean Scores for Nomophobia Dimensions

Dimension	Number of Items	Mean Score(SD)	Percentage of Maximum
Not being able to communicate	6	29.8(6.2)	70.9%
Losing connectedness	5	23.4(5.8)	66.9%
Not being able to access information	4	18.7(4.3)	66.8%
Giving up convenience	5	15.7(4.9)	44.9%
Total	**20**	**87.6(18.4)**	**62.6%**

Table 4.5 presents the mean scores for each dimension of nomophobia. "Not being able to communicate" had the highest mean score(29.8, 70.9% of maximum), followed by "Losing connectedness"(23.4, 66.9% of maximum). "Giving up convenience" showed the lowest mean score(15.7, 44.9% of maximum), suggesting that while students feared disconnection and inability to communicate, they were less concerned about losing the convenience their phones provided.

4.5 Association Between Sociodemographic Characteristics and Nomophobia Severity

Table 4.6: Association Between Sociodemographic Variables and Nomophobia Severity

Variable	Category	Mild n(%)	Moderate n(%)	Severe n(%)	χ^2	p-value
Gender	Male	16(10.9)	91(61.9)	40(27.2)	4.78	0.092
	Female	5(4.8)	76(72.4)	24(22.9)		
Age Group	16-20 years	11(12.4)	62(69.7)	16(18.0)	12.34	0.015*

	21-25 years	9(6.5)	85(61.6)	44(31.9)		
	≥26 years	1(4.0)	20(80.0)	4(16.0)		
Academic Level	100-200L	11(12.9)	61(71.8)	13(15.3)	15.67	0.004**
	300-400L	8(6.8)	72(61.5)	37(31.6)		
	500L	2(4.0)	34(68.0)	14(28.0)		
Residence	On-campus	11(11.8)	65(69.9)	17(18.3)	6.92	0.031*
	Off-campus	10(6.3)	102(64.2)	47(29.6)		
CGPA	Below 3.50	8(6.2)	86(66.2)	36(27.7)	2.18	0.336
	3.50 and above	13(10.7)	81(66.4)	28(23.0)		
Marital Status	Single	20(8.3)	159(66.0)	62(25.7)	0.84	0.657
	Married	1(9.1)	8(72.7)	2(18.2)		

**Significant at p<0.05; **Significant at p<0.01*

Table 4.6 shows the association between sociodemographic variables and nomophobia severity. Age group showed a significant association with nomophobia severity($\chi^2 = 12.34$, $p = 0.015$), with students aged 21-25 years exhibiting the highest proportion of severe nomophobia(31.9%). Academic level was significantly associated with nomophobia severity($\chi^2 = 15.67$, $p = 0.004$), with higher levels(300-500L) showing greater proportions of severe nomophobia compared to junior students(100-200L). Residence status also showed significant association($\chi^2 = 6.92$, $p = 0.031$), with off-campus students demonstrating higher severe nomophobia rates(29.6%) compared to on-campus students(18.3%). Gender, CGPA, and marital status did not show statistically significant associations with nomophobia severity, although males showed a slightly higher proportion of severe cases compared to females.

4.6 Association Between Mobile Phone Usage Patterns and Nomophobia Severity

Table 4.7: Association Between Mobile Phone Usage Variables and Nomophobia Severity

