SMARTPHONE ADDICTION: PREDICTORS AND ASSOCIATION WITH NOMOPHOBIA AND JOB PERFORMANCE AMONG OFFICE WORKERS: A CROSS-SECTIONAL STUDY

By

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Abstract

Introduction: The widespread use of smart phones has given rise to concerns about addictive behaviors leading to the emergence of smart phone addiction and nomophobia, and their potential impact on work performance. **Aim of Work:** This study aims at exploring smartphone addiction predictors and smartphone addiction association with nomophobia and job performance among office workers at faculty of Medicine, Suez Canal University. **Materials and Methods:** A cross-sectional study was conducted on 130 office workers employed in faculty of Medicine, Suez Canal University, Egypt. The participants were chosen using convenient sampling. The data was collected through a self-administered questionnaire that included personal data, smartphone usage data, an assessment of smartphone addiction using the short version of the Smart Phone Addictions Scale, an assessment of nomophobia using the Nomophobia Questionnaire, and an assessment of job performance using the Health and Work Performance Questionnaire. **Results:** The current study found a high prevalence of smartphone addiction, as 58.5% of office workers classified as addicted. All study participants displayed nomophobic behaviors, with the mild level prevailing (54.6%). Furthermore, a moderate positive correlation was observed between smartphone addiction and nomophobia ($r = 0.531$, $p < 0.001$). Additionally, a moderate negative correlation was found between job performance and smartphone addiction ($r=-0.452$, $p < 0.001$), as

well as between job performance and nomophobia (r=-0.478, p< 0.001). Regression analysis revealed that duration of daily smartphone use, playing games, use smartphone for entertainment purposes and nomophobia were significant predictors of smartphone addiction. **Conclusion and Recommendation:** The present study highlights high prevalence of smartphone addiction and nomophobia among office workers. They both affect job performance negatively. Addressing these issues are important for well-being and productivity in the workplace.

Keywords: Smartphone addiction, Nomophobia, Job performance, Office workers and Egypt.

Introduction

Over the past few decades, technology use and the widespread availability of smartphones have drastically changed how people share information and communicate, resulting in a significant influence on daily life. These profound changes have not only affected individuals' personal lives but also the realm of work (Li and Lin, 2018). Concerns have been raised about excessive smartphone (Ratan et al., 2021)usage, which can lead to problematic behaviors such as smartphone attachment, dependency, nomophobia, and smartphone addiction (Hessari and Nategh, 2022) .

Smartphone addiction refers to a type of technological addiction in which individuals excessively use their smartphones throughout their lives and struggle to maintain composure without them(Alageel et al., 2021). A meta-analysis conducted across 24 countries revealed widespread prevalence of smartphone addiction (Olson et al., 2022). Smartphone addiction can affect employees' wellbeing and work performance. Excessive smartphone use can result in decreased productivity, increased distraction, poor time management, and reduced cognitive functioning (Ratan et al., 2021).

Common factors that predict smartphone behavior include the use of games, social networking services, applications for entertainment, the amount of time spent using smartphones on weekends, and gender (female) (Park et al., 2021). Whereas, nomophobia is the anxiety or fear of not being able to use or being reachable by one's mobile phone (King et al., 2013). According to a systematic review conducted among young adults the prevalence of

nomophobia was found to range from 15.2% to 99.7% (Notara et al., 2021).

Although it may be argued that smartphone addiction and nomophobia are connected based on previous research (Elhai et al., 2016), the correlation between these two factors has not yet been sufficiently investigated (Tran, 2016). In a Pakistani study a significant correlation was demonstrated between smartphone addiction and nomophobia (r=0.47) (Latifi, 2020). Some studies propose that excessive phone use and addictive behaviors have a detrimental impact not only on individuals but also on the organization. This ultimately leads to reduced efficiency and job performance within the organization (Duke and Montag, 2017; Wang and and Suh, 2018). A study conducted in Turkey found a negative, and statistically significant correlation between smartphone addiction and employee performance (r = -0.494; p < 0.05) (Alan et al., 2022). While previous studies have investigated the influence of smart phone dependency and nomophobia in different environments, there is a limited understanding of these phenomena among office employees in higher education institutions. Due to the nature of their responsibilities, office workers may be more susceptible to developing an addiction to their smart phones and experiencing nomophobia because they constantly need to be connected and responsive. Therefore, the objective of this research was to bridge this gap in knowledge by conducting a study on the factors that predict smart phone addiction and its association with nomophobia and job performance among office workers.

