Journal of Community Medicine & Public Health
Alkhalaf BN, et al. J Community Med Public Health 8: 439
www.doi.org/10.29011/2577-2228.100439
www.gavinpublishers.com

OPEN ACCESS

GAVIN PUBLISHERS

Research Article

Risk Factors Related to Mobile Phones Use among Higher Education Students in Kuwait: Cross-Sectional Study

Bader N Alkhalaf[1*], Fahad A Alammar[2], Jawaher A Al-Moumen[3]

[1]Department of Environmental Health, College of Health Sciences, Public Authority for Applied Education and Training, Kuwait

[2]Department of Food and Nutrition Science, College of Health Sciences, Public Authority for Applied Education and Training, Kuwait

[3]Jawaher A. Al-Moumen, Secretarial and Office Administration Institute, Public Authority for Applied Education and Training, Kuwait

[*]**Corresponding author:** Bader N Alkhalaf, Department of Environmental Health, College of Health Sciences, Public Authority for Applied Education and Training, Kuwait

Citation: Alkhalaf BN, Alammar FA, Al-Moumen JA (2024) Risk Factors Related to Mobile Phones Use among Higher Education Students in Kuwait: Cross-Sectional Study. J Community Med Public Health 8: 439. DOI: https://doi.org/10.29011/2577-2228.100439

Received Date: 14 May, 2024; **Accepted Date:** 20 May, 2024; **Published Date:** 23 May, 2024

Introduction

Mobile phones have transformed global communication and information access, leading to profound changes in how people interact and share knowledge. Their swift integration into everyday life has provided clear benefits across many areas of society [1]. In education, mobile phones offer the ability to enrich learning, promote collaboration between students and teachers, and provide flexibility in managing coursework [2,3]. This easy access allows students to connect with classmates, tap into learning resources, and engage with academic support systems, thus fostering a more dynamic educational experience [4]. Nonetheless, the pervasive use of mobile phones has also raised concerns regarding potential negative effects on both physical and mental health [5].

Research has increasingly examined the link between mobile phone usage and various health issues, such as headaches, sleep problems, ear pain, eye strain, and difficulties with concentration [5-7]. Research indicates that both the electromagnetic radiation emitted by mobile phones and the behavioral habits associated with their use may contribute to these adverse effects [8]. While exposure to electromagnetic radiation typically falls within established safety thresholds, ongoing discussions persist regarding potential long-term health consequences warranting further examination [8-10]. Extended engagement with mobile devices for activities like reading or watching videos at close range can induce eye strain and visual fatigue, commonly termed "Computer Vision Syndrome" [11].

Moreover, studies have investigated the link between mobile phone usage patterns and sleep quality, suggesting that late-night usage and the blue light emitted from screens may disrupt natural sleep cycles, affecting alertness and overall well-being [12,13]. Excessive mobile phone use has also been associated with a potential risk of addiction, particularly among younger individuals [14]. This addiction can lead to neglect of essential routines, academic responsibilities, and in-person social interactions, negatively impacting users' mental health [15].

The examination of potential health risks from mobile phone usage has become a pressing concern, particularly among student populations. Young adults, who are among the most active users of mobile devices, often spend extensive time on their phones for several reasons, including academic work, social interactions, and entertainment [14]. This sustained usage may increase their vulnerability to the adverse effects linked with mobile phone overuse. Research conducted with university students in multiple countries has shown correlations between prolonged phone use and physical issues such as musculoskeletal pain, eye strain, headaches, and sleep disturbances [16-18]. Additionally, excessive mobile phone use can lead to psychological effects like increased distraction, reduced focus, and problematic internet habits, which are particularly concerning within an academic setting where sustained attention and focus are crucial.

While research on the relationship between mobile phones and health is growing, it has primarily focused on Western industrialized nations, making the generalization of findings to other regions with different usage patterns and cultural contexts challenging. Specifically, in the Middle East, the topic of the effects of mobile phone use, particularly among students, has not yet received sufficiently in-depth investigation. This lack of research extends to the State of Kuwait, where mobile phone penetration is significantly high [19]. The country is particularly relevant for deeper inquiry due to its young population and rapidly developing higher education sector [20].

Understanding the risk factors associated with mobile phone use, the prevalence of health complaints, and the possible impacts on higher education students in Kuwait is crucial for developing appropriate public health guidelines and educational interventions. Current research remains insufficient to fully understand the health complexities tied into the intensive use of mobile phones, particularly within this specific sociocultural context. A closer examination of the relationship between mobile phone usage patterns, demographic factors, and health complaints among students in Kuwait is therefore warranted.

This study intends to bridge the existing knowledge gap by conducting a detailed cross-sectional analysis of the risk factors related to mobile phone usage and their impact on the health of university students in Kuwait. The primary goal is to examine how different variables—such as mobile phone usage patterns, demographic details, and existing health conditions—might be connected to various health issues commonly associated with mobile phone use. To achieve this, the study will focus on answering key research questions like:

RQ1: How common are specific health issues among higher education students in Kuwait?

RQ2: Do demographic factors affect the frequency of health complaints related to mobile phone use?

RQ3: What is the relationship between mobile phone usage patterns and reported health issues?

Literature Review

This literature review explores how mobile phone use shapes higher education experience, focusing on potential health consequences. It examines patterns of student usage, investigating links between use and both physiological and psychological effects. The review pays close attention to studies exploring how factors like demographics or specific habits might make some students more susceptible to health concerns. Particular interest is given to research conducted within Kuwait or the greater Middle East. This analysis will surface key trends, pinpoint knowledge gaps, and provide a durable foundation for the present cross-sectional study. This study delves into risk factors linked to mobile phone use among higher education students in Kuwait.

Patterns of Mobile Phone Use among Higher Education Students

Research into university student mobile phone usage reveals an innate interrelationship between technology, individual purpose, and the broader social environment. Studies across Kuwait, Oman, and Türkiye illustrate both shared habits and subtle differences in how students use these devices within and outside of the classroom [21,22]. One universal theme is the smartphone's dominance over simpler phones. This mirrors a wider trend, opening doors to constant connectivity, effortless multitasking, and an ever-growing range of applications vital for the modern university experience [23,24].

