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RESEARCH ARTICLE OPEN ACCESS

Perceived Health Risks Associated with Smartphone Use Among Health College Students at Qassim University in Saudi Arabia

Shereen Ahmed Ahmed Qalawa[1], Noha Mohammed Ibrahim Ibrahim[2], Hammad Ali Fadlalmola[3], Fatma Mohamed Elmansy[4] and Mohamed Goda Elbqry[4,*]

[1]*Department of Medical and Surgical, College of Nursing, Qassim University, Buraidah, Saudia Arabia and Department of Medical-Surgical Nursing, Faculty of Nursing, Port-Said University, Egypt*
[2]*Department of Nursing, College of Applied Medical sciences, University of Bisha, P.O, Box- 551 Bisha, Saudi Arabia*
[3]*Department of Community Health Nursing, Nursing College, Taibah University, Madinah, Saudi Arabia*
[4]*Department of Medical and Surgical, College of Nursing, Qassim University, Buraidah, Saudia Arabia and Department of Medical-Surgical Nursing, Faculty of Nursing, Suez Canal University, Ismailia, Egypt*

Abstract:

Background: Smartphones have evolved into a fusion of traditional personal digital assistants and cellular phones, integrating mobile communication capabilities with features parallel to those of a handheld computer.

Objective: This study aimed to assess the health risks associated with smartphone use and the prevalence and nature of observed health issues among health college students at Qassim University in Saudi Arabia.

Methods: Employing a descriptive cross-sectional research design, this study surveyed a convenience sample of 511 health college students at Qassim University. The data collection instrument comprised two sections: Section 1 assessed sociodemographic, academic, and health-related information, while Section 2 evaluated the health risks as perceived by students.

Results: The majority of the participants were women (71%) and were studying nursing (26%). A significant proportion (39.9%) reported blurred vision, while 38.6% indicated a lack of adequate sleep. Notably, no significant association was observed between the health complaints and sociodemographic information. The analysis also revealed no significant relationship between health complaints and smartphone usage patterns.

Conclusion: The findings highlight a critical need for further research to investigate the factors contributing to the effect of smartphone use on the physiological well-being of university students. Such research is essential for developing targeted interventions to mitigate the associated health risks.

Keywords: Health college students, Health risks, Perception, Saudi Arabia, Smartphone usage, Cross-sectional research design.

*Address correspondence to this author at the Department of Medical and Surgical, College of Nursing, Qassim University, P.O. Box: 51452, Buraidah City, Country; Tel/Fax: ++966560403003; E-mail: m.elbqry@qu.edu.sa

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1. INTRODUCTION

The integration of smartphones into daily life routines has yielded significant changes in communication and information access. These devices, which combine the functionalities of traditional personal digital assistants and cellular phones, have become universal across various demographic conditions. However, alongside the widespread adoption of smartphones, concerns have been raised regarding the potential health risks associated with their excessive use [1-3]. In Saudi Arabia, the prevalence of smartphone dependence has been a subject of growing research interest. The seminal study conducted by King Abdulaziz University in Jeddah revealed that 36.5% of medical students were regular smartphone users. This statistic is reflective of a broader trend wherein smartphone usage has become deeply ingrained in the daily routines of students and professionals alike [4, 5].

The implications of excessive smartphone use extend beyond mere physical health concerns. Research has indicated a correlation between heavy smartphone usage and negative outcomes in various facets of life, including decreased energy levels, disrupted sleep patterns, poor nutritional choices, weight fluctuations, diminished physical activity, and adversely affected academic performance [6, 7]. These multifaceted impacts underscore the need for a comprehensive understanding of smartphone usage patterns and their consequences. In the realm of communication, smartphones have revolutionized the way information is exchanged. Whether through speaking, writing, or other media, communication serves diverse purposes, such as inquiry, persuasion, entertainment, and information dissemination. This transformative role of smartphones in communication emphasizes their significance in modern society [8, 9].

