

Smartphone Addiction and Insomnia in the General Arab Population: A Multi-Country Cross-Sectional Study

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Abstract

Background

Smartphone addiction and sleep disturbances are growing public health concerns, yet multinational data from the Arab region remains limited. This study aimed to estimate the prevalence of smartphone addiction and insomnia and identify their associated factors among adults in four Arab countries.

Methods

A multinational cross-sectional study was conducted between June and August 2026 across Egypt, Algeria, Iraq, and Saudi Arabia. Participants were recruited via online convenience sampling using social media platforms. The survey utilized the validated Arabic versions of the Smartphone Addiction Scale-Short Version (SAS-SV) and the Insomnia Severity Index (ISI). Multivariable logistic regression was performed to identify independent associated factors.

Results

The final analysis included 1,823 eligible adults (mean age 24.1 ± 7.8 years; 57.1% female). The sample was predominantly composed of students (72.0%) residing in urban areas (82.1%). The prevalence of smartphone addiction was 71.6%, and the prevalence of insomnia was 73.7%. Average daily phone use was 6.5 ± 2.5 hours. In the multivariable analysis, sufficient family income with savings was associated with lower odds of smartphone addiction (AOR = 0.64; 95% CI: 0.51, 0.79), while a pre-existing psychiatric disorder was associated with higher odds (AOR = 1.62; 95% CI: 1.06, 2.54). For insomnia, smartphone addiction had the strongest association with insomnia (AOR = 3.23; 95% CI: 2.57, 4.07). Additionally, pre-existing psychiatric disorders were associated with higher odds of insomnia (AOR = 1.65; 95% CI: 1.04, 2.71), whereas male sex (AOR = 0.60; 95% CI: 0.47, 0.75), older age (AOR = 0.97; 95% CI: 0.94, 0.99), and sufficient income with savings (AOR = 0.79; 95% CI: 0.63, 0.99) were associated with lower odds.

Conclusions

Smartphone addiction and insomnia were highly prevalent in this sample of adults from the Arab region. Smartphone addiction was independently associated with higher odds of insomnia, while socioeconomic and psychiatric factors were associated with both conditions. Nevertheless, the use of online convenience sampling limits the generalizability of these findings to the broader Arab population.

Introduction

In recent years, smartphones have become indispensable tools for communication, education, and entertainment across all age groups, offering substantial logistical and social benefits. Despite these benefits, their pervasive and compulsive use has prompted growing concern regarding technology-related behavioral addictions [1]. Globally, daily mobile screen time increased by approximately two hours per day over the last decade, with the most significant increase observed across the Middle East and Africa, where mobile social media use now averages 4.5 hours daily [2, 3]. Further, a recent meta-analysis reported that approximately 27% of the general global population screens positive for smartphone addiction, with estimates in the Eastern Mediterranean approaching 39% [4]. Although addiction was traditionally associated mainly with substance use, diagnostic frameworks have increasingly expanded to encompass non-substance behavioral patterns that impair daily functioning [5]. For instance, the American Psychiatric Association moved pathological gambling from the category of impulse control disorders to that of addictive disorders in the DSM-5 [6]. In this light, problematic smartphone use demonstrates similar behavioral features to gambling, including tolerance, craving, withdrawal, and severe functional interference [7].

According to Derevensky et al. [8], excessive and problematic smartphone use is often described as smartphone addiction or dependence. Like other forms of addiction, smartphone addiction is generally characterized by preoccupation with the device, loss of control over its use, and continued use despite negative consequences for daily functioning [7]. Excessive smartphone use has also been associated with a range of mental and physical health problems. In terms of mental health, studies have linked problematic smartphone use to increased impulsivity, psychological distress mediated by emotional dysregulation, anxiety, and depression [9, 10]. In addition, Wacks and Weinstein [11] reported associations between smartphone addiction and several physical health problems, including poor eating habits, pain, headaches, and reduced physical fitness. Among these consequences, sleep disturbances are particularly important, given both their frequent association with problematic smartphone use and their broader implications for health and daily functioning [10].