Studies within the Gulf region offer a window into how Kuwaiti students interact with mobile phones. In Kuwait, research shows a clear pattern where students use their smartphones most heavily at home, but also while traveling, on campus, and during leisure time [25]. This paints a picture of the mobile phone's deep integration into the fabric of students' lives, effortlessly spanning both work and relaxation. Alzougool and AlMansour's (2017) findings also illustrate the phone's place in formal education which is Kuwaiti students extensively use them to access learning systems, check exam dates, and complete other university tasks. This underscores the growing importance of mobile devices as tools for academic success [25].

Furthermore, research from the Middle East reveals how mobile phone usage adapts to modern technologies and shifting generational tastes. Belwal et al.'s (2022) study in Oman tracked a marked decline in Nokia's once-unrivaled popularity, with Apple and Samsung dominating the market [23]. This trend mirrors global smartphone advancements and highlights young users' preference for feature-rich devices. Interestingly, this study also found that students are becoming less dependent on parents for phone subscriptions. This suggests a connection between growing financial autonomy and greater individual phone ownership – a shift that influences how extensively young people use their mobiles.

Atas and Çelik's (2019) cross-sectional study of Turkish university students offers a valuable comparison point to those conducted in Kuwait and Oman [22]. Their work aligns with regional findings of heavy smartphone reliance, with students averaging five hours of daily use, concentrated in evening and nighttime hours. Mirroring trends in the Gulf region [21,23], this study reinforces the dominance of social media and messaging apps in student engagement. Across Türkiye, Kuwait, and Oman,

behaviors like texting, web searches, and frequent device checks underscore a pattern of deeply integrated smartphone usage.

Students wield their smartphones for a multitude of reasons, hinting at how these devices influence both their studies and personal lives. Studies like Alzougool and AlMansour's (2017) from Kuwait show social networking dominates smartphone use, a trend seen globally by the popularity of chat and social media apps [25]. While this digital connection offers clear benefits, research like Kaysi et al.'s (2021) reveals a puzzling gap that despite their constant presence, smartphones remain underutilized as deliberate learning tools [26]. This suggests a significant opportunity to thoughtfully integrate smartphones into educational strategies, potentially unlocking new avenues for student success.

Research consistently shows that demographic factors significantly shape how students use mobile phones for learning. In Kuwait, studies reveal that gender, academic major, nationality, age, and level of study can all influence these patterns [25]. Likewise, in Oman, male students tend to use a wider array of mobile features and apps with greater frequency than their female peers [23]. These findings make it clear that understanding the health impacts of mobile phones means considering how demographics might drive both the amount of time spent on devices and the types of activities students engage in.

Previous research on mobile phone usage often relied on self-reports, which can be unreliable. Kaysi et al.'s (2021) study takes a groundbreaking approach by directly tracking smartphone usage with an app [26]. Their results are concerning, showing that university students in their sample used their phones for an average of 317 minutes daily. Crucially, the study's qualitative findings show this is not just about time spent. Students report physical issues and struggle to concentrate on their studies – a clear indication their phone habits are causing significant harm.

Health Effects Associated with Mobile Phones

Intensive research explores the connection between mobile phone use and potential health risks, especially related to the brain, sleep patterns, and eyesight. A central question concerns the biological impact of electromagnetic radiation (EMR) emitted by these devices [8]. Malik's analysis highlights how non-ionizing radiofrequency waves may interact with human tissue. This raises concerns about changes in nerve cell activity, metabolism, chemical balance within the brain, and even the potential for brain tumors [8]. While phone manufacturers strive to limit EMR exposure, the long-term effects of frequent and prolonged phone use remain a significant point of discussion within the scientific community.

Deniz et al. (2017) added important insight by focusing on the hippocampus, a brain region crucial for memory formation [10]. Their cross-sectional study of female medical students revealed an intriguing finding: hippocampal volume and structure seemed unaffected by phone usage levels. However, those with higher mobile phone exposure demonstrated decreased performance on attention-demanding tasks. This suggests that EMR might subtly influence cognitive processes like concentration, even if it does not cause overt changes in brain structure [10].

Excessive smartphone use goes far beyond the question of screen time. It is increasingly linked to a troubling range of physical and mental health risks. Wacks and Weinstein's (2021) review offers a stark picture that depression, anxiety, substance abuse, impulsive behaviors, and sleep problems all appear more common in those with heavy phone use [5]. Even the structure of the brain may be altered. Young people, with their developing brains and social lives, seem particularly vulnerable to the negative impact of unregulated smartphone engagement.

Ratan et al.'s (2022) investigation of smartphone addiction (SA) among young Bangladeshis reveals troubling findings [6]. Their study found that a significant portion of the young adult population (61.4%) exhibits addictive smartphone behaviors. This addiction is not without consequences. SA directly correlates with poorer physical health, including insomnia and obesity. It also increases the likelihood of mental health struggles like anxiety and depression. These results highlight the urgent need for interventions that promote balanced and healthy relationships with technology.

The way students use their smartphones at bedtime is a growing concern and with good reason. Research by Elsheikh et al. (2023) reveals that bedtime phone use is shockingly common among medical students, and it comes at a cost [12]. Students who cannot put their phones down struggle to fall asleep, stay asleep, and get enough sleep overall. This isn't just inconvenient, but it directly harms their academic performance. Beyond sleep itself, studies like Falkenberg et al. (2020) point to a diverse set of worries [17]. Even students with healthy eyes can end up with headaches, stiff necks, and eye strain when they use their phones too much, and too close to their faces. Guiding students towards healthier screen habits is necessary – for better sleep, better grades, and better overall well-being.

Intriguingly, some studies offer an alternative perspective on the presumed negative health impacts of mobile phones. In their analysis of the Ravansar non-communicable diseases (RaNCD) cohort study, Amiri et al. (2022) discovered a surprising negative correlation between blood pressure and mobile phone use in women [27]. Although these findings require further investigation, the researchers hypothesize that increased mobile phone usage may facilitate stress reduction and stronger social bonds, potentially leading to improved cardiovascular health. This hints at the possibility of unanticipated benefits stemming from

our ubiquitous mobile devices.