Globally, smartphone addiction is recognized as a pressing issue, with prevalence rates varying from 9.3% to 48% in different populations [10, 11]. A recent study reported that 19.1% of individuals exhibited signs of smartphone addiction, highlighting a growing concern in the digital age. The study also noted sex differences in smartphone addiction, with women showing higher addiction rates than men. Additionally, a comparative analysis revealed that medical students were less prone to smartphone addiction than their nonmedical counterparts, suggesting variations in usage patterns across different academic disciplines [12]. The overuse of smartphones has been associated with a range of health issues, including but not limited to musculoskeletal pain, headaches, blurred vision, and hearing disorders. Furthermore, the psychological dimension of smartphone overuse manifests in forms, such as depression and altered self-esteem, adding to the complexity of the health risks associated with smartphone use [13, 14]. Therefore, this study sought to examine the perceptions of the health risks related to smartphone usage among health college students at Qassim University in Saudi Arabia.

2. MATERIALS AND METHODS

2.1. Design

This study employed a descriptive cross-sectional research design.

2.2. Setting

The study was conducted in health colleges at Qassim University.

2.3. Sample and Sampling

Once the study was approved, the convenience sampling technique was applied to recruit all available health college students enrolled at the target university. The timeframe for data collection spanned from September to November 2021, coinciding with the first semester of the 2021–2022 academic year. The participant pool comprised students from various levels who were using smartphones, totaling a convenience sample of 511 students.

2.4. Data Collection Tools

Data were collected from September to November 2021 *via* a valid electronic survey that assessed the attitudes and perceptions regarding smartphone usage among participants. This method was chosen to adhere to COVID-19 preventive measures. The survey instrument was adapted from the studies by Penglee *et al*. and Saadeh *et al*. and modified to align with the study aim [15, 16]. Participants accessed the questionnaire individually, outside of their study time, using different social networking platforms. There were no exclusion criteria applied. Each participant was allowed to complete the questionnaire once. All participants were fully informed about the objectives of the study and agreed to voluntarily participate. The link to the survey was created using OneDrive to ensure compatibility and validity with the recently established student accounts on the university platform. The link was distributed among all WhatsApp groups for faculty students. The questionnaire consisted of two main sections.

2.4.1. Section 1

Section 1 of the questionnaire collected socio-demographic, academic, and health-related data, including age, sex, living condition, academic level, academic affiliation, and problems or complaints associated with the overuse of smartphones (six items).

2.4.2. Section 2

Section 2 included a 21 item scale designed to assess the attitudes and perceptions regarding smartphone usage among students. The scale contained multiple-choice questions and true or false questions. The items involved the usage rate (six items), health risks related to smartphone use (nine items), and general feelings toward smartphones (seven items).

2.4.3. Scoring System

The health risk perception was scored using a 5-point Likert scale, where *strongly agree* was assigned a score of 5; *agree*, a score of 4; *somewhat disagree*, a score of 3;

disagree, a score of 2; and *strongly disagree*, a score of 1. The overall scale score was categorized into levels based on the responses: a *low* level for scores below 50%, a *moderate* level for scores from 50% to 75%, and a *high* level for scores of >75%.

2.4.4. Validity and Reliability

The validity of the modified survey instrument was established by consulting three experts in the fields of medical–surgical nursing (two assistant professors) and computer sciences (assistant professors) at Qassim University. These experts evaluated the tool to ensure that it effectively met the study objectives. Furthermore, the reliability of the instrument was assessed using Cronbach's alpha test, which yielded a high-reliability coefficient of 0.940.

2.4.5. Pilot Study

A pilot study was conducted on approximately 10% of the total study sample. It was performed to evaluate the content validity, relevance, and clarity of the instrument used to collect data, to determine how long it took participants to complete the instrument, and to detect any potential problems or obstacles that might occur and prevent the researchers from collecting data. Students who participated in the pilot study were also part of the main study sample because the instrument remained the same.

2.5. Data Collection Procedures

The researchers used simplified Arabic and English to gather data that were appropriate for students. This was achieved by sending academic emails to each student, collecting data outside of study hours, and using various social networking applications, such as WhatsApp. There were no requirements for exclusion. Each student was permitted to complete the questionnaire on their own. All students provided consent to participate voluntarily in the study after being fully informed of its goals, with the option to decline participation if they wished to. After 5 to 10 minutes, the questionnaire was completed and returned. The survey link was created using OneDrive so that it would work with accounts that academic students had just recently created to access the university platform.