Sleep disturbances, and insomnia in particular, represent an important public health concern, with well-documented consequences for mental health and physical wellbeing [12, 13]. Sleep disturbances appear especially common in the Eastern Mediterranean/Middle East and North Africa (MENA) region, as a 2024 meta-analysis of 22 studies among the region's medical students reported a pooled insomnia disorder prevalence ranging from approximately 30% in Jordan to 59% in Morocco, alongside high rates of hypersomnolence and circadian rhythm disturbance [14]. Notably, in that meta-analysis, excessive internet use was identified as a significant associated factor [14]. This is particularly relevant in the context of increasing smartphone use, as smartphone addiction may represent one potentially modifiable contributor to sleep problems.

Although two recent systematic reviews among students in the MENA region, one examining sleep disorders [14] and another investigating the association between problematic smartphone use and mental health [15], have highlighted a high burden of both conditions, they have also identified several limitations in the existing evidence. Both reviews noted that the literature is geographically uneven, with

studies concentrated in Gulf and Levant countries and limited representation of populations from North Africa and Mesopotamia. They also highlighted substantial variation in how both smartphone use and sleep problems are measured. For example, previous sleep studies often used general sleep-quality measures such as the Pittsburgh Sleep Quality Index [16] rather than instruments specifically assessing insomnia, while studies assessing technology use often relied on self-reported daily usage duration or predefined time thresholds instead of validated measures of problematic or addictive smartphone use. There was also considerable variation in the instruments used across studies, limiting comparisons between populations. In addition, many studies included in the reviews relied on unadjusted associations and gave limited consideration to potential confounding factors. Taken together, these limitations suggest that the prevalence of smartphone addiction and insomnia, their associated sociodemographic and clinical factors, and the relationship between these conditions among adults in Arab countries remain insufficiently characterized. To address these gaps, the present multi-country study examines the prevalence of smartphone addiction and insomnia among adults from four Arab countries, identifies factors associated with each condition, and assesses the association between smartphone addiction and insomnia while accounting for relevant sociodemographic and clinical factors.

Methods

Study design and setting

A multinational cross-sectional analytical study was conducted between June and August 2026. The study targeted adults from the general population of four Arab countries, each selected to represent one of the four major Arab sub-regions: Egypt (the Nile Valley), Algeria (the Maghreb), Iraq (the Levant), and Saudi Arabia (the Arabian Peninsula), based on the availability of local collaborators. Eligible participants were individuals aged 18 years or older who resided in one of the four target countries, owned a smartphone, and provided informed consent. Individuals younger than 18 years, those residing outside the selected countries, participants who did not own a mobile phone or who exclusively used traditional (feature) phones, and those who submitted incomplete responses or declined consent were excluded.

Sample size

Sample size estimation was performed using the `samplingbook` package [17] on the R software [18]. A conservative prevalence of 50% was assumed to maximize the required sample size. Based on a 95% confidence level and a 5% margin of error, the initial calculated sample size was 385 participants. To account for non-probability sampling across the four participating countries, a design effect of 4 was applied, yielding a minimum required sample size of 1,540. Ultimately, a total of 1,823 participants were included in the final analysis.

Sampling technique and data collection approach

The required sample size was proportionally distributed across the four selected countries based on their population counts from the World Bank Group website [19]. Accordingly, the planned target allocation was roughly 47.6% for Egypt, 19.1% for Algeria, 18.8% for Iraq, and 14.4% for Saudi Arabia.