Aim of Work

This study aims at exploring smartphone addiction predictors and smartphone addiction association with nomophobia and job performance among office workers at faculty of Medicine, Suez Canal University.

Materials and Methods

Study Design: It is an analytical cross-sectional study.

Place and duration of the study: The study was carried out on a sample of office workers employed in faculty of Medicine, Suez Canal University, Egypt; from November 2023 to January 2024.

Study Sample:

A sample size of 130 office workers was calculated using the following equation (Green, 2010). n= 104+K.Where n=sample size; K = the number of independent variables

affecting smartphone addiction = 11 (Mitchell and Hussain, 2018, Laurence et al., 2020; Park et al., 2021). The study participants were selected using a convenience sampling method. Both male and female employees aged 20 to 60 years, who work as administrative staff at the faculty of Medicine for at least six months and own a smart phone, were included in the study. Any employees with a history of psychological disorders, like schizophrenia or severe depression were excluded from the study.

Study methods:

Data was collected through a **self-administered questionnaire** consisting of five sections:

Section 1: **Personal characteristics**: including age, gender, educational level, marital status, years spent in current office job

Section 2: **Smartphone use data**: These involved the possession of a smartphone, duration of daily mobile use, common reasons for smartphone daily use.

Section 3: **Assessment of smart phone addiction using the Smart Phone Addictions Scale short version (SAS-SV)**: The SAS-SV is an abbreviated version of the original SAS.

It comprises of 10 items that are rated on a scale ranging from 1 ("strongly disagree") to 6 ("strongly agree"). The overall score was calculated by summing up the responses from these 10 items, where higher scores indicate a greater level of addiction to smartphones. The cut-off value for addiction differs for males and females (31 for males and 33 for females). Males who obtain a score of more than 31 points are considered to be addicted, whereas females are designated as addicts if they exceed 33 points (Kwon et al., 2013).

Section 4: **Assessment of Nomophobia using the Nomophobia Questionnaire (NMP-Q)**: The NMP-Q comprises 20 questions which are formulated on a 7-point Likert scale, ranging from 1 to 7.

A score of 20 indicates the absence of nomophobia, while scores ranging from 21 to 59 are classified as mild nomophobia. Scores between 60 and 99 represent a moderate level, and a score of 100 to 140 suggests severe nomophobia (Yildirim and Correia, 2015).

Section 5: **Assessment of Job Performance using The Health and Work Performance Questionnaire**: This questionnaire consists of seven items

that allow individuals to assess their own job performance over the course of the past four weeks. Participants were instructed to rate their responses on a 5-point Likert scale that ranged from 1 (all of the time) to 5 (none of the time). The total score on the questionnaire ranges from 7 to 35, with higher scores indicating a greater level of job performance. (Kessler et al., 2003). The original English questionnaire was initially translated bidirectionally into Arabic using a "back–back" approach. A public health expert was consulted to review and modify the questions in order to guarantee their facial and content validity. To test the questionnaire's language clarity and feasibility, a pilot study was conducted with 20 office workers from the faculty of Medicine at Suez Canal University. The data from the pilot study was not included in the final analysis. The reliability of the Arabic version of the questionnaire was considered satisfactory, as the Cronbach's alpha was >0.7 (Smart phone addiction scale = 0.772; Nomophobia scale = 0.927; Health and Work Performance Questionnaire = 0.802).

Consent

Participants gave informed consent before data collection. Participants were informed about the study's purpose and assured of confidentiality.

Ethical Approval

Ethical approval was obtained from the Ethical Committee at the Faculty of Medicine, Suez Canal University on November 29, 2023, with approval number 5500#, and followed ethical guidelines.

Data Management

The obtained data was coded, entered and processed using Statistical Package of Social Science (SPSS) version 23. Participants' characteristics are summarized using mean ± standard deviation for continuous variables and as frequency and percentage for categorical variables. The normality of data was tested with the Kolmogorov Smirnov test. The chi-square test or Fisher's exact test when necessary were used to assess the association between participants' characteristics, pattern of smartphone use, and smartphone addiction. Spearman's correlation analysis was used for assessing the associations between nomophobia, smartphone addiction, and job performance. Linear regression analysis was used for exploring predictors of smartphone addiction and job performance. Statistical significance was set at $p<0.05$.

Results

Table 1. Socio demographic characteristics of the studied sample (No=130).

