Egyptian Journal of Occupational Medicine, 2025; 49 (3) : 87 - 102

CONSULTANT PHYSICIANS' WORK PERFORMANCE AND BEDTIME WEB SURFING

By

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DOI: *10.21608/ejom.2025.387401.1372*

Submit date: *2025-05-24* ***Revise date:*** *2025-06-24* ***Accept date:*** *2025-06-30*

Authors' contributions: *All authors contributed equally in this work.*

Abstract

Introduction: Bedtime web surfing is a prevalent problem nowadays and it may affect work performance. **Aim of Work:** To assess the effect of bedtime surfing on consultant physicians' work performance. **Materials and Methods:** A cross-sectional study was conducted from the first of October 2024 to the end of April 2025 on 385 consultant physicians from Egypt to assess their bedtime web surfing and its effect on job performance using the Individual Work Performance Questionnaire (IWPQ). Other sociodemographic data, criteria related to surfing and others related to their job were collected. **Results:** Mean (±SD) age of the participants was 46.04 (± 8.72) years, 59.2% were females, and 55.6% had urban residence. More than 70% of the participants prefer daytime web surfing and more than 50% would spend their surfing time on different social media platforms. Bedtime web surfers were significantly older, mostly females, from urban areas and have mainly surgical subspecialties. Linear regression analysis showed that task and contextual performance were significantly associated but negatively correlated with bedtime surfing ($p<0.001$). Also, task performance was significantly associated with rural residence ($p=0.006$). None of the domains of IWPQ was associated with other risk factors. **Conclusion:** Web surfing is an indispensable activity in a physician's life, it was more prevalent among females, older participants and those from urban areas. It had a significantly negative effect on both the task and contextual performance and it added value as the main purpose of its use was social media browsing.

Keywords: Bedtime web surfing, Consultant physicians, Individual Work Performance and Mobile phone surfing.

Introduction

The latest decade has seen an incredible development and growth in the telecom technology and cellphone along with smooth and fast connectivity through the Web to the online and virtual world. Also, worldwide this development has facilitated a lot in the economic progress, but it has also led to the development of a new problematic entity which is commonly known as Web Addiction (WA) (Teodorescu et al., 2023).

Recently many researchers have searched the term 'Web Addiction' as shortage of scientific evidence of real addiction and the term "problematic web use" has been preferred to be used (Moreno et al., 2022; Ruiz-Centeno et al., 2025).

Smartphones with web facilities are considered as friends for human beings due to increasing reliance on media-based interactions through various applications (Nawaz, 2024).

Smartphones are smart; they can execute several tasks at the same time like offering instant access to information, social interactions, and entertainment. Technology has kept on growing since the introduction of the first cellphone, leading to the current situation of making them more users friendly, attractive and popular. Smartphones are currently part of our life and we are somehow become dependent on our phones (Khan, 2008, Ellahi et al., 2021, Fryman and Romine, 2021).

Excessive use of smart phone has been found to affect one's personal, public and skilled performances (Muthulakshmi and Kothai, 2023), also has been associated with many health problems, including both biological and psychological issues (Gugushvili et al., 2020).

Healthcare professionals are well-known to be exposed to great pressure and stress due to their professional responsibilities and are prone to developing mental health problems like anxiety, depression, substance abuse etc (Marković et al., 2024).

Web Addiction (WA) as a mental health problem among healthcare professionals has moreover received some research attention (Grover et al., 2019).

In terms of the correlates of WA, studies done in the general population or a specific group of people (students, professionals etc.) suggest that excessive Web use is associated with significant

socio-occupational dysfunction (Ibrahim et al., 2022; Kumar et al., 2023), as it might decrease the work performances (Hussain and Khattak, 2019; Jarrahi et al., 2023). Work performance is defined as behaviors or actions that are relevant to the goals of the organization (Campebell, 1990)

Research suggests that excessive screen exposure at night can disrupt sleep patterns by affecting melatonin production, leading to reduced cognitive function, daytime fatigue, and decreased efficiency at work (Suni and Vyas, 2023, Wang et al., 2023). Furthermore, the blue light emitted from screens can prolong wakefulness, making it harder to achieve restorative sleep, which is essential for optimal brain function (Alam et al., 2024).

To the best of our knowledge, limited research has explored the impact of bedtime web surfing on the work performance of consultant physicians. This gap highlighted the need for a study specifically aimed at assessing this effect.