Risk Factors for Mobile Phone-Related Health Effects

Numerous studies have explored the factors that make individuals more prone to the detrimental health effects of mobile phone use. For instance, Thomée et al.'s (2011) insightful study of young adults reveals a vital connection between mental health and the psychosocial dimensions of mobile phone usage [28]. The study found that high-frequency use was significant, but even more influential were qualitative factors such as the stress of constant availability, the perception of overuse, and the pressure to always be connected. Crucially, these psychosocial risks continued to predict stress, poor sleep, and depressive symptoms even after one year, highlighting the lasting impact of our attitudes towards mobile devices on our well-being [28].

Wacks and Weinstein's (2021) extensive research solidify the troubling link between excessive smartphone use and numerous physical and mental health concerns [5]. Their work revealed that women, and individuals who are highly focused on their phones, tend to display more addictive behaviors. Furthermore, certain usage patterns – like intensive social media engagement – were connected to heightened impulsiveness, lowered self-esteem, and disrupted sleep. These findings underscore the several ways smartphone habits, personal factors, and potential long-term health risks may tragically intertwine.

Studies on the connections between screen time and health problems consistently highlight the adverse impact of specific usage patterns. Nakshine et al.'s (2022) review outlines the detrimental effects of excessive screen time, including sleep disruption, increased risks of obesity and cardiovascular disease, and worsened symptoms of depression and anxiety [29]. A primary concern is the way blue light from screens suppresses melatonin production, particularly at night, leading to a cascade of negative consequences for sleep and overall well-being [29]. Smartphones in the bedroom compound the issue, with notifications disrupting sleep and shortening its duration.

Csibi et al.'s (2021) study on problematic smartphone use highlights the significant disparities in vulnerability across different age groups [30]. Young adults (20-34 years) emerge as particularly susceptible, scoring highly on addiction measures. This is likely influenced by an intense focus on their devices, alongside a reliance on smartphones for emotional regulation. Concerningly, younger children also exhibit risk factors, underlining the importance of early and sustained intervention. These findings emphasize the need for tailored approaches that safeguard against the potential long-term health impacts of excessive smartphone engagement, considering the unique risk profiles of each developmental stage.

Chen et al.'s (2017) research into smartphone addiction among Chinese college students highlights a concerning link between specific app usage patterns and mental health risks [31]. Their study suggests gender plays a distinct role where males who frequently use game apps and females who engage heavily with multimedia and social networking apps appear more susceptible to addiction. This finding underscores the need for targeted interventions that address the unique ways smartphone use can become problematic. Furthermore, the study establishes a strong correlation between smartphone addiction and conditions like anxiety, depression, and poor sleep quality, affecting both genders.

The research thus far consistently highlights that prolonged mobile phone use, the presence of the phone in bedrooms, nighttime screen exposure, and emotionally driven usage patterns all elevate the risk of sleep disturbances. Sleep problems appear to be a crucial factor that could link mobile phone use with a cascade of other negative health outcomes, spanning from mental well-being and cognitive function to obesity and cardiovascular disease [5,29]. Furthermore, several studies emphasize that the psychosocial aspects of mobile phone use are integral to understanding addiction and adverse health effects. Perceived demands on availability and concerns over accessibility can lead to heightened stress responses related to mobile phones, which themselves become risk factors for mental health concerns [28]. Importantly, demographic factors such as gender and age further compound these risks, requiring both tailored support and awareness campaigns for different population groups.

The Kuwaiti Context

Kuwait presents a compelling context in which to investigate the relationship between mobile phone use and health concerns. With remarkably high mobile phone penetration rates and rapid social change, Kuwait exemplifies how mobile phones become deeply embedded in daily life. Al-Hunaiyyan and Al-Hajri's (2018) study reveals an enthusiastic embrace of mobile technology amongst instructors at the College of Business Studies [21]. This openness towards integrating mobile devices into work and educational processes highlights a broader societal trend towards technological uptake. Furthermore, Al-Hunaiyyan et al.'s (2018) work with both students and instructors across higher education institutions confirms that positive perceptions of mobile learning (m-learning) and familiarity with mobile applications are widespread [21]. This receptiveness to integrating mobile devices with learning opens avenues for exploration into the health impacts of such usage.

In Kuwait, while mobile devices offer clear educational and social potential, it is crucial to consider how cultural norms may uniquely shape their use compared to the West. Al-Hunaiyyan et al.'s (2018) work highlights a friction between connectivity's advantages and the desire to maintain personal space and privacy

[21]. This suggests that mobile phones, while increasingly ubiquitous, could potentially conflict with established expectations around social interaction and personal boundaries within Kuwaiti society. Exploring whether these tensions lead to stress or anxiety around mobile phone use would be a valuable direction for future research.

Research examining health perceptions of mobile phones in Kuwait provides important clues about key concerns. Buabbas et al.'s (2021) qualitative work with parents highlights an understanding of the health risks linked to children's overuse of smartphones [32]. Parents were primarily worried about physical issues like headaches and eye strain and behavioral changes such as anger and addiction. These findings mirror similar anxieties about mobile phone use voiced by parents and adults across diverse cultures. This suggests that a feeling of unease about technology's influence on health and well-being may be a broadly shared phenomenon, even in areas where mobile phone use is quite common.

Alqallaf's (2022) study offers a nuanced exploration of smartphone addiction among Kuwaiti youth, pinpointing its social and psychological underpinnings [33]. The research underscores a link between addiction, struggles with self-efficacy, and potential friction within both the individual and their family unit. Loneliness did not surface as a major factor. This work illuminates a complex interplay – where personality quirks and familial relationships intertwine to shape the risks posed by technology overuse.

Findings from within Kuwait resonate across the broader Middle East and North Africa (MENA) region, revealing parallels and intriguing divergences. Intensive mobile phone adoption, particularly by younger generations, paints a shared picture of deep device integration [25]. Anxieties about problematic mobile phone use among Kuwaiti parents mirror a concern rippling across the MENA region and indeed, globally. This commonality underscores a potential for regionally impactful public health initiatives; those tailored to promoting healthier technology habits may find widespread traction due to their cultural relevance.