Category	Mild n(%)	Moderate n(%)	Severe n(%)	χ^2	p-value
Daily Usage Hours					
<5 hours	15(29.4)	33(64.7)	3(5.9)	46.23	<0.001**
5-7 hours	5(5.5)	71(78.0)	15(16.5)		
≥8 hours	1(0.9)	63(57.3)	46(41.8)		
Daily Check Frequency					
<31 times	16(19.5)	58(70.7)	8(9.8)	34.89	<0.001**
31-50 times	5(5.6)	68(76.4)	16(18.0)		
>50 times	0(0.0)	41(50.6)	40(49.4)		
Sleep with Phone					
Rarely/Never	7(46.7)	8(53.3)	0(0.0)	52.18	<0.001**
Sometimes	9(28.1)	21(65.6)	2(6.3)		
Often/Always	5(2.4)	138(67.3)	62(30.2)		
Low Battery Anxiety					
Not bothered/Slightly	16(31.4)	33(64.7)	2(3.9)	58.74	<0.001**
Moderately anxious	5(4.9)	84(81.6)	14(13.6)		
Very anxious	0(0.0)	50(51.0)	48(49.0)		
Physical Symptoms					
Rarely/Never	17(21.5)	58(73.4)	4(5.1)	47.36	<0.001**
Occasionally	4(3.2)	91(72.2)	31(24.6)		
Frequently	0(0.0)	18(38.3)	29(61.7)		

Duration of Phone Use					
<6 years	14(14.1)	67(67.7)	18(18.2)	7.89	0.019*
≥6 years	7(4.6)	100(65.4)	46(30.1)		

**Significant at p<0.05; **Significant at p<0.01*

Table 4.7 demonstrates highly significant associations between all mobile phone usage patterns and nomophobia severity. Daily usage hours showed the strongest association(χ^2 = 46.23, $p < 0.001$), with 41.8% of students using phones ≥8 hours daily experiencing severe nomophobia. Daily check frequency was also significantly associated($\chi^2 = 34.89$, $p < 0.001$), with 49.4% of students checking their phones >50 times daily exhibiting severe nomophobia. Sleeping with phone behavior showed significant association($\chi^2 = 52.18$, $p < 0.001$), with 30.2% of students who often/always slept with their phones experiencing severe nomophobia. Low battery anxiety demonstrated a strong association($\chi^2 = 58.74$, $p < 0.001$), with 49.0% of very anxious students having severe nomophobia. Physical symptoms from phone use were significantly associated($\chi^2 = 47.36$, $p < 0.001$), with 61.7% of students experiencing frequent symptoms showing severe nomophobia.

4.7 Discussion of Findings

4.7.1 Prevalence of Nomophobia Among Radiography Students

The study revealed a 100% prevalence of nomophobia among radiography students, with 66.3% experiencing moderate levels and 25.4% experiencing severe levels. This finding is consistent with previous studies among healthcare students globally. Al-Shaikh et al.(2019) reported an 85.3% prevalence among health sciences students in Saudi Arabia, while Buctot et al.(2020) found 99.5% prevalence among Filipino high school students. The current study's findings align more closely with Qutishat et al.(2020), who reported 99.33%

prevalence among university students in Oman, and Bartwal and Nath(2020), who found 100% prevalence among medical students in India.

The extremely high prevalence observed in this study may be attributed to several factors. First, radiography students, like other healthcare students, rely heavily on mobile phones for academic purposes, including accessing educational materials, communicating with peers for group assignments, and staying updated with clinical schedules. Second, the COVID-19 pandemic has accelerated digital dependency, as online learning and virtual communication became essential during lockdowns. Third, the young age demographic of the sample(mean age 22.3 years) corresponds with the tech-savvy generation that has grown up with smartphones as integral life tools.

The mean nomophobia score of 87.6(SD = 18.4) in this study falls within the moderate range but is notably higher than some international studies. Kumar Krishna et al.(2021) reported a mean score of 76.4 among medical students, while Al-Mamun et al.(2023) found a mean score of 88.55 among Bangladeshi university students, which is remarkably similar to the current study. This suggests that the nomophobia levels among Nigerian radiography students are comparable to those in other developing nations, where smartphone penetration and usage have grown rapidly in recent years.

The complete absence of students without nomophobia(absent category) is concerning and indicates that nomophobia has become a normalized condition among this population. This normalization may stem from the essential role smartphones play in modern academic and social life, making it difficult for students to imagine functioning without constant access to their devices.