Materials and Methods

Study design: It was a cross-sectional study

Place and duration of the study: The study was conducted from the first of October 2024 to the end of April 2025 on consultant physicians from Egypt.

Study sample: Egyptian consultant physicians who are medically qualified doctors, have completed specialist training and are listed on the consultants register in a medical specialty, were invited to participate. The participants must be currently practicing their work in an Egyptian health care facility either governmental Ministry of Health (MOH) including teaching hospitals, University hospitals), and /or in a registered private health care facility or both.

To assess the effect of bedtime web surfing on consultant physicians' work performance, the participants were classified according to their spending hours in front of screens and most of the web surfing hours (diurnal preference in relation to Web surfing) 1) during daytime and 2) at bedtime. The work performance was assessed by the "Individual Work Performance Questionnaire (IWPQ)" developed and validated by Koopmans, 2015.

Study methods:

The questionnaire used was formed of three parts:

1-**Part I**: Socio-demographic criteria of consultant physicians (age, sex, residence, etc.).

2-**Part II** : Information regarding consultant physicians' jobs, sleeping hours, the main screen used for surfing, hours spent surfing, and web surfing time, mainly at daytime or bedtime.

3-**Part III** : The assessment of consultant physicians' job performance using the Individual Work Performance Questionnaire (IWPQ), (Koopmans, 2015**).** The IWPQ consisted of three parts. The first part contains five items for task performance (TP). TP is the proficiency with which individuals perform the core substantive or technical tasks central to his or her job (Campbell, 1990). The second part has eight items for the contextual performance (CP) component. CP is the behaviors that support the organizational, social, and psychological environment in which the technical core must function (Borman and Motowidlo, 1993). The third part has five items for counterproductive work behavior (CWP). CPW is the behavior that harms the well-being of the organization (Rotundo and Sakett, 2002).

Each item in task performance (TP) and contextual performance (CP) was presented in a five-point Likert scale scoring from 1 to 5 (seldom = 1 to always = 5), while counterproductive work behavior was presented in a four-point Likert scale scoring from 0 to 4 (never = 0 to often = 4). The primary reason for using IWPQ as a data collection tool is that it has adequate validity and good internal consistency. For each part of the questionnaire, the higher the score, the better the performance.

Sample size: the sample size was calculated by G*power software developed by Faul et al., 2007 and was based on past literature of Zaman et al., 2022 who assessed the job performance of healthcare providers in Pakistan and found that the job performance scale was 60.6% of doctors had satisfactory performance. The sample size calculated using statistics and the sample size calculator version 6 was 367 subjects at 95% confidence level and 80% power of the study. The sample size was calculated using the following formula:

To account for potential non-responses and incomplete questionnaires, the sample size was increased to 400 participants. After excluding 3.75% of the questionnaires due to incomplete responses, the final sample size included in the analysis was 385.

Consent

An informed consent to participate and publish was attached to the first part of the questionnaire which was completely anonymous. All the data were kept confidential and used only for research purposes.

Ethical Approval

Institutional Review Board of Faculty of Medicine, Menoufia University, Egypt had ethically approved the study before data collection; approval No 11/2024 COM 25-1 and was conducted according to the Declaration of Helsinki and its later amendment.

Data Management

The studied variables were tested for normality using the Kolmogorov-Smirnov test. They were expressed in: Number (No), percentage (%) mean ($\bar{x}$), median and standard deviation (SD). Results were collected, tabulated and statistically analyzed with SPSS statistical package version 27 (SPSS Inc.2020). Student's t-test is a test of significance used for comparison of quantitative variables between two groups of normally distributed data, while Mann Whitney's test was used for not normally distributed data. Chi-square test ($\chi 2$) was used to study the association between qualitative variables (with Z test to compare column proportions). Whenever any of the expected cells were less than five, Fischer's Exact test was used. Linear regression analysis was used to ascertain the effect of different risk factors on the different domains of the IWPQ. Two-sided P- value of < 0.05 was considered statistically significant and < 0.001 was considered statistically highly significant.