Data were collected using a self-administered electronic questionnaire hosted on Google Forms via convenience sampling. Local data collection collaborators who are university students coordinated survey distribution within their respective countries. The survey link was disseminated across popular social media platforms (e.g., WhatsApp, Facebook, Telegram, and X/Twitter). Participants were informed that participation was voluntary, anonymous, and uncompensated. Owing to the open online distribution of the survey, a response rate could not be calculated. A total of 1,971 responses were received across the four target countries. Participants were excluded if they did not own a mobile phone ($n = 22$), used a feature phone ($n = 7$), or submitted incomplete responses ($n = 119$), resulting in a final analyzed sample of 1,823 eligible participants.

Study tool and outcome definitions

Study tool and outcome definitions

Data were collected using an Arabic self-administered electronic questionnaire (Supplementary File 1). The first section assessed mobile phone use, including mobile phone ownership, phone type, average daily phone use in hours, and most-used mobile applications (social media, video streaming, mobile gaming, and others).

The second section captured sociodemographic characteristics: age, sex, country of residence (Egypt, Algeria, Iraq, or Saudi Arabia), area of residence (urban or rural), perceived sufficiency of family income (insufficient, sufficient without saving, or sufficient with saving), employment status (student, employed, or unemployed), marital status (single or married), and highest educational attainment (high school or less, or tertiary education). Participants were also asked whether they had received a physician-confirmed diagnosis of a psychiatric disorder (yes/no).

The third section evaluated smartphone addiction using the validated Arabic version [20] of the Smartphone Addiction Scale - Short Version (SAS-SV) [21]. The SAS-SV contains 10 items rated on a 6-point Likert scale ranging from 1 ("strongly disagree") to 6 ("strongly agree"), producing a total score between 10 and 60. Established sex-specific cutoffs were applied to categorize smartphone addiction: scores ≥ 31 for males and ≥ 33 for females indicated the presence of smartphone addiction [21].

The fourth section evaluated insomnia using the validated Arabic version [22] of the Insomnia Severity Index (ISI) [23]. The ISI is a 7-item instrument used to assess insomnia severity. Each item is rated on a 5-point Likert scale ranging from 0 to 4, yielding a total score ranging from 0 to 28, with higher scores indicating greater insomnia severity. A total score of ≥ 10 was used to define the presence of insomnia (yes/no) [24].

Statistical Analysis

Statistical analyses and data summaries were performed using R software [18] and jamovi [25], with tables prepared using the SummaryTables module in jamovi [26]. Categorical variables were presented as frequencies and percentages, while continuous variables (e.g., age) were summarized using means and standard deviations (SD). Factors associated with smartphone addiction and insomnia were identified using univariable and multivariable logistic regression analyses, with crude odds ratios (COR) and adjusted odds ratios (AOR) reported alongside 95% confidence intervals. A p-value < 0.05 was considered statistically significant.

Results

Participant Demographics

A total of 1,823 eligible individuals were included in the study (mean age 24.1 ± 7.8 years; 57.1% female). Most participants were single (87.3%), students (72.0%), resided in urban areas (82.1%), and reported a sufficient family income (93.5%, including 53.2% without saving and 40.3% with saving). Regarding educational attainment, 54.8% had a high school education or less, while 45.2% had attained tertiary education. Geographically, roughly half of the participants were from Egypt (49.8%), followed by Algeria (22.0%) and Iraq (17.6%), with a smaller cohort from Saudi Arabia (10.6%). A minor proportion reported a physician-diagnosed psychiatric disorder (7.5%; Table 1).

Participants reported an average daily phone use of 6.5 ± 2.5 hours. The overall prevalence of smartphone addiction was 71.6% (95% CI = 69.5%, 73.6%), and the prevalence of insomnia was 73.7% (95% CI = 71.6%, 75.6%). Meanwhile, the most-used apps were social media (84.5%), followed by video streaming (44.5%), and gaming (10.2%; Fig. 1).