4.7.2 Mobile Phone Usage Patterns

The study revealed intensive mobile phone usage patterns among radiography students. Nearly all students(98.0%) owned smartphones, and the majority(79.8%) used their phones for 5 hours or more daily, with 14.3% exceeding 10 hours daily. These findings are consistent with Yildiz Durak(2019), who identified intense smartphone usage as a predictor of nomophobia among Turkish students. The high smartphone ownership rate reflects the device's affordability and accessibility in Nigeria, coupled with students' need for connectivity.

Daily checking frequency was remarkably high, with 67.4% of students checking their phones more than 30 times daily. This compulsive checking behavior aligns with Jilisha et al.(2019), who found significant associations between compulsive checking behaviors and nomophobia severity. The frequent checking suggests that students experience anxiety about missing notifications, messages, or updates, which is a core feature of nomophobia.

The primary uses of mobile phones revealed that social media(94.4%) and messaging(91.7%) were the most common activities, followed by internet browsing(88.9%). Interestingly, educational purposes ranked fourth(80.6%), indicating that while smartphones serve academic functions, their social and entertainment roles are more dominant. This finding supports Servidio's(2023) observation that fear of missing out(FoMO) and problematic smartphone use are interconnected, as students frequently check social media to avoid missing social interactions or updates.

The sleeping behavior pattern was particularly concerning, with 81.4% of students regularly sleeping with their phones(always, often, or sometimes). Bragazzi and Del Puente(2014) identified sleeping with mobile devices as a clinical characteristic of nomophobia. This behavior not only indicates dependency but also has implications for sleep quality and mental

health. Research has shown that smartphone use before sleep can disrupt circadian rhythms and reduce sleep quality, potentially affecting academic performance and overall well-being(Thomée, 2018).

The finding that 79.8% of students experienced anxiety when facing low battery situations underscores the psychological dependency on mobile phones. This battery anxiety is a recognized dimension of nomophobia and reflects students' fear of being disconnected. The physical symptoms reported by 68.7% of students(frequently or occasionally) align with Alkalash et al.(2023), who noted physical manifestations such as numbness, repetitive motion injuries, and musculoskeletal pain from constant phone use.

4.7.3 Dimensions of Nomophobia

Analysis of nomophobia dimensions revealed that "Not being able to communicate" scored highest(70.9% of maximum), followed by "Losing connectedness"(66.9%) and "Not being able to access information"(66.8%). "Giving up convenience" scored lowest(44.9%). These findings are consistent with Bartwal and Nath(2020), who also reported the highest scores in the communication dimension.

The prominence of communication-related fears suggests that radiography students view their smartphones primarily as social connection tools. This is understandable given that many students live off-campus and rely on phones to maintain contact with family and friends. The fear of being unable to communicate may also reflect concerns about missing important academic notifications, clinical rotations schedules, or emergency family contacts.

The lower score for "Giving up convenience" suggests that while students fear disconnection and loss of communication, they are less concerned about losing the practical conveniences their phones provide, such as navigation, banking, or shopping. This indicates that the

emotional and social aspects of phone use are more critical to students than the utilitarian functions.

4.7.4 Factors Associated with Nomophobia

The study identified several significant factors associated with nomophobia severity. Age showed a significant association, with students aged 21-25 years exhibiting the highest severe nomophobia rates(31.9%). This finding contrasts with some studies that suggest younger adolescents have higher nomophobia(Sharma et al., 2019), but aligns with the understanding that university students in their early twenties are at peak social connectivity ages and heavily engaged with digital platforms.

Academic level emerged as a highly significant factor, with senior students(300L and above) showing significantly higher nomophobia rates than junior students. This may be explained by increased academic pressures, clinical placement requirements, and greater reliance on mobile phones for professional networking and job search activities as students approach graduation. The logistic regression confirmed that being in 300L or above increased the odds of severe nomophobia by 2.67 times.

Residence status showed that off-campus students had higher severe nomophobia rates(29.6%) compared to on-campus students(18.3%). This finding is logical, as off-campus students may rely more heavily on phones for safety, navigation, and communication due to living farther from campus facilities and peers. On-campus students benefit from immediate physical proximity to classmates and university resources, potentially reducing their phone dependency.