Results

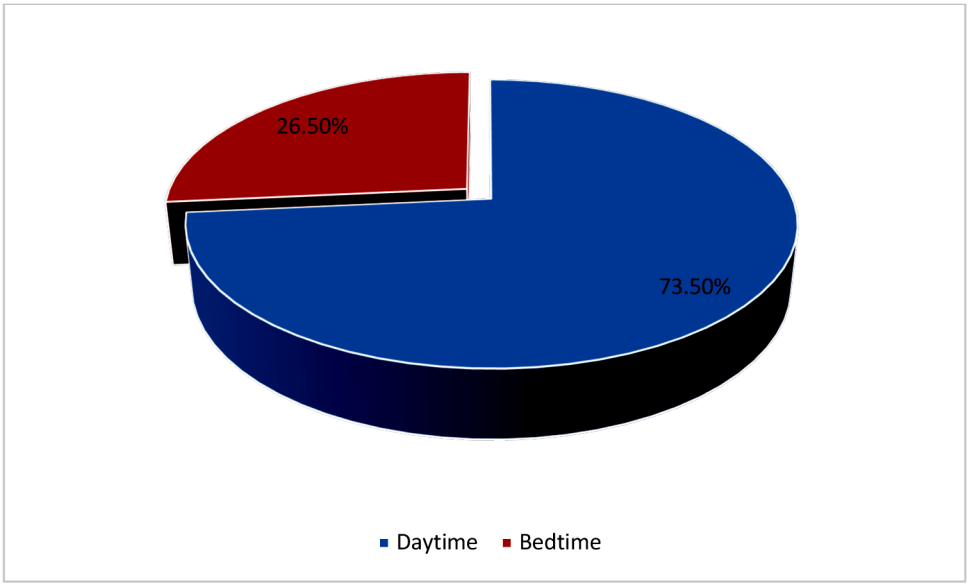

Figure 1: Web surfing preference among the studied physicians.

Bedtime web surfers represented 26.5 % (95% CI: 22.1-31.2%) of all the studied physicians.

Table 1: Comparison between daytime and bedtime surfers regarding sociodemographic characteristics (No=385).

Characters	Total	Daytime (No =283 No. (%)	Bedtime(No=102) No. (%)	P-value
Age / years (Mean±SD, range)	46.03 ± 8.72 (34.0-75.0)	44.68 ± 7.77	49.77 ± 10.07	**<0.001****
Gender				
Male	228 (59.2)	181 (64.0)	47 (46.1)	**0.002***
Female	157 (40.8)	102 (36.0)	55 (53.9)	
Residence				
Urban	214 (55.6)	137 (48.4)	77 (75.5)	**<0.001****
Rural	171 (44.4)	146 (51.6)	25 (24.5)	
Specialty				
Mainly surgical	128 (33.2)	83 (29.3)	45 (44.1)	**<0.001****
Mainly medical	124 (32.2)	88 (31.1)	36 (35.3)	
Almost equal	133 (34.5)	112 (39.6)	21 (20.6)	
Place of work				
Governmental	65 (16.9)	46 (16.3)	19 (18.6)	0.463
Private	29 (7.5)	24 (8.5)	5 (4.9)	
Both	291 (75.6)	213 (75.3)	78 (76.5)	

*: Significantly higher than their corresponding in the other group by Z test.

*: Significant difference, **: Highly significant difference

The study included 358 participants. Their mean (±SD) age was 46.04 (± 8.72) years, 59.2% were females, 55.6% were from urban residence, 34.5% were having specialties with equal surgical and medical practice and 75.6% were working in governmental and private hospitals. Bedtime surfig were significantly older, mostly females, urban residents and have subspecialty mainly of surgical practice. There was no significant difference between them regarding place of work (p=0.463).

Table 2: Comparison between daytime and bedtime web surfers regarding web surfing habits (No=385):

Habits	Total	Daytime (No=283) No. (%)	Bedtime (No =102) No. (%)	P-value
Working hours/ day(Mean± SD,Range)	10.35 ± 2.17, 5-16	10.39 ± 2.08	10.25 ± 2.41	0.554
Sleeping hours/ day (Mean± SD, Range)	6.60 ± 1.18, 5-9	6.47 ± 1.15	6.98 ± 1.17	**<0.001****
Check phone during night Yes NO	 196 (50.9) 189 (49.1)	 135 (47.7) 148 (52.3)	 61 (59.8) 41 (40.2)	0.036
Screen type Laptop Smartphone	 45 (11.7) 340 (88.3)	 36 (12.7) 247 (87.3)	 9 (8.8) 93 (91.2)	0.294
Screen time (hour/ day) (Mean± SD, Range)	4.55 ± 2.05, 2-10	4.76 ± 2.14	3.97 ± 1.63	**0.003***
Screen time/hours ≤4 >4	 216 (56.1) 169 (43.9)	 149 (52.7) 134 (47.3)	 67 (65.7) 35 (34.3)	**0.027***
Purpose of surfing Mainly Scientific Mainly news Mainly social	 86 (22.3) 78 (20.3) 221 (57.4)	 63 (22.3) 65 (23.0) 155 (54.8)	 23 (22.5) 13 (12.7) 66 (64.7)	0.076