Variables	No.	%
Gender		
Male	11	8.5
Female	119	91.5
Age		
Range	28-58 years	
Mean (SD)	40.44 years (6.46)	
Age groups/ years		
<30	9	6.9
30-40	72	55.4
41-51	42	32.3
≥ 52	7	5.4
Marital status		
Single	18	13.8
Married	97	74.6
Divorced or widow	15	11.5
Educational level		
Secondary / Diploma	49	37.7
Bachelor's degree	81	62.3
Employment duration/years		
Range	6-30 years	
Mean (SD)	16.76 years (5.34)	

A total of 130 office workers participated in the study, with a mean age of 40.44 years (SD = 6.46). Among the participants, there were 11 males (8.5%) and there were 119 females (91.5%). The educational levels varied, with 49 participants (37.7%)

having a secondary education, 81 participants (62.3 %) are holding a bachelor's degree. Regarding marital status, the majority of participants reported being married (74.6%), while 13.8 % of participants indicated being single. Moreover, the mean employment duration was 16.76 years (SD = 5.34) as indicated in Table 1. The mean duration of daily smartphone use was found to be approximately 6.65 hours per day (SD = 2.41). Regarding reasons to use smartphone, 96.2 % of participants reported using their smartphones primarily for making phone calls. Around 53% of participants reported using smartphones for engaging with social media platforms, and 34.6 % used it for entertainment purposes. While, approximately 26.9 % of participants reported using smartphones for playing games (Results are not tabulated).
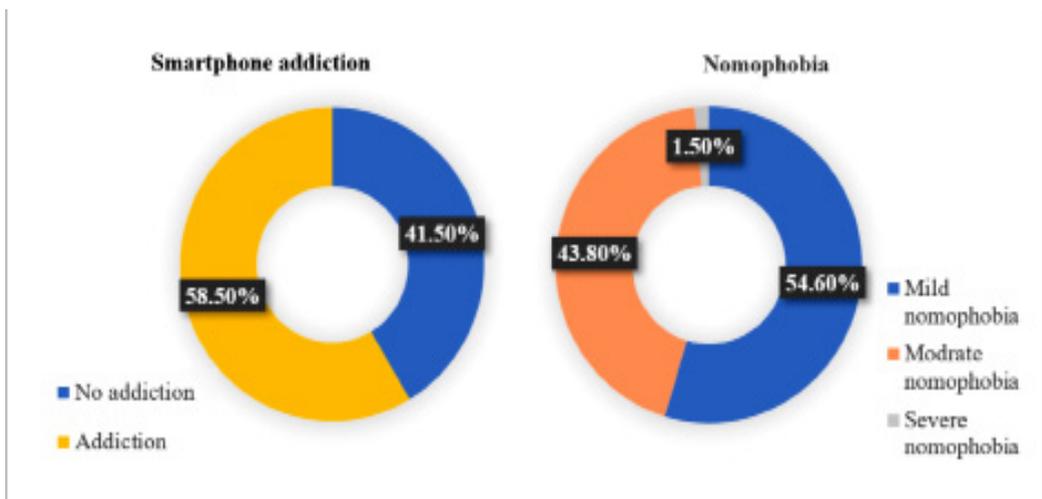

Figure 1. Distribution of smartphone addiction among participants (No=130).

As shown in Figure1, the prevalence of smartphone addiction among office workers was 58.5 %. Whereas, the distribution of nomophobia was 54.6%, 43.8%, and 1.5% for Mild, Moderate, and Severe nomophobia, respectively.

Table 2. Relation between sociodemographic characteristics and both smartphone addiction and nomophobia (No =130).