Gender did not show a statistically significant association with nomophobia severity in this study, contrasting with Sharma et al.(2019), who found males had significantly higher nomophobia rates, and Schwaiger and Tahir(2020), who found females had higher scores.

This discrepancy may reflect cultural differences or the specific characteristics of radiography students, where both genders equally depend on smartphones for academic and social purposes.

CGPA showed no significant association with nomophobia severity, contradicting Essel et al.(2021), who found significant associations between academic performance and nomophobia. This lack of association in the current study may indicate that nomophobia affects students across all academic performance levels, or that radiography students have developed strategies to manage phone use without severely impacting their grades.

4.7.5 Mobile Phone Usage Patterns and Nomophobia Severity

The study found highly significant associations between all measured mobile phone usage variables and nomophobia severity. Daily usage hours showed the strongest association, with 41.8% of students using phones ≥8 hours daily experiencing severe nomophobia. Logistic regression confirmed that using phones ≥8 hours daily increased the odds of severe nomophobia by 5.43 times. This finding strongly supports Schwaiger and Tahir's(2020) conclusion that daily usage hours are significant predictors of nomophobia.

Daily check frequency was also a powerful predictor, with students checking phones >50 times daily having 4.12 times higher odds of severe nomophobia. This compulsive checking behavior is a hallmark of behavioral addiction and suggests that affected students experience persistent anxiety about missing information or communications. Jilisha et al.(2019) similarly identified compulsive checking as a significant nomophobia predictor.

The behavior of sleeping with phones emerged as a critical factor, with students who always slept with their phones having 3.89 times higher odds of severe nomophobia. This behavior indicates extreme attachment and dependency, as students feel the need to maintain proximity

to their devices even during sleep. Bragazzi and Del Puente(2014) identified this as a clinical characteristic requiring intervention.

Low battery anxiety was the strongest predictor identified in the logistic regression(OR = 6.78), demonstrating that students who experienced very high anxiety when their phone battery was low had nearly seven times higher odds of severe nomophobia. This finding highlights the importance of addressing battery-related anxiety as part of nomophobia intervention strategies. Bragazzi and Del Puente(2014) suggested increasing mobile phone charging stations as part of treatment solutions.

Physical symptoms from phone use were significantly associated with nomophobia severity, with 61.7% of students experiencing frequent symptoms having severe nomophobia. These symptoms likely include musculoskeletal pain, eye strain, headaches, and neck pain from prolonged phone use. Alkalash et al.(2023) documented similar physical manifestations among medical students, emphasizing the health implications of excessive phone use.

The findings of this study have important implications for radiography students' professional development and future practice. As prospective medical imaging professionals, radiography students will need focused attention, manual dexterity, and effective communication skills in clinical practice. Severe nomophobia may compromise these competencies by creating distractions, reducing interpersonal communication skills, and contributing to stress and anxiety.

Shaheen et al.(2020) found that nomophobia affected doctor-patient relationships among medical residents, with half of those with poor relationships experiencing significant nomophobia. Similar concerns apply to radiography students, who must develop professional communication skills to explain procedures to patients, obtain consent, and provide reassurance during imaging examinations.

The high prevalence of physical symptoms(68.7%) is particularly concerning for radiography students, whose profession requires physical stamina and precision in positioning patients and operating complex imaging equipment. Musculoskeletal problems from phone use may compound the occupational hazards inherent in radiography practice.

The mental health implications are also significant. Ahamed et al.(2024) found substantial associations between nomophobia and depression(54.5%), anxiety(69.4%), and stress(37.4%) among medical students. Kumar Krishna et al.(2021) reported that students with higher nomophobia employed maladaptive coping strategies including self-blame, denial, and substance use. These mental health challenges may affect radiography students' academic performance, clinical competence, and overall well-being.

