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Prevalence of Smartphone Addiction and its Effect on Psychological Stress and Quality of Sleep Among a Sample of Egyptian Physicians

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A B S T R A C T

Background: In the medical field, the increasing use of medical applications has enabled healthcare workers to communicate and access useful information quickly. However, using smartphones at work can lead to distractions and mistakes during health procedures. **Objective**: To assess the prevalence of smartphone addiction among physicians and to examine how smartphone addiction and psychological distress affect sleep quality in a sample of Egyptian physicians. **Methods:** This cross-sectional study collected information on demographics, smartphone addiction, sleep quality, and psychological distress through an online questionnaire. Data were collected through an online survey that target physicians. **Results:** The study included 176 Egyptian physicians. The mean age was 42.4 ± 6.3 years and 63.1% were female. The average smartphone addiction score was 22.4 ± 5.4. Nearly two-thirds of the participants (64.8%) show high levels of smartphone addiction. Physicians who did not walk regularly and those who did not typically eat healthy foods had significantly higher scores for both smartphone addiction and psychological distress. A significant positive correlation was found between smartphone addiction and psychological distress ($r=0.423$, $p<0.001$). Conversely, there were significant negative correlations between both smartphone addiction ($r=-.168$, $p=0.026$) and psychological distress ($r=-0.443$, $p<0.001$), and sleep quality. **Conclusions:** The study findings indicate that smartphone addiction among physicians has a detrimental effect on psychological distress and sleep quality. To mitigate the negative impacts of smartphone addiction, it is essential to promote strategies for reducing dependency on smartphones.

INTRODUCTION

A smartphone is a "portable device that can be used with a stylus or finger touch and has a touch screen interface."[1] With significant advancements in portable technology over time, smartphone addiction is becoming an increasingly serious public health issue. Devices like tablets, laptops, and smartphones have become ubiquitous, with smartphones taking on a central role in daily activities. Physicians frequently use smartphones in their work environments. [2]

Physicians use smartphones and digital platforms to enhance their clinical practice by providing access to

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drug technical data sheets, guidelines, research, and updates. They also improve communication and decision-making processes among medical staff.[3] However, there are growing concerns about the potential negative effects of smartphone use on users' health. Notable adverse effects associated with smartphone use include addiction, disrupted sleep, and psychological distress.[4]

Smartphone use significantly increases the risk of diminishing both the quantity and quality of sleep. Overuse of smartphones has been linked to daytime fatigue, increased sleep latency, and shorter sleep duration.[5] Specifically, using a smartphone right before bed can disrupt the circadian rhythm and is associated with reduced sleep duration, while late-night smartphone use correlates with inadequate sleep.[6]

Moreover, the association between psychopathological symptoms and smartphone addiction may be mediated by poor sleep quality.[7] Psychological distress refers to troubling thoughts and an inability to cope, and it is a significant source of global disease burden, contributing to high levels of morbidity and mortality while adversely affecting sleep quality.[8]

The quality of sleep is essential for both physical and mental well-being. Inadequate sleep has been linked to various negative psychological and physical outcomes, including heart disease, depression, anxiety, and overall psychological distress.[9]

Given the limited number of studies on this issue in Egypt, this study aims to assess the prevalence of smartphone addiction and its relationship with sleep quality and psychological distress among a sample of Egyptian physicians.

METHODS

This was a cross-sectional study that used an online survey, with links to the questionnaire distributed via professional groups on WhatsApp, Snapchat, Twitter, and other social media platforms, as well as through personal invitations. Data collection took place from March 1, 2024, to July 1, 2024.

The study included a sample of Egyptian physicians of both genders who agreed to participate.

Data collection tool: The questionnaire was structured into four parts, assessing psychological distress, smartphone addiction, sleep quality, and demographic data. *Demographic Variables:* The first part gathered sociodemographic information, including age, gender, qualifications, specialty, and residence. It also included yes/no questions about smoking, healthy eating habits, frequency of walking, and the presence of chronic diseases. *Smartphone Addiction:* The second part utilized the six-item Application-Based Smartphone Addiction