2.6. Data Analysis

All data were collected, tabulated, and statistically analyzed using IBM SPSS Statistics for Windows (SPSS 2015; version 23.0; Armonk, NY: IBM Corp.), a rudimentary statistical program. Statistical data were presented as means ± standard deviations for quantitative variables and as frequencies (n) and percentages (%) for qualitative variables. The relationships between the general perception and attitude scores and the expert and participant characteristics were evaluated using the chi-square test. Two dependent variables were used in the marginal homogeneity test rather than just two categories. Statistical significance was set at a p-value of ≤0.05.

3. RESULTS

The study surveyed 511 health college students at Qassim University and examined the impact of smartphone overuse on various health aspects. In this section, the results are organized into sociodemographic and academic data, health complaints due to smartphone overuse, and associations with sociodemographic data and usage patterns. As shown in Table **1**, most of the participants were aged 18 to 23 years and were women (71%).

Table 1. Distribution of the students according to their sociodemographic and academic data (N=511).

Sociodemographic and Academic Data	n	%
Age (year)	-	-
■ 18–20	231	45.2
■ 21–23	244	47.7
■ ≥24	36	7.0
Sex	-	-
■ Female	363	71.0
■ Male	148	29.0
Academic level	-	-
■ 1–4	302	59.1
■ 5–7	164	32.1
■ ≥8	45	8.8
Living condition	-	-
■ With family	472	92.4
■ With relative	7	1.4
■ Alone	32	6.3

The distribution across academic affiliations revealed the highest representation from nursing (26%) and applied medical sciences (18.2%) (Fig. **1**). Most participants were in the early stages of their college education (levels 1–4) and lived with their families.

Table **2** presents the health complaints from smartphone overuse among the participants. The analysis revealed that the health issues attributed to smartphone overuse were significant. The most common complaints included stress (40.3%), blurred vision (39.9%), and inadequate sleep (38.6%).

Table 2. Distribution of the students' health problems resulting from smartphone overuse (N=511).

Health Problems Resulting from Smartphone Overuse	n	%
■ Lightheadedness	121	23.7
■ Blurred vision	204	39.9
■ Wrist pain	28	5.5
■ Back pain	181	35.4
■ Fatigue	148	29.0
■ Inadequate sleep	197	38.6
■ Withdrawal	91	17.8
■ Discomfort	169	33.1
■ Low self-confidence	43	8.4
■ Stress	206	40.3

As shown in Table **3**, there was no significant

relationship between the health complaints and sociodemographic and academic factors, such as age, sex, academic affiliation, or academic level. These findings suggest that the observed health issues are pervasive across different sociodemographic contexts.

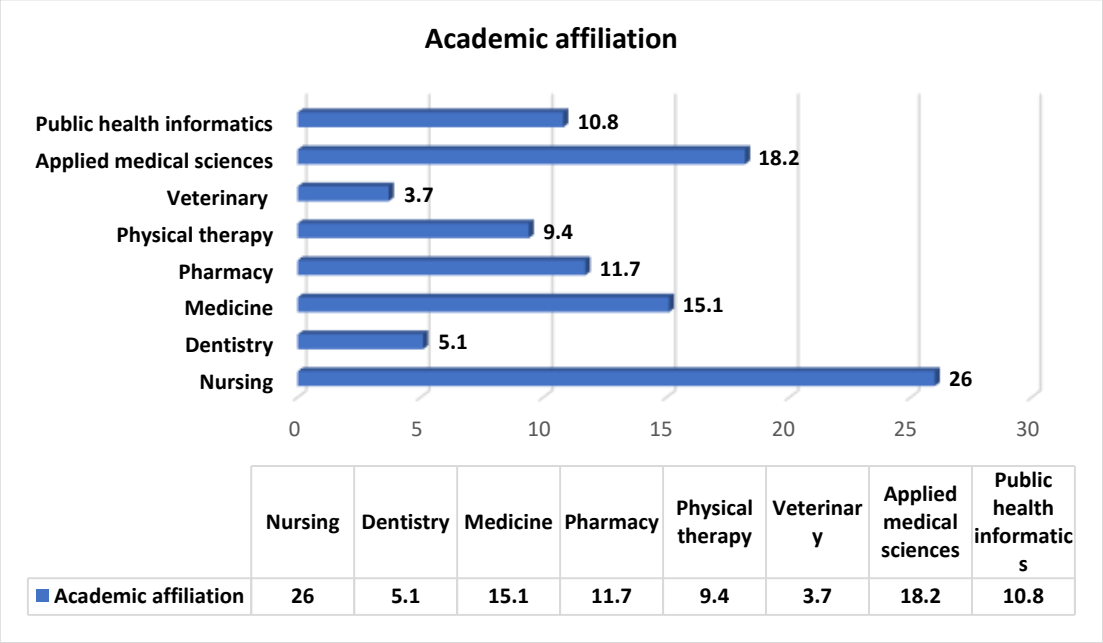

Fig. (1). Distribution of the students according to their academic affiliation (N=511).