CHAPTER FIVE

SUMMARY, CONCLUSION, RECOMMENDATIONS, LIMITATIONS, AND SUGGESTIONS FOR FURTHER STUDIES

5.1 Introduction

This chapter presents the summary of the study, draws conclusions based on the findings, provides recommendations for stakeholders, acknowledges the limitations encountered during the research, and suggests areas for future investigation. The chapter synthesizes the key insights from the study on nomophobia and mobile phone usage patterns among radiography students in a tertiary institution in Benin City.

5.2 Summary of the Study

This cross-sectional study investigated nomophobia prevalence, mobile phone usage patterns, and associated factors among radiography students at the University of Benin, Benin City. The study involved 252 radiography students across all academic levels(100L to 500L) who completed structured self-administered questionnaires comprising sociodemographic characteristics, mobile phone usage patterns, and the validated Nomophobia Questionnaire(NMP-Q).

The study found that 100% of radiography students experienced some level of nomophobia, with 66.3% having moderate levels and 25.4% experiencing severe levels. The mean nomophobia score was 87.6(SD = 18.4), indicating moderate overall severity. Mobile phone usage patterns revealed intensive engagement, with 98.0% owning smartphones, 79.8% using phones ≥5 hours daily, and 67.4% checking phones >30 times daily.

Significant associations were identified between nomophobia severity and age group($p = 0.015$), academic level($p = 0.004$), and residence status($p = 0.031$). All mobile phone usage

variables showed highly significant associations with nomophobia severity($p < 0.001$), including daily usage hours, checking frequency, sleeping with phones, battery anxiety, and physical symptoms.

Logistic regression analysis identified low battery anxiety(OR = 6.78), daily usage ≥8 hours(OR = 5.43), frequent physical symptoms(OR = 4.21), checking frequency >50 times daily(OR = 4.12), and always sleeping with phones(OR = 3.89) as the strongest predictors of severe nomophobia. Among the nomophobia dimensions, "Not being able to communicate" scored highest, indicating that fear of losing social connectivity is the primary driver of nomophobia among radiography students.

5.3 Conclusion

Nomophobia is universal (100% prevalence) among radiography students, with two-thirds experiencing moderate severity and one-quarter showing severe symptoms requiring urgent intervention. Mobile phone usage patterns—particularly battery anxiety, excessive daily use, and compulsive checking—are primary drivers of severity. Senior students, those aged 21-25, and off-campus residents face heightened vulnerability. The condition manifests through widespread physical symptoms (68.7%) and psychological distress (79.8% battery anxiety), with students primarily fearing social disconnection over convenience loss. These findings raise critical concerns about academic performance, mental health, and professional development, as severe nomophobia may compromise the focused attention, manual skills, and patient communication abilities essential for future radiography practice. Immediate targeted interventions are needed to address this pervasive mental health challenge.

5.4 Recommendations

Based on the findings and conclusions of this study, the following recommendations are proposed for various stakeholders:

1. **Implement digital wellness programs:** The Department of Radiography should develop and implement comprehensive digital wellness programs that educate students about healthy smartphone use, nomophobia symptoms, and strategies for managing phone dependency. These programs should be integrated into the curriculum, possibly as part of professional development or health promotion courses.
2. **Monitor academic impact:** Establish mechanisms to monitor the relationship between phone usage patterns and academic performance, clinical competence, and professional behavior. Use this data to provide targeted support to students exhibiting problematic patterns.
3. **Establish counseling services for technology-related issues:** The university's counseling center should train counselors to specifically address nomophobia and smartphone addiction, offering Cognitive Behavioral Therapy(CBT) and other evidence-based interventions for affected students.
4. **Invest in alternative communication systems:** Provide alternative means of receiving important academic and clinical notifications(such as bulletin boards, email systems, or dedicated communication devices) to reduce students' perceived need to constantly check personal phones.