Variables	Smartphone Addiction		p value	Nomophobia			p value
	Yes (No = 54) No. (%)	NO (No = 54) No. (%)		Mild (No =71) No. (%)	Moderate (No =57) No. (%)	Severe (No =2) No.(%)	
Gender Male Female	9 (11.8) 67 (88.2)	2 (3.7) 52 (96.3)	0.121 F	3(4.2) 68 (95.8)	8 (14) 49 (86)	0 2 (100)	0.214 F
Age group/ years <30 30-40 41-51 ≥ 52	6 (7.9) 42 (55.3) 26 (34.2) 2 (2.6)	3 (5.6) 30 (55.6) 16 (29.6) 5 (9.3)	0.404 F	2(2.8) 39 (54.9) 25 (35.2) 5 7)	7 (12.3) 31 (54.4) 17 (29.8) 2 (3.5)	0 2 (100) 0 0	0.365 F
Marital Status Single Married Divorced or widowed	17 (22.4) 47 (61.8) 12 (15.8)	1 (1.9) 50 (92.6) 3 (5.6)	<0.001C*	3 (4.2) 65 (91.5) 3 (4.2)	15 (26.3) 30 (52.6) 12 (21.1)	0 2 (100) 0	<0.001F*
Educational level Secondary education /Diploma Bachelor's degree	41 (53.9) 35 (46.1)	8 (14.8) 46 (85.2)	<0.001C*	11 (15.5) 60 (84.5)	37 (64.9) 20 (35.1)	1 (50) 1 (50)	<0.001F*
Employment duration / years <10 10-20 21-30	6 (7.9) 58 (76.3) 12 (15.8)	4 (7.4) 41 (75.9) 9 (16.7)	0.987 C	4 (5.6) 54 (76.1) 13 (18.3)	5 (8.8) 44 (77.2) 8 (14)	1(50) 1(50) 0	0.206 F

C: Chi-square test   F: Fisher's Exact test,   SD: Standard Deviation,   *: Significant p-value is less than 0.05

Table 2 illustrated the relationship between sociodemographic characteristics and both smartphone addiction and nomophobia. The analysis revealed that marital status was a significant risk factor for smartphone addiction. Also, there was a significant association between the educational level and smartphone addiction (p < 0.001), with participants having secondary education were more likely to have smartphone addiction scores compared to those having bachelor's degree. As regards nomophobia, a significant association was found between nomophobia and both marital status and educational level (p < 0.001).

Concerning relationship between pattern of smartphone usage and smartphone addiction, a significant association between the duration of daily smartphone use and smart addiction was found (p < 0.001). The participants who reported longer durations of daily smartphone use were more likely to exhibit smart addiction compared to those who spent less time using their smartphones. The analysis also demonstrated that playing games, entertainment purposes, such as watching videos or listening to music, engaging in social networking, as well as surfing the internet and information seeking for work were significant risk factors for smart addiction (p<0.001) (Results were not tabulated).

Table 3. Spearman's correlation between nomophobia, smartphone addiction and job performance (No=130).

	Smartphone addiction		Nomophobia		Job performance	
	r	p-value	r	p-value	r	p-value
Smartphone addiction			0.531	**<0.001***	-0.452	**<0.001***
Nomophobia	0.531	**<0.001***			-0.478	**<0.001***
Job performance	-0.452	**<0.001***	-0.478	**<0.001***		

* : Statistically significant p-value (<0.05).

In Table 3, the results of the correlation analysis between nomophobia, smartphone addiction and job performance score showed a significant moderate positive correlation between smartphone addiction and nomophobia scores (r = 0.531, p < 0.001). It was observed that smartphone addiction, and nomophobia scores had moderate negative correlations with job performance (r=-0.452, p < 0.001; r=-0.478, p< 0.001, respectively).

Table 4. Linear regression of predictors for smartphone addiction, and job performance (No=130).

	Coefficient	95% CI of Coefficient	p value
Smartphone addiction			
(Constant)	26.928	20.577 -33.280	**<0.001 ***
Duration of daily smartphone use in hours	0.763	0.372 -1.155	**<0.001 ***
Playing games	2.207	0.003 - 4.114	**0.024***
Entertainment	3.878	1.923 - 5.833	**<0.001 ***
Nomophobia	0.087	0.036 - 0.139	**0.001 ***
Job performance			
(Constant)	29.15	20.77- 37.53	**<0.001 ***
Smartphone addiction	-0.22	-0.093, -0.006	**0.002 ***
Nomophobia	-0.05	-0.356, -0.083	**0.025***

Smartphone addiction model**:** R^2 of multivariate model = 0.531, Adjusted R Square= 0.500. Job performance model**:** R^2 of multivariate model = 0.290,   Adjusted R Square=0.249,   *: Significant p-value is less than 0.05.

To identify predictors of smartphone addiction, a multiple linear regression analysis was performed as displayed in Table 4.The results revealed that duration of daily smartphone use in hours ($\beta = 0.763$, p< 0.001), playing games (β =2.207, p =0.024), engaging in entertainment activities (β =3.878, p< 0.001) and nomophobia (β =0.087, p =0.001) were significant predictors of smartphone addiction. Also, smartphone addiction (β =-0.22, p =0.002), and nomophobia were found to be significant predictors for low job performance (β =-0.05, p =0.025).