Careful consideration must be given to the distinctive socio-cultural elements within Kuwait, for they likely shape how mobile phones are woven into students' experiences. As Al-Hunaiyyan et al. (2018) highlight, cultural expectations around personal space and time could significantly influence Kuwaiti mobile phone users' understanding of their devices' impact on well-being [21]. Additionally, Kuwait's rapid modernization and youthful population suggest a potentially unique risk for problematic smartphone use compared to other regional nations. The intersection of technological affinity, widespread device access, and shifting social dynamics might create a particular susceptibility to potential adverse health outcomes associated with mobile phone use.

Methodology

Research Design

This study adopted a cross-sectional research design to explore the potential risk factors stemming from mobile phone use, and their related health impacts among Kuwaiti higher education students. A cross-sectional approach proved ideal, allowing researchers to gather data at a specific moment in time [32]. This design facilitated the assessment of current health concerns among students, and enabled exploration of potential links between these ailments and factors like demographics, phone usage patterns, and other relevant variables. Moreover, as an observational design, it provided a practical foundation for investigating a multifaceted issue where in-depth longitudinal data might be limited [32]. The findings will inform the development of future research, paving the way for studies that may illuminate causal relationships.

Study Population

This study targeted higher education students in Kuwait's Public Authority for Applied Education and Training (PAAET) as a governmental institute. Focusing on PAAET ensured a representative sample of this significant segment of Kuwait's student population while controlling for educational level. To broaden the scope of the findings, the research included colleges and institutions from diverse disciplines within PAAET. Participants were required to be active students between 17 and 50 years old. This age range was chosen and focusing on younger adults, which tend to exhibit unique mobile phone usage patterns and potential vulnerabilities [33]. This is a self-reported specially designed questionnaire, individuals who are unable to complete the questionnaire due to language difficulties or cognitive impairments were excluded.

Sampling

To ensure unbiased results and meaningful insights, this study carefully selected participants. First, colleges and institutes in PAAET were randomly sampled. Within these institutions, a stratified approach guaranteed a balanced mix of age groups (17-26 and 27-50) and genders (male and female). This deliberate sampling controlled for potential biases, allowing for more accurate conclusions on how age and gender might affect the link between mobile phone use and health concerns [34]. A target sample of 785 was set, with a power analysis confirming that this size would provide enough statistical strength to uncover significant relationships between variables.

Data Collection

A carefully designed questionnaire was used as the primary data collection tool, aiming to capture insights across multiple important areas. The first part of the questionnaire gathered demographic details such as age, gender, governorate (place of student residence), and GPA (academic achievement) as factors potentially linked to mobile usage patterns and overall health [23]. The second section explored mobile phone habits. Participants were asked about their phone models, daily usage patterns, preferred usage locations, bedtime phone use, and their reliance on accessories. This combination of questions targeted both quantitative data (like usage time) and qualitative insights (like primary purposes), providing a well-rounded understanding of individual usage behaviors [28].

The questionnaire's concluding section focused on identifying health complaints. Participants were asked about the presence and intensity of headaches (including migraines and general pain), dizziness, earaches, poor concentration, eye irritation, and disrupted sleep. The questions carefully differentiated between ongoing health concerns and those that were occasional. This distinction is crucial for understanding the nature of the reported symptoms. Although self-reported data can have limitations, it offers invaluable insights into the participants' lived experiences with their health [33]. To ensure accuracy across different populations, the questionnaire was created in both English and Arabic, with careful translation and back-translation for consistency.

Data Analysis

Data analysis in this study employed both descriptive and inferential statistical approaches. To begin, descriptive statistics for participants were addressed. The study relied on a self-reported questionnaire tailored specifically to this research project. The questionnaire had two distinct sections. The first gathered demographic data, including gender, age, governorate of students residence and GPA, and how they used their mobile phones. Subsequently, the prevalence of each reported health complaint was determined. This calculation established the percentage of participants who experienced specific health issues, such as headaches, dizziness, or ear pain. To investigate the relationships between potential risk factors and health complaints, Person chi-square two sided test was used. Risk factors like location of residence, gender, and GPA, were cross tabulated with the various health complaints, while controlling for potential confounders. Logistic regression models were employed to examine the associations between risk factors like usage of phone, place keeping the phone, bed usage and hours with health complaints, while controlling for potential confounders. Odds ratios and their respective confidence intervals were calculated as part of this analysis to assess the strength and magnitude of any identified associations.

Ethical Considerations

Throughout this research study, ethical principles were prioritized. Before beginning the questionnaire, each participant provided informed consent. This process ensured they understood the study's aims, methods, possible risks and benefits, and their absolute right to withdraw. Participants' privacy was paramount; confidentiality and anonymity were rigorously observed. Data was de-identified and kept in secure storage, accessible only to the research team. To guarantee the ethical soundness of the work, approval was gained from an ethics review board before the study began. These steps reflect the highest standards of research ethics and demonstrate a deep commitment to protecting the well-being of the student participants.

Findings

Descriptive

Demographics

A diverse sample of 780 higher education students from PAAET colleges and institutes was carefully selected for this study. The sample demonstrated a balanced gender representation, with males comprising 48.5% of participants and females accounting for 51.5%. Students hailed from different governorates across Kuwait, with Jahra holding the largest representation at 33.6%. Most students (32.7%) achieved a GPA within the 2-2.99 range, suggesting a moderate level of academic performance. The overwhelming majority of students (91%) were between 17-26 years old, while the rest were aged 27-50 (Table 1).

Age Groups	N(%)	Gender	N(%)	GPA	N(%)	Governorate	N(%)
17-26	675(91)	Male	378(48.5)	1-1.99	36(8.8)	Asema	71(9.9)
27-50	67(9)	Female	402(51.5)	2-2.99	134(32.7)	Hawalli	71(9.9)
Total	742	Total	780	3-4	119(29)	Farwania	118(16.4)
				60-70	34(8.3)	Ahmadi	141 (19.6)
				71-80	58(14.1)	Jahra	242(33.6)
				80-95	29(7.1)	M. Alkabeer	77(10.7)
				Total	410	Total	720

Table 1: Distribution of student's age groups, gender, GPA and Governorate.