Table 1: Sociodemographic characteristics of the participants

Characteristics	Total (n=176)
Age (years)	42.4±6.3
Age groups	
≤40 years	52 (29.5%)
> 40 years	124 (70.5%)
Sex	
Female	111 (63.1%)
Male	65 (36.9%)
Specialty	
Academic	21 (11.9%)
Assistive	38 (21.6%)
Surgery	51 (29%)
Medicine	66 (37.5%)
Qualification	
Specialist	66 (37.5%)
Consultant	110 (62.5%)
Residence	
Rural	8 (4.5%)
Urban	168 (95.5%)
Chronic disease	
No	124 (70.5%)
Yes	52 (29.5%)
Smoking	
No	163 (92.6%)
Yes	13 (7.4%)
Do you walk regularly?	
No	125 (71%)
Yes	51 (29%)
Do you usually eat healthy food?	
No	83 (47.2%)
Yes	93 (52.8%)

Assistive include Radiology and clinical pathologyScale to assess smartphone addiction. Respondents rated six statements on a six-point Likert scale, [10]ranging from "strongly disagree" to "strongly agree." Total scores ranged from 6 to 36, with a score of 21 or above indicating high levels of smartphone addiction.[11] The scale demonstrated good reliability, with a Cronbach's alpha ranging from 0.81 to 0.88.[12] *Psychological Distress:* The third section employed the Kessler Scale 10 to quantify psychological distress. This questionnaire consists of ten items rated on a five-point Likert scale, where 1 indicates "never" and 5 indicates "all the time." Scores range

from 5 to 50, with higher scores reflecting greater psychological distress. The scale has a high reliability, with a Cronbach's alpha of 0.88.[13-14] *Sleep Quality:* In the fourth part, participants evaluated their overall sleep quality over the preceding seven days using a one-item Sleep Quality Scale. Participants rated their experience on a scale from 0 (poor) to 10 (excellent).[15]

Table 2: Relation between Sociodemographic characteristics of the participants and smartphone addiction

Characteristics	Smartphone addiction	p-value
Whole group	22.4±5.4	
Prevalence of smartphone addiction		
<21	62 (35.2%)	
≥ 21	114 (64.8%)	
Age groups		
≤40 years	23.4±5.4	.121
> 40 years	21.9±5.5	
Gender		
Female	22.2±5.6	.726
Male	22.6±5.3	
Specialty		
Academic	22.7±5.3	.278
Assistive	21.1±4.2	
Surgery	23.1±5.9	
Medicine	22.5±5.8	
Qualification		
Specialist	22.4±6.3	.900
Consultant	22.4±4.9	
Residence		
Rural	21.3±6.2	.495
Urban	22.4±5.46	
Chronic disease		
No	22.1±5.5	.284
Yes	23.1±5.4	
Smoking		
No	22.3±5.6	.876
Yes	22.9±4.2	
Do you walk regularly?		
No	23.2±5.5	**.002**
Yes	20.3±4.9	
Do you usually eat healthy food?		
No	23.2±4.9	**.042**
Yes	21.7±5.8	

Tool validation: A pilot study was conducted with 15 participants to assess the clarity, applicability, and response to the questionnaire.

Sample size estimation: According to previous research [16], The average healthcare worker's smartphone addiction score was 23.22± 11.52. To achieve a 95% confidence level and a precision of 1.8, the required sample size was 161 physicians, the sample size was calculated using a Statulator sample size calculator. Physicians were recruited using convenience sampling to gather data from academic institutions, public and private hospitals, and clinics.

Statistical methods: The Statistical Package of Social Sciences (SPSS) (version 26) was used to analyze the data. To ascertain whether the data were normal, the Kolmogorov-Smirnov single-sample test was employed. Summaries of qualitative data are expressed as numbers and percentages. The numerical variables were summarized using the mean and standard deviation. When comparing two groups of quantitative data, the Mann-Whitney test was employed, and when comparing groups of more than two, the Kruskal-Wallis test was utilized. The significant variables in the univariate analysis were subjected to linear regression to assess the independent factors affecting smart phone addiction, psychological stress, and sleep quality. The Spearman correlation method was used to correlate continuous data. P was considered significant at 0.05.

RESULTS

The study included 176 Egyptian physicians, with an average age of 42.4 ± 6.3 years. Approximately two-thirds of the participants (63.1%) were female. More than one-third (37.5%) were medical specialists, while 62.5% were consultants. Most participants (95.5%) lived in urban areas. Less than one-third (29.5%) reported having a chronic disease, and 7.4% identified as smokers. About half of the participants (52.8%) typically ate healthy food, and 29% walked regularly (Table 1).