Discussion

Excessive utilization of smartphones in both personal and professional domains can result in addictive behaviors and adverse outcomes. Interestingly, more than half of the office workers in the current study exhibited signs of smartphone addiction (58.5 %) (Figure 1). This high percentage indicates that smartphone addiction is a prevalent issue among studied office workers that needs to be addressed in the workplace. One possible explanation for this high prevalence is the addictive nature of smartphone applications and social media platforms which are designed to be engaging and often utilize techniques such as notifications, likes, and comments that trigger a dopamine response in the brain (Macit et al., 2018). Comparably, in a study conducted on smartphone addiction among postgraduate students in an Arabic sample (Middle Eastern post graduate students), a prevalence rate of 51% was reported (Alageel et al., 2021). Another study conducted in Saudi Arabia found the prevalence rate of smartphone addiction among the adult population to be 66.6% (El-Zayat

et al., 2023). Additionally, Mezher et al. (2023) noticed that 71.4% of hospital professionals in Beirut were addicted to smartphones. These variations could possibly be attributed to variances in the methodologies employed in the studies, such as the characteristics of the participants, unique work settings, and cultural factors.

Another noteworthy finding was that all participants in the current study exhibited nomophobic behaviors, with the highest proportion of them having a mild level of nomophobia (54.6%). Whereas 43.8% of them encountered moderate nomophobia (Figure 1). This particular finding implies that the prevalence of nomophobia is a serious problem among office workers. Similarly, a study conducted in Ghana among teachers revealed that all participants exhibited nomophobic behaviors, but with the highest percentage being observed for a Moderate level of nomophobia (54.8%) (Essel et al., 2022). Likewise, a study conducted in Turkey among pre-service teachers indicated that all participants experienced nomophobia, with 22% were categorized as Mild nomophobia,

55.5% exhibited Moderate nomophobia (Sevim-Cirak and Islim, 2021). The disparities in the reported distribution of nomophobia levels may be influenced by job demands, cultural disparities, or variations in the criteria employed to evaluate nomophobia.

The present study also demonstrated a significant moderate positive correlation between smartphone addiction and nomophobia (r=0.531, p<0.001) (Table 3). As well, nomophobia was statistically significant predictor of smartphone addiction (β =0.087, p =0.001) (Table 4). This agreed also with the findings of Semerci (2019), as well as Göktaş and Demirer (2023). These researchers found a statistically significant relationship between nomophobia and smartphone addiction, and concluded that nomophobia was the most influential factor in predicting smartphone addiction. These findings align with the conclusions drawn from prior research conducted by Koay et al. (2019), Yildiz Durak (2019), Buctot et al. (2020), and Latifi (2020) which indicated a positive correlation between smartphone addiction and nomophobia (r= 0.728, p < 0.05; r = .819, p < .001; r =0.615, p < .01; r=0.47, p=0.01) respectively. The reason for this positive relationship between smartphone addiction and nomophobia can be understood through that both smartphone addiction and nomophobia have similar psychological and behavioral traits involving an excessive dependency on mobile devices. Individuals who are addicted to their smartphones may form a strong bond with their devices, resulting in increased fear or unease when they are unavailable (Güner and Demir, 2022) .

Additionally, the present study indicated that educational level was a significant risk factor for smartphone addiction and nomophobia (p<0.001) with workers attaining a lower educational level were more likely to experience smartphone addiction and nomophobia (Table 2). These results matched those observed in an Iranian study which showed a statistically significant relationship between the prevalence of nomophobia and participants' level of education (Jamshidifar et al., 2023). In contrast, earlier study conducted among the general population in the Kingdom of

Saudi Arabia showed that education had no statistically significant relation with nomophobia (Hussien, 2022). Likewise, this finding contradicted findings from prior study conducted among young adults in Bangladesh, which showed that education had no statistically significant relation with smartphone addiction (Ratan et al.,2022). Also, the marital status was a significant risk factor for smartphone addiction and nomophobia. It was observed that a higher proportion of unmarried office workers, including those who were single or divorced/widowed, belonged to the smartphone addiction group, as compared to the non-addiction group (p<0.001) (Table 2). This finding was consistent with a study by Mezher et al. (2023), which also reported that single participants were more likely to display smartphone addiction. Nevertheless, a previous study done by Jamshidifar et al. (2023) failed to detect a significant relationship between the participants' marital status and the level of nomophobia. The underlying explanation could be that individuals with lower education levels may have limited access to information and resources for healthy smartphone use.