Associated Factors of Smartphone Addiction

In the multivariable logistic regression analysis, only family income and psychiatric disorder were significantly associated with smartphone addiction (Table 2). Participants reporting sufficient income with saving had significantly lower odds of smartphone addiction compared to those with sufficient income without saving (AOR = 0.64, 95% CI = 0.51, 0.79, $p < 0.001$). Conversely, participants with a diagnosed psychiatric disorder had higher odds of smartphone addiction compared to those without such a diagnosis (AOR = 1.62, 95% CI = 1.06, 2.54, $p = 0.030$). None of the other evaluated variables showed a statistically significant association in the adjusted model.

Table 2

Binary logistic regression analysis of having smartphone addiction among the general Arab population
(N = 1,823)

Variable	Smartphone addiction (SAS-SV)		Univariable regression		Multivariable regression ³	
	No N = 518 ^{1,2}	Yes N = 1,305 ^{1,2}	COR (95% CI)	p- value	AOR (95% CI)	p- value
Age (years)	24.5 (8.5)	24.0 (7.5)	0.99 (0.98, 1.00)	0.20	0.99 (0.96, 1.01)	0.20
Sex						
Female	314 (30.2%)	727 (69.8%)	—		—	
Male	204 (26.1%)	578 (73.9%)	1.22 (1.00, 1.51)	0.056	1.19 (0.95, 1.48)	0.12
Country						
Egypt	245 (27.0%)	663 (73.0%)	—		—	
Algeria	126 (31.4%)	275 (68.6%)	0.81 (0.62, 1.04)	0.10	0.76 (0.57, 1.02)	0.066
Iraq	95 (29.7%)	225 (70.3%)	0.88 (0.66, 1.16)	0.35	0.94 (0.70, 1.27)	0.70
Saudi Arabia	52 (26.8%)	142 (73.2%)	1.01 (0.72, 1.44)	0.96	1.14 (0.79, 1.67)	0.49
Residence						
Urban (City)	432 (28.9%)	1,064 (71.1%)	—		—	
Rural (Countryside)	86 (26.3%)	241 (73.7%)	1.14 (0.87, 1.50)	0.35	1.02 (0.77, 1.36)	0.88
Family income						
Sufficient without saving	240 (24.8%)	729 (75.2%)	—		—	
Sufficient with saving	249 (33.9%)	486 (66.1%)	0.64 (0.52, 0.79)	< 0.001	0.64 (0.51, 0.79)	< 0.001
Insufficient	29 (24.4%)	90 (75.6%)	1.02 (0.66, 1.62)	0.92	1.00 (0.64, 1.58)	> 0.99
Employment status						

Variable	Smartphone addiction (SAS-SV)		Univariable regression		Multivariable regression ³	
	No N = 518 ^{1,2}	Yes N = 1,305 ^{1,2}	COR (95% CI)	p-value	AOR (95% CI)	p-value
Student	370 (28.2%)	942 (71.8%)	—		—	
Employed	110 (28.4%)	278 (71.6%)	0.99 (0.77, 1.28)	0.95	1.11 (0.77, 1.62)	0.58
Unemployed	38 (30.9%)	85 (69.1%)	0.88 (0.59, 1.32)	0.53	1.02 (0.64, 1.66)	0.92
Marital status						
Single	444 (27.9%)	1,147 (72.1%)	—		—	
Married	74 (31.9%)	158 (68.1%)	0.83 (0.62, 1.12)	0.21	0.88 (0.56, 1.41)	0.60
Highest education level						
High school or less	281 (28.1%)	718 (71.9%)	—		—	
Tertiary education	237 (28.8%)	587 (71.2%)	0.97 (0.79, 1.19)	0.77	1.12 (0.86, 1.48)	0.40
Psychiatric disorder						
No	490 (29.0%)	1,197 (71.0%)	—		—	
Yes	28 (20.6%)	108 (79.4%)	1.58 (1.04, 2.47)	0.037	1.62 (1.06, 2.54)	0.030
¹ Mean (SD); n (%) ² Percentages are row-wise ³ McFadden's R ² = 0.015; Nagelkerke's R ² = 0.026; Likelihood-ratio $\chi^2(13) = 33.59$, p = 0.001 Abbreviations: AOR = Adjusted Odds Ratio, CI = Confidence Interval, COR = Crude Odds Ratio, ISI = Insomnia Severity Index, SAS-SV = Smartphone Addiction Scale - Short Version						