The average smartphone addiction score was 22.4 ± 5.4. higher Prevalence of smart addiction among the study participants, nearly two-thirds of the participants (64.8%) show high levels of smartphone addiction

Physicians who did not walk regularly had significantly higher smartphone addiction scores compared to those who did walk regularly (23.2 ± 5.5 vs. 20.3 ± 4.9, P = 0.002). Similarly, those who did not usually eat healthy foods had higher smartphone addiction scores than those who did (23.2 ± 4.9 vs. 21.7 ± 5.8, P = 0.042). No statistically significant differences were observed regarding age,

gender, specialty, qualifications, presence of chronic disease, smoking status, and smartphone addiction scores (Table 2).

The average psychological distress score was 25.7 ± 8.2. Physicians aged ≤40 years exhibited higher average psychological distress scores compared to those aged >40 years (29.1 ± 7.8 vs. 24.3 ± 8.1, P < 0.001). Consultant physicians had significantly lower psychological distress scores than specialists (24.7 ± 7.8 vs. 27.4 ± 8.7, P = 0.029). Physicians who did not walk regularly also had higher psychological distress scores than those who did (27.1 ± 8.1 vs. 22.3 ± 7.8, P < 0.001). Additionally, those who did not usually eat healthy foods reported significantly higher psychological distress than those who did (28.3 ± 7.7 vs. 23.5 ± 8.1, P < 0.001, Table 3).

Table 3: Relation between Sociodemographic characteristics of the participants and psychological distress

Characteristics	Psychological distress	p-value
Whole group	25.7±8.2	
Age groups		
≤40 years	29.1±7.8	**<.001**
> 40 years	24.3±8.1	
Gender		
Female	26.1±7.9	.348
Male	25.1±8.8	
Specialty		
Academic	27.7±7.8	.117
Assistive	23.4±5.3	
Surgery	25.2±8.9	
Medicine	27.3±8.9	
Qualification		
Specialist	27.4±8.7	**.029**
Consultant	24.7±7.8	
Residence		
Rural	29.8±9.6	.191
Urban	25.5±8.1	
Chronic disease		
No	25.1±7.7	.246
Yes	27.1±9.3	
Smoking		
No	25.6±8.3	.275
Yes	27.7±7.2	
Do you walk regularly?		
No	27.1±8.1	**<.001**
Yes	22.3±7.8	
Do you usually eat healthy food?		
No	28.3±7.7	**<.001**
Yes	23.5±8.1	

The average sleep quality among the participants was 6.1±1.9. No statistically significant relation between age, gender, specialty, residence, chronic disease, smoking, and sleep quality, however, A physician who ate healthy food had significantly higher average sleep quality than those who didn't

Table 4: Relation between Sociodemographic characteristics of the participants and sleep quality

Characteristics	Sleep Quality	p-value
Whole group	6.1±1.9	
Age groups		
≤40 years	5.7±1.8	**.102**
> 40 years	6.2±2.0	
Gender		
Female	6.0±2.0	.862
Male	6.1±2.0	
Specialty		
Academic	5.5±2.2	.356
Assistive	6.4±1.9	
Surgery	6.1±1.9	
Medicine	5.8±1.9	
Qualification		
Specialist	6.1±2.1	**.694**
Consultant	6.0±1.8	
Residence		
Rural	6.4±1.7	.563
Urban	6.0±2.0	
Chronic disease		
No	6.0±2.0	.877
Yes	6.1±1.9	
Smoking		
No	6.1±2.0	.055
Yes	5.0±1.7	
Do you walk regularly?		
No	5.9±1.9	**.124**
Yes	6.4±2.2	
Do you usually eat healthy food?		
No	5.6±1.9	**.020**
Yes	6.4±2.0	

eat healthy food (6.4±2.0 versus 5.6±1.9, p-value=.020, Table 4)

A significant positive correlation was found between smartphone addiction and psychological distress (r = 0.423, P < 0.001). There was also a significant weak negative correlation between smartphone addiction and sleep quality (r = -0.168, P = 0.026),

as well as a significant weak negative correlation between psychological distress and sleep quality (r = -0.443, P < 0.001, Table 5).

The independent factor increasing smartphone addiction was not walking regularly, the independent factors increasing psychological stress were younger age, not eating healthy food, and not walking regularly, the independent factor affecting improve sleep quality was eating healthy food.