Mobile Phone Usage Patterns

Mobile phones dominate student life, with a staggering 95.4% relying on iPhones model. Usage is alarmingly high, with 69.9% of students spending five or more hours on their devices daily. Unsurprisingly, home remains the primary location for phone use (83.1%). Even in bed, phones remain a pervasive distraction with 74.3% of students admit to this habit, with a concerning 45.8% of those using their phones for an hour or longer before sleep (Table 2).

1	N(%)	2	N(%)	3	N(%)	4	N(%)	5	N(%)
IPhone	723(95.4)	1	46(6.1)	home	623(83.1)	no	194(25.7)	1	264(45.8)
Samsung	23(3)	2	180(24)	car	33(4,4)	yes	560(74.3)	2	188(32.6)
others	12(1.6)	>5	525(69.9)	others	94(12.5)			>5	125(21.7)
Total	758	Total	751	Total	750	Total	754	Total	577
1: Type of mobile phone, 2: Mobile phone use in hours, 3: Mobile phone common use place, 4: Mobile phone use in bed, 5: Mobile phone use in bed /hours									

Table 2: Distribution of participant's response to questions related to mobile phone usage patterns.

Health Complaints and Mobile Phone Habits

A remarkable 74.9% of students experienced side effects attributed to their mobile phone use. Health concerns were widespread, with students frequently reporting headaches (31.9%), and dizziness (53.9%) (Table 3). Furthermore, table 4 shows severe headaches (40.4%), difficulty concentrating (51.2%), and disrupted sleep patterns (53%). However, ear pain was less prevalent, with 71.6% of students unaffected, suggesting a weaker link between this symptom and mobile phone use. Interestingly, students were divided when it came to phone placement during sleep: 49% kept their phones close, under pillows or near their bodies, while 51% stored them further away. Phone usage peaked at night for the majority of students (57.1%). Regarding accessories, a substantial 55.8% used Bluetooth or external ear buds. Finally, pockets seemed the preferred storage option for most students (66%), hinting at a need for convenient access to their devices (Table 5).

1	N(%)	2	N(%)	3	N(%)	4	N(%)
no	80(10.6)	no	512(68.1)	pain when I wake up	120(45.6)	no	334(46.1)
yes	565(74.9)	yes	240(31.9)	pain during sleep	52(19.8)	yes	390(53.9)
do not know	109(14,5)			pain all day	91(34.6)		
Total	754	Total	752	Total	263	Total	724
1: Mobile phone side effect, 2: Do you suffer from headache or head pain regularly, 3: Headache or head pain some times, 4: Do you suffer from dizziness some times							

Table 3: Distribution of participant's response to questions related to health complaints.

Response	1-N(%)	2-N(%)	3-N(%)	4-N(%)	5-N(%)
no	433(95.6)	516(71,6)	353(48.8)	507(70.4)	341(47)
yes	293(40.4)	205(28.4)	370(51.2)	213(29.6)	384(53)
Total	726	721	723	720	725
1: Do you suffer from severe headaches some times, 2: Do you suffer from ear pain some times, 3: Do you suffer from lack of concentration some times, 4: Do you suffer from eye redness some times, 5: Do you suffer from sleep disturbance some times					

Table 4: Distribution of participant's response to questions related to other health complaints.

1	N(%)	2	N(%)	3	N(%)	4	N(%)
under pillow or body	353(49)	day time	306(42.9)	Bluetooth	200(27,8)	In Bag	246(33.9)
away from body	368*51)	night time	408(75.1)	External	202(28.1)	In pocket	479(66.1)
				Do not use	318(44,2)		
Total	721	Total	714	Total	720	Total	726
1: Where do you put your mobile phone during sleep, 2: When you mostly use your mobile phone, 3: Do you use mobile phone accessories, 4: What is the best place for you to keep your mobile phone							

Table 5: Distribution of participant's response to questions related to phone usage, placement, and use of accessories.

Prevalence of Health Complaints Demographically

A close examination of health complaint prevalence uncovered intriguing patterns. Gender emerged as a key factor, with females reporting fewer instances of regular headaches, dizziness, ear pain, and eye redness than males. Males, on the other hand, were more prone to difficulties with concentration and disrupted sleep patterns (Table 6).

Variable	Male No yes	Female No yes
Headaches N=748	201(55.4) 162(44.6)	310(80.5) 75(19.5)
Dizziness N=720	102(28.9) 251(71.1)	230(62.7) 137(37.3)
Ear pain N=717	210(59.5) 143(40.5)	304(83.5) 60(16.5)
Poor concentration N=719	112(31.8) 240(68.2)	239(65.1) 128(34.9)
Eye redness N=716	209(59.9) 140(40.1)	296(80.7) 71(19.3)
Sleep disturbance N=721	110(31.2) 243(68.8)	229(62.2) 139(37.8)
(All chi-square results were >p= 0.00)		

Table 6: Cross tabulation between student's gender and health complaints.

Surprisingly, the link between GPA groups and health complaints proved more elusive. Students with low GPA suffers significantly more headaches, dizziness, and poor concentration. Whereas, symptoms of eye redness and sleep disturbance were significantly more frequent in the high achievers group (Table 7).

Variable	1 No yes	2 No yes	3 No yes	p-value
Headaches N=276	18(51.4) 17(48.6)	100(78.7) 27(21.3)	73(64) 41(36)	**0.002**
Dizziness N=267	8(23.5) 26(76.5)	71(58.7) 50(41.3)	44(39.3) 68(60.7)	**0.000**
Ear pain N=265	19(55.9) 15(44.1)	90(75.6) 29(24.4)	78(69.6) 34(30.4)	0.080
Poor concentration N=267	11(32.4) 23(67.6)	68(56.2) 53(43.8)	49(43.8) 63(56.3)	**0.025**
Eye redness N=263	23(69.7) 10(30.3)	97(80.2) 24(19.8)	69(63.3) 40(36.7)	**0.017**
Sleep disturbance N=266	15(45.5) 18(54.5)	69(57) 52(43)	39(34.8) 73(65.2)	**0.003**
1-GPA =1-1.99, 2-GPA=2-2.99,3-GPA=3-4				

Table 7: Cross tabulation between students GPA and health complaints.