Associated Factors of Insomnia

The multivariable logistic regression analysis identified smartphone addiction, sex, age, family income, and psychiatric disorder as independent factors significantly associated with insomnia (Table 3). Smartphone addiction was the strongest factor, with addicted participants having over three times the odds of insomnia compared to their non-addicted peers (AOR = 3.23, 95% CI = 2.57, 4.07, $p < 0.001$). Male participants had 40% lower odds of insomnia compared to females (AOR = 0.60, 95% CI = 0.47, 0.75, $p < 0.001$). Older age (AOR = 0.97, 95% CI = 0.94, 0.99, $p = 0.003$) and having sufficient income with saving (AOR = 0.79, 95% CI = 0.63, 0.99, $p = 0.044$) were also associated with reduced odds of insomnia. Conversely, having a diagnosed psychiatric disorder significantly increased the odds (AOR = 1.65, 95% CI = 1.04, 2.71, $p = 0.041$). None of the remaining sociodemographic variables reached statistical significance in the multivariable model.

Table 3

Binary logistic regression analysis of having insomnia among the general Arab population (N = 1,823)

Variable	Insomnia (ISI)		Univariable regression		Multivariable regression ³	
	No N = 480 ^{1,2}	Yes N = 1,343 ^{1,2}	COR (95% CI)	p-value	AOR (95% CI)	p-value
Age (years)	25.9 (9.7)	23.5 (6.9)	0.96 (0.95, 0.98)	< 0.001	0.97 (0.94, 0.99)	0.003
Sex						
Female	236 (22.7%)	805 (77.3%)	—		—	
Male	244 (31.2%)	538 (68.8%)	0.65 (0.52, 0.80)	< 0.001	0.60 (0.47, 0.75)	< 0.001
Country						
Egypt	234 (25.8%)	674 (74.2%)	—		—	
Algeria	109 (27.2%)	292 (72.8%)	0.93 (0.71, 1.22)	0.59	0.90 (0.66, 1.23)	0.50
Iraq	74 (23.1%)	246 (76.9%)	1.15 (0.86, 1.56)	0.35	1.03 (0.75, 1.44)	0.85
Saudi Arabia	63 (32.5%)	131 (67.5%)	0.72 (0.52, 1.01)	0.057	0.80 (0.55, 1.17)	0.24
Residence						
Urban (City)	395 (26.4%)	1,101 (73.6%)	—		—	
Rural (Countryside)	85 (26.0%)	242 (74.0%)	1.02 (0.78, 1.35)	0.88	0.90 (0.67, 1.22)	0.50
Family income						
Sufficient without saving	236 (24.4%)	733 (75.6%)	—		—	
Sufficient with saving	218 (29.7%)	517 (70.3%)	0.76 (0.62, 0.95)	0.014	0.79 (0.63, 0.99)	0.044
Insufficient	26 (21.8%)	93 (78.2%)	1.15 (0.74, 1.85)	0.55	1.20 (0.75, 1.98)	0.46
Employment status						