Whereas, marital status may influence smartphone addiction and nomophobia through social support and emotional attachment. No significant associations between gender, age and both smartphone addiction and nomophobia were detected among the studied group (Table 2). Similar findings have been identified by Alageel et al. (2021) from Arabic country, Essel et al. (2021) from Ghana, İdil et al. (2022) from Turkey. Another study done by Jamshidifar et al. (2023) from Iran noticed a significant relationship between age and nomophobia. While, Vagka et al. (2023) from Greece discovered that female participants were more likely to have severe nomophobia.

The study›s findings on job performance revealed a moderate negative correlation between smartphone addiction and job performance (r=-0.452, p < 0.001) (Table 3). This suggests that an increase in smartphone addiction is associated with a decrease in job performance. The negative correlation between smartphone addiction and job performance may be due to the distraction caused by constant engagement with smartphones. Similarly, the study also found a

moderate negative correlation between nomophobia and job performance (r=-0.478, p < 0.001) (Table 3). Significantly, the study also identified smartphone addiction (β =-0.22, p =0.002) and nomophobia (β =-0.05, p =0.025) as significant predictors of low job performance (Table 4). This may be explained by that workers experiencing nomophobia may constantly check their phones during work hours to alleviate their anxiety and ensure they are not missing out an important information or communication leading to decreased focus and productivity. Similarly, a study conducted by Alan et al. (2022) found a statistically significant weak negative correlation between smartphone addiction and employee performance (r= –0.494; p < 0.05). Also, it was partially in harmony with previous research conducted on 475 office and service workers in Iran, which showed that smartphone addiction can be positively associated with job performance. However, smartphone addiction indirectly decreases job performance through intensifying life invasion and techno exhaustion(Hessari and Nategh, 2022).

Also, the multivariate analysis in the current study revealed that the duration of daily smartphone use in hours (β = 0.763, p< 0.001), viewing entertainment activities (β =3.878, p< 0.001), and playing games (β =2.207, p =0.024) on smartphones were statistically significant predictors of smartphone addiction (Table 4). This implies that individuals who were engaged in high levels of daily smartphone use are more likely to develop smartphone addiction. Additionally, engaging with entertainment activities, playing games can provide immediate pleasure and gratification, further reinforcing the addictive tendencies. Similarly, a study done by Mezher et al. (2023) identified total time of daily smartphone use as a significant contributing factor of smartphone addiction. These findings also were in line with earlier study done by Park et al. (2021) who reported that games, entertainment applications were significant predictors of the addictive smartphone behavior. This also accorded with earlier study, which showed that smartphone addiction scores were significantly associated with duration of daily smartphone usage (Mustafaoglu et al., 2021).

Study Limitations

It is imperative to acknowledge certain limitations of current research. Firstly, the study design employed was cross-sectional, thereby constraining the ability to establish a causal relationship between smartphone addiction, nomophobia, and job performance. To examine the temporal relationships and causal effects, longitudinal studies are warranted. Secondly, this study relied on self-report measures, which are susceptible to biases such as memory recall. In order to enhance the accuracy of the findings, future research could incorporate objective measures. Thirdly, the sample consisted of office workers in a single location. Therefore, caution should be exercised when generalizing the findings to other employee types in different geographical areas. Further studies could be conducted with samples drawn from diverse occupations in various countries.

Conclusion

The present study disclosed that a significant proportion of the studied office workers were affected by smartphone addiction. All of participants had nomophobia with mild nomophobia prevailing. Duration of daily smartphone use in hours, engaging in playing games, viewing entertainment content, and nomophobia were predictors of smartphone addiction. Marital status and educational level also were significantly linked to smartphone addiction. There was a significant moderate and positive correlation between smartphone addiction and nomophobia. Additionally, both smartphone addiction and nomophobia were negatively correlated with job performance.

Recommendations

The current study suggests implementation programs to educate office workers about the risks of smartphone addiction, nomophobia, as well excessive engagement in activities as gaming, and entertainment content. It also recommends introducing digital detox programs and skill-building workshops for managing smartphone use, especially for unmarried or lower-educated employees. Employee assistance programs should be considered for those struggling with addiction. Organizations should establish policies to promote work-life

balance and set boundaries for phone usage. Longitudinal studies are needed to understand the long-term effects of addiction on office workers.

Conflict of Interest

Funding

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