Table 3. Distribution of the students' health complaints resulting from smartphone overuse according to their sociodemographic and academic data (N=511).

Sociodemographic and Academic Data	Inadequate Sleep	Withdrawal	Discomfort	Low Self-confidence	Stress
Age (year)	No	Yes	No	Yes	No
■ 18–20	146 (46.5%)	85 (43.1%)	188 (44.8%)	43 (47.3%)	152 (44.4%)
■ 21–23	148 (47.1%)	96 (48.7%)	201 (47.9%)	43 (47.3%)	163 (47.7%)
■ ≥24	20 (6.4%)	16 (8.1%)	31 (7.4%)	5 (5.5%)	27 (7.9%)
Sex	No	Yes	No	Yes	No
■ Female	222 (70.7%)	141 (71.6%)	295 (70.2%)	68 (74.7%)	241 (70.5%)
■ Male	92 (29.3%)	56 (28.4%)	125 (29.8%)	23 (25.3%)	101 (29.5%)
Academic affiliation	No	Yes	No	Yes	No
■ Nursing	86 (27.4%)	47 (23.9%)	112 (26.7%)	21 (23.1%)	98 (28.7%)
■ Medicine	53 (16.9%)	24 (12.2%)	65 (15.5%)	12 (13.2%)	49 (14.3%)
■ Pharmacy	32 (10.2%)	28 (14.2%)	50 (11.9%)	10 (11.0%)	40 (11.7%)
■ Physical therapy	32 (10.2%)	16 (8.1%)	40 (9.5%)	8 (8.8%)	30 (8.8%)
■ Dentistry	17 (5.4%)	9 (4.6%)	22 (5.2%)	4 (4.4%)	21 (6.1%)
■ Applied medical sciences	53 (16.9%)	40 (20.3%)	70 (16.7%)	23 (25.3%)	54 (15.8%)
■ Veterinary medicine	9 (2.9%)	10 (5.1%)	16 (3.8%)	3 (3.3%)	11 (3.2%)
■ Public health informatics	32 (10.2%)	23 (11.7%)	45 (10.7%)	10 (11.0%)	39 (11.4%)
Academic level	No	Yes	No	Yes	No
■ 1–4	197 (62.7%)	105 (53.3%)	245 (58.3%)	57 (62.6%)	195 (57.0%)
■ 5–7	91 (29.0%)	73 (37.1%)	140 (33.3%)	24 (26.4%)	115 (33.6%)
■ ≥8	26 (8.3%)	19 (9.6%)	35 (8.3%)	10 (11.0%)	32 (9.4%)
χ^2 (p)	0.893 (0.640)	0.486 (0.784)	1.194 (0.550)	0.023 (0.989)	0.630 (0.730)

Note: χ^2: chi-square test; p<0.05: significant.

Table 4. Distribution of the students' health complaints according to their smartphone usage time and sex (N=511).

Usage Time (hour)	Inadequate Sleep	Withdrawal	Discomfort	Low Self-confidence	Stress
-	No	Yes	No	Yes	No
2–4	35 (11.1%)	31 (15.7%)	51 (12.1%)	15 (16.5%)	39 (11.4%)
5–7	150 (47.8%)	94 (47.7%)	205 (48.8%)	39 (42.9%)	171 (50.0%)
≥8	129 (41.1%)	72 (36.5%)	164 (39.0%)	37 (40.7%)	132 (38.6%)
χ^2 (p)	2.607 (0.272)	1.695 (0.428)	3.071 (0.215)	2.999 (0.223)	3.504 (0.173)
Female	97 (30.9%)	58 (29.4%)	126 (30.0%)	29 (31.9%)	107 (31.3%)
Male	217 (69.1%)	139 (70.6%)	294 (70.0%)	62 (68.1%)	235 (68.7%)
χ^2 (p)	0.120 (0.729)	0.124 (0.725)	0.445 (0.505)	0.502 (0.479)	0.009 (0.924)
χ^2: chi-square test; p<0.05: significant					

Table 4 illustrates the relationship between health complaints with smartphone usage patterns and sex. The analysis revealed no significant relationship between them, indicating that the health issues due to smartphone overuse were uniformly experienced regardless of the duration of smartphone use and sex.