Variable	Insomnia (ISI)		Univariable regression		Multivariable regression ³	
	No N = 480 ^{1,2}	Yes N = 1,343 ^{1,2}	COR (95% CI)	p-value	AOR (95% CI)	p-value
Student	307 (23.4%)	1,005 (76.6%)	—		—	
Employed	137 (35.3%)	251 (64.7%)	0.56 (0.44, 0.72)	< 0.001	0.82 (0.57, 1.20)	0.31
Unemployed	36 (29.3%)	87 (70.7%)	0.74 (0.49, 1.12)	0.15	0.84 (0.51, 1.40)	0.50
Marital status						
Single	396 (24.9%)	1,195 (75.1%)	—		—	
Married	84 (36.2%)	148 (63.8%)	0.58 (0.44, 0.78)	< 0.001	1.34 (0.83, 2.22)	0.24
Highest education level						
High school or less	234 (23.4%)	765 (76.6%)	—		—	
Tertiary education	246 (29.9%)	578 (70.1%)	0.72 (0.58, 0.89)	0.002	0.93 (0.70, 1.25)	0.64
Psychiatric disorder						
No	456 (27.0%)	1,231 (73.0%)	—		—	
Yes	24 (17.6%)	112 (82.4%)	1.73 (1.12, 2.78)	0.018	1.65 (1.04, 2.71)	0.041
Smartphone addiction (SAS-SV)						
No	225 (43.4%)	293 (56.6%)	—		—	
Yes	255 (19.5%)	1,050 (80.5%)	3.16 (2.54, 3.95)	< 0.001	3.23 (2.57, 4.07)	< 0.001

¹Mean (SD); n (%)

²Percentages are row-wise

³McFadden's R² = 0.080; Nagelkerke's R² = 0.129; Likelihood-ratio $\chi^2(14) = 168.88$, p < 0.001

Variable	Insomnia (ISI)		Univariable regression		Multivariable regression ³	
	No	Yes	COR (95% CI)	p-value	AOR (95% CI)	p-value
	N = 480 ^{1,2}	N = 1,343 ^{1,2}				
Abbreviations: AOR = Adjusted Odds Ratio, CI = Confidence Interval, COR = Crude Odds Ratio, ISI = Insomnia Severity Index, SAS-SV = Smartphone Addiction Scale - Short Version						

Discussion

This study investigated the prevalence and factors associated with smartphone addiction and insomnia among a sample of adults in the Arab region. We found that 71.6% of the cohort screened positive for smartphone addiction, and 73.7% met the criteria for insomnia. Sufficient family income with savings was associated with significantly lower odds of smartphone addiction, whereas the presence of a pre-existing psychiatric disorder was associated with a markedly increased prevalence. Importantly, smartphone addiction was the most significant independent predictor of insomnia.

The prevalence of smartphone addiction observed in this sample (71.6%) was higher than the 65.0% reported among Saudi Arabian university students [27] and lower than the 81.2% reported among Moroccan nursing students [28]. It was also lower than the 87.8% reported in a broad Egyptian sample by Khalifa et al. [29], but substantially higher than the 37.1% reported among Jordanian adults in a recent general-population study [30]. Our estimate also exceeded the pooled global prevalence of 27.0% reported by Meng et al. [4], as well as reported rates among young adults in the United Kingdom (38.9%) [31] and medical students in Serbia (21.7%) [32]. These differences may partly reflect variation in population characteristics, particularly the predominance of university students in our sample, as well as differences in study settings and measurement approaches. Indeed, in their meta-analysis, Meng et al. [4] also demonstrated substantial heterogeneity in smartphone addiction prevalence across regions, publication periods, assessment scales, and sample representativeness, suggesting that prevalence estimates should be interpreted cautiously when comparing populations assessed using different methodologies. Nevertheless, these explanations remain speculative, and further well-designed studies using standardized assessment approaches and comparable populations are needed to clarify the sources of this variation.

In our multivariable analysis, we found that sufficient family income with savings was associated with lower odds of smartphone addiction, whereas having a pre-existing psychiatric disorder was associated with substantially higher odds. The inverse association with financial security is consistent with evidence that smartphone addiction may be more prevalent in lower-income settings and among individuals experiencing socioeconomic constraints [33]. One possible explanation is that smartphones provide relatively accessible means of entertainment, social connection, and stress relief when other resources are limited. The positive association with psychiatric disorders is also consistent with previous literature

linking depression, anxiety, and other psychological difficulties with problematic smartphone use [34]. Smartphones may serve as a readily available means of coping with distress or regulating emotions, although the cross-sectional design prevents conclusions about directionality.