While students' governorate of residence was considered, the prevalence of most health complaints showed little geographical variation. Headaches, dizziness, ear pain, poor concentration, and sleep disturbances lacked any strong association with specific governorates. However, Hawali seems to have more complaints regarding poor concentration and eye redness variables, with significant difference than the other students living in other residential areas (Table 8). This could be considered as minor differences in reports of concentration issues and eye redness, yet without a discernible pattern.

Variable	1 No yes	2 No yes	3 No yes	4 No yes	5 No yes	6 No yes
Headaches F N=691 % p-value=0.28	52 17 75.4 24.6	45 24 65.2 34.8	83 30 73.5 26.5	147 83 63.9 36.1	97 39 71.3 28.7	48 26 64.9 35.1
Dizziness F N=667 % p-value=0.08	31 36 46.3 53.7	27 44 38 62	51 57 47.2 52.8	103 124 45.4 54.6	71 56 55.9 44.1	24 43 35.8 64.2
Ear pain F N=664 % p-value=0.48	47 19 71.2 28.8	53 17 75.7 24.3	75 33 69.4 30.6	153 73 67.7 32.3	97 29 77 23	50 18 73.5 26.5

Poor concentration F N=666 % p-value=**0.01**	30 37 44.8 55.2	25 45 36.6 63.4	52 56 48.1 51.9	106 119 47.1 52.9	79 48 62.2 37.8	32 36 47.1 52.9
Eye redness F N=664 % p-value=**0.02**	54 12 81.8 18.2	44 27 62 38	78 30 72.2 27.8	152 75 67 33	99 27 78.6 21,4	43 23 65.2 34,8
Sleep disturbance F N=667 % p-value=0.09	35 32 52.2 47.8	26 45 36.6 63,4	58 50 53.7 46.3	99 128 43.6 56.4	67 59 53.2 46.8	28 40 41.2 58,8
F= frequency, %=proportions, 1=Asema, 2=Hawalli, 3=Farwania, 4=Jahra, 5=Ahmadi, 6=M.Alkabeer						

Table 8: Cross tabulation between student's residence and health complaints.

These findings imply that gender and GPA differences play a more decisive role than location in predicting the frequency of health complaints. The data consistently reveals a higher occurrence of certain health issues; among males compared to females, and distinctive difference between low and high achievers.

Logistic Regression Results

Analyses using logistic regression uncovered a number of critical connections between mobile phone usage habits, and the occurrence of health issues. A particularly stark finding was the robust link between daily phone usage time and several negative health outcomes. Extended hours of daily mobile phone engagement directly correlated with increased reports of headaches, dizziness, concentration difficulties, ear pain, eye redness, and disrupted sleep patterns (Tables 9-14). Additionally, the specific practice of using a mobile phone while in bed was found to increase the likelihood of concentration problems and ear pain (Tables 11,12). These results underscore the possibility of context-specific consequences stemming from mobile phone use. Importantly, the Cox & Snell and Nagelkerke R Square values signal that the models used offer only a moderate capacity to predict outcomes. This underscores that, while the study pinpoints significant risk factors, a considerable portion of the variation in health complaints could stem from elements outside the study's scope.

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Mobile phone use in hours	.542	.218	6.181	1	**.013**	1.719
Mobile phone common use place	.127	.135	.891	1	.345	1.136
Mobile phone use in bed	.114	.476	.057	1	.811	1.121
Mobile phone use in bed / hours	.270	.122	4.897	1	**.027**	1.310
Constant	-2.922	1.157	6.382	1	.012	.054
a. Variable(s) entered on step 1: Mobile phone use in hours, Mobile phone common use place, Mobile phone use in bed, Mobile phone use in bed / hours.						

Table 9: Logistic regression analysis between suffers from headache and risk factors.

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Mobile phone use in hours	.660	.194	11.533	1	**.001**	1.935
Mobile phone common use place	-.005	.146	.001	1	.971	.995
Mobile phone use in bed	.847	.460	3.382	1	.066	2.332
Mobile phone use in bed / hours	.165	.129	1.643	1	.200	1.180
Constant	-3.544	1.136	9.728	1	.002	.029

a. Variable(s) entered on step 1: Mobile phone use in hours, Mobile phone common use place, Mobile phone use in bed, Mobile phone use in bed / hours.

Table 10: Logistic regression analysis between suffers from dizziness and risk factors.

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Mobile phone use in hours	0.522	0.196	7.069	1	**0.008**	1.686
Mobile phone common use place	-0.085	0.144	0.351	1	0.554	0.918
Mobile phone use in bed	1.752	0.568	9.495	1	**0.002**	5.765
Mobile phone use in bed / hours	0.183	0.127	2.088	1	0.148	1.201
Constant	-5.165	1.325	15.191	1	0	0.006

a. Variable(s) entered on step 1: Mobile phone use in hours, Mobile phone common use place, Mobile phone use in bed, Mobile phone use in bed / hours.

Table 11: Logistic regression analysis between suffers from poor concentration and risk factors.

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Mobile phone use in hours	0.679	0.25	7.367	1	0.007	1.972
Mobile phone common use place	0.016	0.151	0.011	1	0.918	1.016
Mobile phone use in bed	2.173	1.037	4.386	1	0.036	8.782
Mobile phone use in bed / hours	0.224	0.129	3.029	1	0.082	1.251
Constant	-8.201	2.213	13.728	1	0	0

a. Variable(s) entered on step 1: Mobile phone use in hours, Mobile phone common use place, Mobile phone use in bed, Mobile phone use in bed / hours.

Table 12: Logistic regression analysis between suffers from ear pain and risk factors.