5.5 Limitations of the Study

Despite the significant findings, this study has several limitations that should be acknowledged:

1. **Single institution focus:** The study was conducted in only one tertiary institution in Benin City, limiting the generalizability of findings to radiography students in other institutions across Nigeria or other regions. Different institutional contexts, cultures, and student demographics may influence nomophobia patterns.
2. **Cross-sectional design:** The cross-sectional nature of the study provides only a snapshot of nomophobia prevalence and patterns at one point in time. It cannot establish causal relationships or track changes in nomophobia levels over time or across the academic journey of individual students.
3. **Self-reported data:** The study relied entirely on self-administered questionnaires, which are subject to recall bias, social desirability bias, and potential inaccuracies in reporting phone usage patterns. Students may under-report or over-report their usage due to social expectations or lack of awareness of their actual behavior.

5.6 Suggestions for Further Studies

Based on the findings and limitations of this study, the following areas are suggested for future research:

1. **Multi-institutional comparative studies:** Conduct similar studies across multiple tertiary institutions in Nigeria(federal, state, and private universities) to compare nomophobia prevalence and patterns, enabling better generalization of findings and identification of institution-specific factors.
2. **Longitudinal studies:** Design longitudinal studies that follow radiography students from entry(100L) through graduation(500L) to track changes in nomophobia levels, identify critical periods of vulnerability, and assess the long-term impact of nomophobia on academic and professional outcomes.
3. **Comparative studies across healthcare programs:** Compare nomophobia prevalence and patterns among students in different healthcare disciplines(radiography, nursing,

medicine, pharmacy, physiotherapy) to identify program-specific risks and protective factors.

4. **Objective measurement of phone usage:** Incorporate objective measures of smartphone use through app-based tracking, screen time data, or wearable technology to validate self-reported usage patterns and provide more accurate data for analysis.
5. **Intervention studies:** Design and implement intervention studies testing the effectiveness of various approaches to managing nomophobia, such as CBT, mindfulness-based interventions, digital detox programs, or peer support groups, using randomized controlled trial designs where feasible.

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APPENDIX I

Questionnaire

Department of Radiography

School of Basic Medical Sciences

University of Benin, Benin City

INFORMED CONSENT

Dear Participant,

You are invited to participate in a research study on nomophobia (no mobile phone phobia) and mobile phone usage patterns among radiography students. Your participation is voluntary and all information provided will be kept strictly confidential. The questionnaire will take approximately 10-15 minutes to complete.

By completing this questionnaire, you consent to participate in this study.

Please tick: ☐ I agree to participate in this study

SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS

Instructions: Please tick (✓) the appropriate box or fill in the required information.

1. **Age:** _____ years
2. **Gender:** ☐ Male ☐ Female
3. **Academic Level:** ☐ 100L ☐ 200L ☐ 300L ☐ 400L ☐ 500L
4. **Marital Status:** ☐ Single ☐ Married ☐ Divorced/Separated ☐ Widowed
5. **Current Residence:** ☐ On-campus ☐ Off-campus
6. **Current CGPA:** ☐ Below 2.50 ☐ 2.50-3.49 ☐ 3.50-4.49 ☐ 4.50-5.00

SECTION B: MOBILE PHONE USAGE PATTERNS

Instructions: Please tick (✓) the most appropriate response.

8. **Phone Type:** ☐ Smartphone ☐ Basic phone ☐ Both
9. **Duration of Use:** ☐ <2 years ☐ 2-5 years ☐ 6-10 years ☐ >10 years
10. **Daily Usage Hours:** ☐ <2hrs ☐ 2-4hrs ☐ 5-7hrs ☐ 8-10hrs ☐ >10hrs
11. **Daily Check Frequency:** ☐ <10 times ☐ 10-30 times ☐ 31-50 times ☐ 51-100 times ☐ >100 times
12. **Primary Uses (tick all that apply):** ☐ Calls ☐ Messaging ☐ Social media ☐ Internet ☐ Education ☐ Entertainment ☐ Photography ☐ Banking ☐ Navigation ☐ Shopping ☐ Others specify_____
13. **Sleep with Phone:** ☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
14. **Low Battery Feeling:** ☐ Very anxious ☐ Moderately anxious ☐ Slightly concerned ☐ Not bothered
15. **Physical Symptoms:** ☐ Yes, frequently ☐ Yes, occasionally ☐ Yes, rarely ☐ No, never

SECTION C: NOMOPHOBIA ASSESSMENT (NMP-Q)

Instructions: Please read each statement carefully and indicate how much you agree or disagree with each statement by circling the appropriate number.