The average daily smartphone use reported in our cohort was 6.5 hours, broadly consistent with the 6.7 hours of average daily online time reported among active digital users worldwide by Meng et al. [4]. Nevertheless, our estimate is higher than the approximately 4.5 hours per day spent on mobile media reported in regional tracking data from the Middle East and Africa [3], which may partly reflect the broader range of academic, communicative, and entertainment activities captured by overall smartphone use in our predominantly student sample. Regarding specific application use, social media was the most frequently reported category (84.5%). This pattern is broadly consistent with global mobile analytics showing that social media and entertainment applications account for a substantial proportion of young adults' screen time, while gaming represents a smaller proportion [2]. It also reflects broader digital trends in the Middle East and North Africa, where social media has become an important medium for entertainment and daily news consumption [3]. However, these findings should be interpreted in light of the study's convenience sampling and recruitment through social media platforms. Compared to physical data collection, this approach may have preferentially attracted individuals with higher levels of digital engagement, potentially contributing to the high reported frequency of social media use and the elevated average daily smartphone use. As such, these findings may reflect patterns within a highly digitally engaged subset of adults.

The prevalence of insomnia observed in this sample (73.7%) was broadly comparable to estimates reported among student populations in the region, including 70.2% in Jordan [35] and 75.2% in Pakistan [36], and was higher than the 40.9% rate of severe insomnia reported among Jordanian adults in a recent general-population study [30]. Our estimate was also higher than the pooled national prevalence rates ranging from 30.4% to 59.1% reported across Middle Eastern and North African countries by Chaabane et al. [14]. In contrast, it was comparable to the 67.8% reported among medical students in Peru [37], but higher than estimates reported among young adults in the United Kingdom (61.6%) [31] and university students in China (14.3%) [38]. These differences may partly reflect variation in population characteristics, particularly the predominance of university students in our sample, as well as differences in study settings and measurement approaches. Indeed, in their meta-analysis, Chaabane et al. [14] demonstrated substantial heterogeneity in sleep disorder prevalence across subgroups, assessment scales, and academic training periods, suggesting that prevalence estimates should be interpreted cautiously when comparing populations assessed using different methodologies. For instance, many comparative studies evaluate general sleep dissatisfaction rather than utilizing specific clinical criteria for insomnia disorders. Nevertheless, these explanations remain speculative, and further well-designed studies using standardized assessment approaches and comparable populations are needed to clarify the sources of this variation.

In our multivariable model, smartphone addiction was the strongest predictor of insomnia, consistent with prior meta-analysis studies [10], while several other factors were also significantly associated with

insomnia. A pre-existing psychiatric disorder was associated with higher odds of insomnia, consistent with multiple prospective [39] and randomized [40] studies, as well as a prior meta-analysis linking anxiety and depressive symptoms with insomnia among students in the Middle East and North Africa [14]. Further, older age was associated with lower odds of insomnia, with each one-year increase corresponding to approximately 3% lower odds (AOR = 0.97). This is consistent with Fragoso et al., who reported a 5% reduction in insomnia odds per one-year increase in age among adults with mild sleep-disordered breathing [41]. Nevertheless, these findings should be interpreted cautiously, as the cross-sectional design precludes determining directionality, particularly for the relationship between psychiatric disorders and insomnia [42].

Male sex was associated with lower odds of insomnia than female sex, consistent with regional and global evidence of a higher prevalence of insomnia among women [43]. This pattern has been attributed to a combination of biological, psychological, and social factors, although the mechanisms underlying the sex difference remain incompletely understood [44]. On the other hand, sufficient family income with savings was also associated with lower odds of insomnia. This is consistent with evidence linking socioeconomic disadvantage and financial strain with poorer sleep [45], potentially through greater psychological stress and worry.