4. DISCUSSION

The prevalence of smartphone use among college students is a well-documented phenomenon. Research, including that by Penglee *et al*. in the United States and Thailand, has begun to explore how excessive smartphone use may hinder physical activity, a crucial aspect of health promotion in higher-education settings [15]. The findings of the present study align with those of Saadeh *et al*. in Jordan, wherein a substantial increase in smartphone use was noted among students during the COVID-19 pandemic, with a significant proportion engaging in more than 6 hours of daily use [16]. Similarly, in China, Dai *et al*. reported that problematic smartphone use was prevalent among college-aged youth and was associated with a high risk of adverse outcomes [17].

The present study revealed that nearly half of the students used smartphones for 5–7 hours daily, leading to smartphone usage-related complaints of stress, blurred vision, and insomnia. This pattern resonates with global findings, indicating a consistent trend across various cultural and geographic contexts. For instance, in Korea, Kim *et al*. identified a strong correlation between psychological issues, such as stress and depression and excessive smartphone use [18]. In Singapore, Lin and Chiang noted that adolescents with greater perceived freedom were more prone to smartphone addiction, with female students being particularly at risk [19].

The role of social media in smartphone addiction was highlighted in the studies by Carbonell *et al*. in Spain and Lin and Chiang in Singapore [19, 20]. Carbonell *et al*. observed an increased perception of problems associated with mobile phone use, particularly due to social networks, affecting women more than men. In Thailand, Tangmunkongvorakul *et al*. reported that excessive smartphone users had lower mental health scores, indicating the psychological impact of smartphone addiction [21].

In Saudi Arabia, the functional and realistic aspects of smartphone use in healthcare settings are being explored [22]. This study underscores the need for educational programs to harmonize smartphone use among university students, as suggested by Jilisha *et al*. Such programs should aim to provide knowledge and awareness about the risks of overuse and strategies to optimize health and well-being [23, 24].

4.1. Limitations

The study has some limitations. First, recall bias and social desirability effects may be present in self-reported questionnaires, which may prejudice their usage during the COVID-19 pandemic. Second, the study used a cross-sectional design, so no causality could be inferred. Third, the study was conducted at a single university in Saudi Arabia, indicating that the findings may not be generalizable to other settings.

CONCLUSION

The overall findings of the current study highlight a critical need for further research to investigate the factors contributing to the effect of smartphone use on the health-related well-being of university students. The reported health complaints were significant among the participants; these complaints were associated with daily hours of smartphone usage. There is a need for longitudinal studies to explore the reasons for the overuse of smartphone devices among Saudi Arabian medical students as well as to examine the link between smartphone usage and risks of stress, blurred vision, and inadequate sleep.

NURSING IMPLICATIONS

The implications of this study plan are that the findings can be used to develop the perception of health risks associated with smartphone use among college students at Qassim University in Saudia Arabia to enhance their performance and health-related well-being. Also, care guidelines should be adapted to comprehensively decrease or/and prevent health risks associated with smartphone use/complaints and their consequences.

AUTHORS' CONTRIBUTIONS

Every author has contributed significantly to this work, whether through the idea, design, execution, collection, analysis, and interpretation of data or to all of these levels. They have contributed to writing, editing, or critically

evaluating the manuscript; they have given their final approval for the article to be published; they have given their approval to the journal to which the article has been submitted; and they agree to be responsible for every aspect of the work.

ABBREVIATION

COVID-19 = Coronavirus Disease-19

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval for this study was granted by the ethical board (redacted) of the College of Nursing on September 2, 2021, and the Research Ethic Committee Qassim University with No. 24-91-04 on May 2024.

HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Participants provided informed consent prior to data collection by coding the collected data.

STANDARDS OF REPORTING

STROBE and SAGER guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data and supportive information are available within the article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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