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Mobile phone use in hours	0.624	0.233	7.161	1	**0.007**	1.866
Mobile phone common use place	-0.112	0.152	0.539	1	0.463	0.894
Mobile phone use in bed	0.579	0.577	1.009	1	0.315	1.784
Mobile phone use in bed / hours	0.049	0.128	0.144	1	0.704	1.05
Constant	-4.92	1.351	13.267	1	0	0.007

a. Variable(s) entered on step 1: Mobile phone use in hours, Mobile phone common use place, Mobile phone use in bed, Mobile phone use in bed / hours.

Table 13: Logistic regression analysis between suffers from eye redness and risk factors.

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
Mobile phone use in hours	0.535	0.195	7.518	1	**0.006**	1.708
Mobile phone common use place	-0.218	0.143	2.328	1	0.127	0.804
Mobile phone use in bed	1.491	0.526	8.035	1	**0.005**	4.44
Mobile phone use in bed / hours	0.124	0.127	0.955	1	0.329	1.132
Constant	-4.717	1.255	14.117	1	0	0.009
a. Variable(s) entered on step 1: Mobile phone use in hours, Mobile phone common use place, Mobile phone use in bed, Mobile phone use in bed / hours.						

Table 14: Logistic regression analysis between suffers from sleep disturbance and risk factors.

Discussion

Interpretation of Findings

This study's findings reveal a troubling pattern of excessive mobile phone reliance among higher education students in Kuwait, suggesting potential health risks. Students demonstrate a marked preference for iPhones and devote considerable time to their devices daily, aligning with trends observed in studies from Kuwait, Oman, and Türkiye [23,25,26]. This underscores the pivotal role smartphones occupy in both communication and academic pursuits within the region. While home use indicates a desire for privacy and focus, the widespread practice of using phones in bed is alarming. Research clearly links this behavior to sleep disruption [12], highlighting a potential health concern for this student population.

Detailed analysis highlights a disturbing relationship between prolonged mobile phone use and a concerning range of health problems. Students who rely heavily on their phones report significantly higher rates of headaches, dizziness, difficulty concentrating, ear pain, eye redness, and sleep disruption. These findings reinforce a growing body of research that links excessive smartphone usage to both physical and psychological consequences [5,6]. Using a phone in bed appears especially harmful, significantly increasing the risk of concentration issues and ear pain. These insights emphasize the importance of examining both the amount of time spent on a mobile device and the specific circumstances of its use when seeking to understand potential health hazards.

A demographic analysis reveals compelling insights. The tendency for males to report more health complaints than females align with similar findings in Kuwait and Oman [23,25]. Whether this signifies biological distinctions in how mobile phone use impacts the genders or reflects social factors influencing technology engagement and health perception, remains an open question.

The significant number of students reporting phone-related side effects is in line with concerns raised by parents in research conducted by Buabbas et al. (2021) in Kuwait [32]. This cross-generational concern highlights a growing awareness of the potential for mobile devices to harm health. While electromagnetic radiation's direct physiological impacts were not studied here, the high frequency of student-reported symptoms warrants further research. Additionally, the weak link between GPA and health complaints contrasts with previous findings suggesting academic performance suffers from excessive phone use [33]. This discrepancy may stem from research design differences and demands further analysis.

Exploring Reasons and Limitations

The robust connection between extensive phone use and health concerns arises from multiple factors. Sleep disruption is a key pathway, with extended screen time and blue light from devices as likely culprits [29]. Decreased physical activity and poor posture associated with phone use can lead to discomfort such as headaches and eye strain [5]. Psychosocial aspects, like the pressure to be constantly reachable and anxieties about overuse, also weigh heavily [28]. This study brings crucial findings, yet certain limitations warrant attention. Self-reported data on both phone use and health complaints introduces potential bias. Future studies could utilize objective tracking and physiological measures to link phone habits to specific health outcomes. While the models here indicate significant relationships, the moderate R-square

values suggest that additional elements also contribute to the observed health impacts.

Public Health Recommendations

This study's findings reveal urgent public health concerns within Kuwait's higher education setting. Awareness campaigns are needed to educate students about the dangers of smartphone addiction and overuse. These campaigns should prioritize sleep hygiene, encouraging students to establish device-free periods, especially before bed. Additionally, providing guidance on using mobile phones for learning, without compromising well-being, would prove invaluable. This study offers a solid basis for such interventions, suggesting that tailored messaging for male students could significantly enhance their impact.

Conclusion

This study exposed a concerning link between mobile phone usage patterns and various health issues among Kuwaiti higher education students. Excessive daily use and practices such as using phones in bed appear to have detrimental effects. Significant gender differences emerged, with male students reporting more frequent health complaints in several areas. Given the pervasive role of mobile phones in student life, these results demand immediate public health initiatives to foster healthier technology usage. Educational campaigns, targeted support, and continued exploration of effective interventions are paramount. Such efforts will safeguard student well-being in Kuwait by addressing the potential health consequences associated with mobile phone overuse.