Limitations

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional design precludes establishing causal inferences. Second, our reliance on online convenience sampling through social media platforms may have introduced selection bias, resulting in a cohort heavily skewed toward young, single, urban university students. This demographic skew likely inflated our prevalence estimates and limits the generalizability of the findings to the broader population. Third, the data were collected using self-administered screening tools, which are susceptible to reporting biases and do not replace formal clinical diagnoses. Finally, although our multivariable models adjusted for several sociodemographic and clinical variables, we were unable to account for other unmeasured confounders known to influence sleep and digital behavior, such as caffeine consumption, physical activity levels, and medication use.

Conclusions

Smartphone addiction and insomnia were highly prevalent among adults in this Arab-region sample, with smartphone addiction showing the strongest independent association with insomnia. Financial security was associated with lower odds of smartphone addiction, while pre-existing psychiatric disorders were associated with a higher prevalence. These findings highlight the need for greater attention to problematic smartphone use and sleep health among adults, particularly those with existing mental health conditions. Longitudinal studies are needed to clarify the temporal relationships between smartphone use, mental health, and insomnia.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Institutional Research Board (IRB) of Mansoura University's Faculty of Medicine (approval code: R.26.06.3762.R1), and the study was conducted according to the principles of the Helsinki Declaration. All participants were invited to voluntarily and anonymously complete an online survey, provided electronic informed consent, and were free to respond at their convenience.

Consent for publication

Not applicable.

Clinical trial number

Not applicable.

Conflict of interest

The authors declare no conflicts of interests.

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Author Contribution

MAE, SAK, and AE-G contributed to the conceptualization of the study. MAE, SAK, SA, HK, AA and the Neutromedica Team of Collaborators contributed to data collection. NED conducted the statistical analysis and interpretation of the results. NED, YMO, MAE, SAK, SA, HK, and AA contributed to data collection and writing of the manuscript. NED, YMO, MAE, SAK, and AE-G contributed to the critical intellectual revision of the manuscript. All authors approved the final version of the manuscript.

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None.

Data Availability

The data of this study is available from the corresponding author upon reasonable request.

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Figures

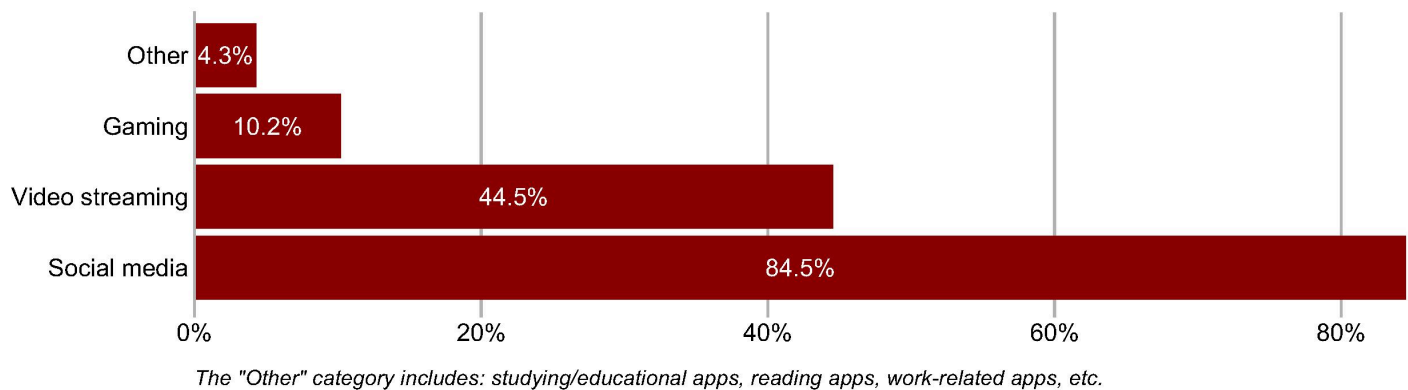


Figure 1

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