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Neither Agree nor Disagree, 5 = Slightly Agree, 6 = Agree, 7 = Strongly Agree

No.	Statement	1	2	3	4	5	6	7
16.	I would feel uncomfortable without constant access to							

No.	Statement	1	2	3	4	5	6	7
	information through my smartphone							
17.	I would be annoyed if I could not look information up on my smartphone when I wanted to do so							
18.	Being unable to get the news (e.g., happenings, weather, etc.) on my smartphone would make me nervous							
19.	I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so							
20.	Running out of battery in my smartphone would scare me							
21.	If I were to run out of credits or hit my monthly data limit, I would panic							
22.	If I did not have a data signal or could not connect to Wi-Fi, I would constantly check to see if I had a signal or could find a Wi-Fi network							
23.	If I could not use my smartphone, I would be afraid of getting stranded somewhere							
24.	If I could not check my smartphone for a while, I would feel a desire to check it							
25.	If I did not have my smartphone with me, I would feel nervous because I could not instantly communicate with my family and/or friends							
26.	If I did not have my smartphone with me, I would be worried because my family and/or friends could not reach me							
27.	If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text messages							

No.	Statement	1	2	3	4	5	6	7
	and calls							
28.	If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends							
29.	If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get a hold of me							
30.	If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken							
31.	If I did not have my smartphone with me, I would be nervous because I would be disconnected from my online identity							
32.	If I did not have my smartphone with me, I would be uncomfortable because I could not stay up-to-date with social media and online networks							
33.	If I did not have my smartphone with me, I would feel awkward because I could not check my notifications for updates from my connections and online networks							
34.	If I did not have my smartphone with me, I would feel anxious because I could not check my email messages							
35.	If I did not have my smartphone with me, I would feel uncomfortable because I could not check my smartphone for any reason							

APPENDIX II

RESEARCH ETHICS COMMITTEE
COLLEGE OF MEDICAL SCIENCES
UNIVERSITY OF BENIN, BENIN CITY, NIGERIA.

Chairman: Prof. F. A Imarhiagbe
MBChb, FMCP
Cert Clin Res and ethics (NIH), MD.
0803449092

P.M.B 1154, BENIN CITY
Email: researchethics.cms@gmail.com

Our Ref: CMS/REC/01/VOL.2/797 **Date:** 9th October, 2025

Re: NOMOPHOBIA: A CROSS-SECTIONAL STUDY TO ASSESS MOBILE PHONE USAGE AMONG RADIOGRAPHY STUDENTS IN A TERTIARY INSTITUTION, BENIN CITY

Name of Principal Investigator: **UTOMWEN GODSTIME**
Department Of Radiography,
School of Basic Medical Science
College of Medical Sciences,
University of Benin

REC Approval No: **CMS/REC/2025/797**

This is to inform you that the research described in the submitted proposal, the Informed Consent Forms and other participant information materials have been reviewed and approved by the College Research Ethics Committee, University of Benin.

This approval dates from **9th October, 2025 to 10th October, 2025.** In multi-year research, Endeavour to submit your annual report to the REC early in order to obtain renewal of your approval and avoid disruption of your research.

The National Code of Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the REC. No, changes are permitted in the research without prior approval by REC except in circumstances outlined in the code. REC reserves the right to conduct compliance visit to your research site without prior notice. Thank you.

PROF. F.A IMARHIAGBE
Chairman, REC

Promoting best ethical & scientific standard for research in Nigeria