Table 5: correlation between psychological stress, sleep quality, and smartphone addiction

	Smartphone addiction		Psychological stress	
	r	p-value	r	p-value
Psychological stress	0.423	<.001	---	---
Sleep Quality	-0.168	0.026	-0.443	<.001

Table 6: Multivariate analysis of factors affecting smartphone addiction psychological stress, and sleep quality

	Beta	95% confidence interval for Beta	P-value
Smartphone addiction			
Walking regularly	-0.240	-4.6, -1.1	0.001
Psychological stress			
Age group	-0.257	-7.1, -2.1	<.001
Health food	-0.229	-6.1, -1.5	0.001
Walking regularly	-0.240	-6.0, -1.8	0.001
Sleep Quality			
Healthy food	0.191	1.1-1.3	0.001

DISCUSSION

This study found that the average smartphone addiction score among participants was 22.4 ± 5.4, exceeding the high addiction level cutoff point of 21.[11] This finding is higher than the average smartphone addiction reported in a study by Alzhrani et al. on Saudi healthcare workers and students. [17] These results indicate a significant prevalence of smartphone addiction among Egyptian physicians.

The survey revealed no statistically significant difference in smartphone addiction between male and female participants, this aligns with Wu et al., [18] who found no significant correlation between gender and smartphone addiction. In contrast, Tateno et al. [19] reported that men scored lower on smartphone addiction than women.

The study also demonstrated that higher levels of smartphone addiction are associated with lower sleep quality, which can negatively impact overall health. Increasing evidence supports this correlation, indicating that smartphone addiction adversely affects sleep quality. These findings underscore the need to address smartphone addiction among physicians to improve sleep quality and mitigate its detrimental effects.[20]

Moreover, physicians who do not walk regularly had significantly higher smartphone addiction scores compared to those who do walk regularly. This result is consistent with Kim et al.,[21] who found that participants with smartphone addiction were less likely to engage in regular walking.

In this study there was a significant positive correlation between Smartphone addiction and psychological distress, the results were consistent with another study that showed a fair positive correlation between smartphone addiction and psychological health [22]

Another study has demonstrated connections between psychological distress and smartphone addiction [23], In contrast, another study found that people with psychological distress use their phones more frequently as a coping mechanism for unpleasant emotions brought on by their suffering, suggesting that psychological discomfort may be a precondition for smartphone addiction. [4]

Participants who did not typically eat healthy foods also exhibited significantly higher smartphone addiction scores than those who did. This finding suggests that smartphone addiction may influence eating habits, potentially leading to disordered eating patterns.[24]

The relationship between smartphone addiction and changes in eating habits may be attributed to prolonged smartphone use, which encourages a sedentary lifestyle. Individuals may resort to convenient, high-calorie foods or snacks to extend their screen time.[25]

Additionally, this study found that physicians aged ≤40 years had higher average psychological distress scores than those aged >40 years. This is consistent with other research indicating that younger adults report higher levels of psychological distress. [26] The observation that specialists in our study experienced more psychological distress than consultants may reflect these age-related trends. These findings may appear inconsistent with the study by Klaiber et al., [27] who reported fewer daily stressors among older than younger adults

The study also concluded that physicians who do not walk regularly had significantly higher psychological distress scores than those who do. This aligns with other findings suggesting that regular walking can help reduce symptoms of psychological stress.[28]

Finally, there was a significant weak negative correlation between psychological distress and sleep quality, consistent with research showing that poor sleep quality is associated with elevated psychological stress. [29] Furthermore, physicians who did not typically eat healthy foods reported higher psychological distress than those who did, aligning with studies indicating a link between unhealthy dietary habits and increased psychological distress.[30]

CONCLUSIONS

The study findings indicates that smartphone addiction among physicians has a detrimental effect on psychological distress and sleep quality. To mitigate the negative impacts of smartphone addiction, it is essential to promote strategies for reducing dependency on smartphones

Ethical Consideration

Data was collected anonymously through an online survey. Participants were provided with a detailed description of the study's objectives. Participation in the survey was voluntary, and prior written consent was obtained through a consent question; the survey could not proceed without the respondents' agreement and cooperation. Participants were assured of the confidentiality of the information gathered. The study obtained IRB approval of the National Cancer Institute, Cairo University (approval number: EB2410-304-039-192).

***Limitation*:** This study uses an online survey which has a lower response rate, possibly diminishing the sample's representativeness. The study sample was a convenience sample, due to the potential bias, finding are often not generalizable to the entire population. However, we consider the present study a guide for further studies considering larger sample size taken randomly for generalization.

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Availability of data and materials*:* Data will be available upon request from the corresponding author

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