References

1. Mohite AV, Parchure A (2023) Smartphones and Their Impact on the Human Life.
2. Mohammadi M, Sarvestani MS, Nouroozi S (2020) Mobile phone use in education and learning by faculty members of technical-engineering groups: Concurrent mixed methods design. Front Educ 5: 16.
3. Sheikhtaheri A, Hashemi N, Hashemi NA (2018) Benefits of using mobile technologies in education from the viewpoints of medical and nursing students. Stud Health Technol Inform 251: 289-292.
4. Husnita L, Rahayuni A, Fusfitasari Y, Siswanto E, Rintaningrum R (2023) The Role of Mobile Technology in Improving Accessibility and Quality of Learning. al-fikrah: Jurnal Manajemen Pendidikan 11: 259-271.
5. Wacks Y, Weinstein AM (2021) Excessive smartphone use is associated with health problems in adolescents and young adults. Front Psychiatry 12: 669042.
6. Ratan ZA, Parrish AM, Alotaibi MS, Hosseinzadeh H (2022) Prevalence of smartphone addiction and its association with sociodemographic, physical and mental well-being: a cross-sectional study among the young adults of Bangladesh. Int J Environ Res Public Health 19: 16583.
7. Girela-Serrano BM, Spiers AD, Ruotong L, Gangadia S, Toledano MB, et al. (2022) Impact of mobile phones and wireless devices use on children and adolescents' mental health: a systematic review. Eur Child Adolesc Psychiatry 16: 1-31.
8. Malik JA (2020) Effects of electromagnetic radiation of mobile phones on the human brain. In Mobile Devices and Smart Gadgets in Medical Sciences (pp. 97-120). IGI Global.
9. Miller AB, Sears ME, Morgan LL, Davis DL, Hardell L, et al. (2019) Risks to health and well-being from radio-frequency radiation emitted by cell phones and other wireless devices. Front Public Health 7: 223.
10. Deniz OG, Kaplan S, Selçuk MB, Terzi M, Altun G, et al. (2017) Effects of short and long term electromagnetic fields exposure on the human hippocampus. J Microsc Ultrastruct 5: 191-197.
11. Chu GC, Chan LY, Do CW, Tse AC, Cheung T, et al. (2023) Association between time spent on smartphones and digital eye strain: A 1-year prospective observational study among Hong Kong children and adolescents. Environ Sci Pollut Res Int 30: 58428-58435.
12. Elsheikh AA, Elsharkawy SA, Ahmed DS (2023) Impact of smartphone use at bedtime on sleep quality and academic activities among medical students at Al-Azhar University at Cairo. Journal of Public Health, pp.1-10.
13. Alshoaibi Y, Bafil W, Rahim M (2023) The effect of screen use on sleep quality among adolescents in Riyadh, Saudi Arabia. J Family Med Prim Care 12: 1379-1388.
14. Loleska S, Pop-Jordanova N (2021) Is Smartphone Addiction in the Younger Population a Public Health Problem? Pril (Makedon Akad Nauk Umet Odd Med Nauki) 42: 29-36.
15. Alotaibi MS, Fox M, Coman R, Ratan ZA, Hosseinzadeh H (2022) Perspectives and experiences of smartphone overuse among university students in Umm Al-Qura University (UQU), Saudi Arabia: a qualitative analysis. Int J Environ Res Public Health 19: 4397.
16. Issa LF, Alqurashi KA, Althomali T, Alzahrani TA, Aljuaid AS, et al. (2021) Smartphone use and its impact on ocular health among university students in Saudi Arabia. Int J Prev Mmed 12: 149.
17. Falkenberg HK, Johansen TR, Thorud HMS (2020) Headache, eyestrain, and musculoskeletal symptoms in relation to smartphone and tablet use in healthy adolescents. Scandinavian Journal of Optometry and Visual Science 13: 8-14.
18. Gammoh Y (2021) Digital eye strain and its risk factors among a university student population in Jordan: A cross-sectional study. Cureus 13: e13575.
19. Helgi Library (2023) Mobile phone penetration (as % of population) in Kuwait.
20. Al-Shammari B, Al-Sultan W (2010) Corporate governance and voluntary disclosure in Kuwait. International Journal of Disclosure and Governance 7: 262-280.
21. Alhajri R, Al-Hunaiyyan A, Alzaid A, Al-Raqqas B (2018) An Investigation of Mobile Technology Usage among College Students. 'FEAST - International Conference on Engineering Management, Industrial Technology, Applied Sciences, Communications and Media (EITAC)', in Research Gate. London, UK.
22. Atas AH, Çelik B (2019) Smartphone use of university students:

Patterns, purposes, and situations. Malaysian Online Journal of Educational Technology 7: 59-70.

23. Belwal R, Hoque SMS, Belwal S (2022) Mobile phone usage behavior: A longitudinal study of university students in Oman. The Electronic Journal of Information Systems in Developing Countries 88: e12219.
24. Rao VV, Alwaaili MA, Al-abdali ZJ, Alshaaili FS (2023) A Study on Mobile Phone Usage by the University Students in Oman. Saudi J Bus Manag Stud 8: 1-9.
25. Alzougool B, AlMansour J (2017) The use of smartphone for learning activities by university students in Kuwait. In Proceedings of Teaching and Education Conferences (No. 4907508). International Institute of Social and Economic Sciences.
26. Kaysi F, Yavuz M, Aydemir E (2021) Investigation of University Students' Smartphone Usage Levels and Effects. International Journal of Technology in Education and Science 5: 411-426.
27. Amiri F, Moradinazar M, Moludi J, Pasdar Y, Najafi F, et al. (2022) The association between self-reported mobile phone usage with blood pressure and heart rate: evidence from a cross-sectional study. BMC Public Health 22: 2031.
28. Thomée S, Härenstam A, Hagberg M (2011) Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults-a prospective cohort study. BMC Public Health 11: 66.
29. Nakshine VS, Thute P, Khatib MN, Sarkar B (2022) Increased screen time as a cause of declining physical, psychological health, and sleep patterns: a literary review. Cureus 14: e30051.
30. Csibi S, Griffiths MD, Demetrovics Z, Szabo A (2021) Analysis of problematic smartphone use across different age groups within the 'components model of addiction'. International Journal of Mental Health and Addiction 19: 616-631.
31. Chen B, Liu F, Ding S, Ying X, Wang L, et al. (2017) Gender differences in factors associated with smartphone addiction: a cross-sectional study among medical college students. BMC Psychiatry 17: 341.
32. Buabbas AJ, Hasan H, Buabbas MA (2021) The associations between smart device use and psychological distress among secondary and high school students in Kuwait. PLoS One 16: e0251479.
33. Alqallaf J (2022) Smartphone addiction of the youth in Kuwait: An empirical research on the antecedents and the outcome. Annals of the Faculty of Arts 50: 360-377.
34. Wang X, Cheng Z (2020) Cross-sectional studies: strengths, weaknesses, and recommendations. Chest 158: S65-S71.
35. Jameel S, Shahnawaz MG, Griffiths MD (2019) Smartphone addiction in students: A qualitative examination of the components model of addiction using face-to-face interviews. J Behav Addict 8: 780-793.
36. Iliyasu R, Etikan I (2021) Comparison of quota sampling and stratified random sampling. Biom Biostat Int J Rev 10: 24-27.