*: Significant difference **: Highly significant difference

The mean (±SD) sleeping hours/day was 6.60 ± 1.18, while the mean (±SD) working hours/day was 10.35 ± 2.17. Half of the participants would wake up at night to check phones. More than 70% of the participants prefer daytime web surfing and more than 50% would spend their surfing time on different social media platforms.

Although there was no significant difference between the 2 groups as regarding

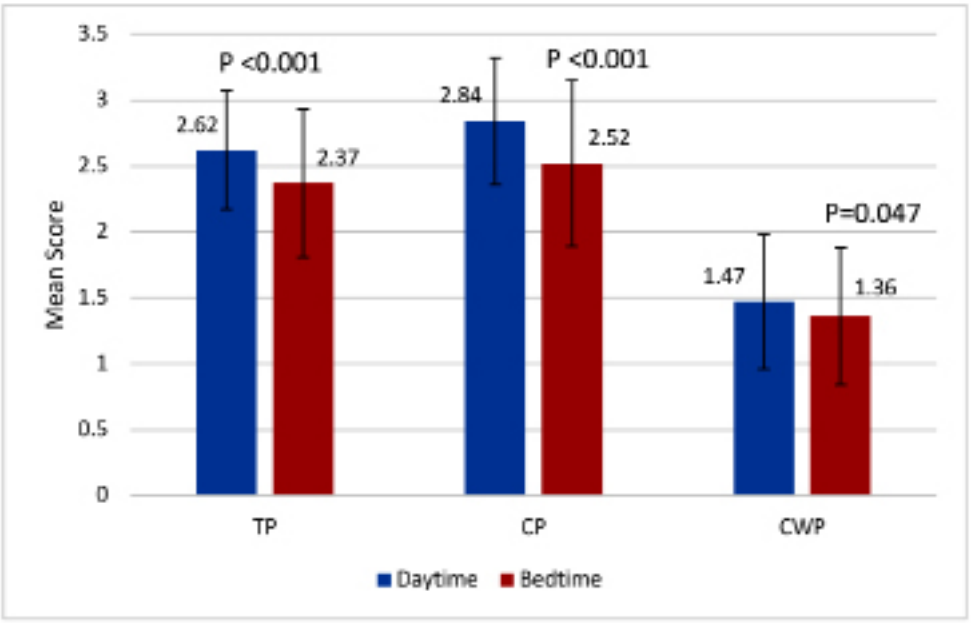

Figure 2: Comparison between day time and bed time web surfers regarding the domains of the IWPQ (No=385).

TP: Task Performance CP: Contextual Performance CWP: Counterproductive Work Behavior

Regarding the domains of the IWPQ, The mean (±SD) Task Performance (TP) of the participants was 2.55 ± 0.49 (ranging from 1.20-4.0), the mean (±SD) Contextual Performance (CP) was 2.76 ± 0.54 (ranging from 0.88-3.88), and the mean (±SD) Counterproductive Work Behavior (CWB) was 1.44 ± 0.51 (ranging from 0.20-3.2). The bed time surfers had significantly lower mean Task Performance (TP) ($p<0.001$), lower mean Contextual Performance (CP) ($p<0.001$) and lower Counterproductive Work Behavior (CWB) ($p=0.047$) (Figure 2).

Table 3: Linear regression analysis between different domains of the IWPQ and the different risk factors:

	TP		CP		CWP	
	B	**P value**	**B**	**P value**	**B**	**P value**
Age	0.002	0.464	-0.005	0.111	-0.002	0.426
Gender	-0.070	0.175	-0.055	0.333	-0.100	0.064
Residence	0.140	**0.006***	0.038	0.498	0.083	0.121
Specialty	0.038	0.220	0.010	0.771	0.019	0.555
Sleeping hours	0.018	0.407	-0.011	0.636	-0.027	0.231
Checking phone at night	0.017	0.733	-0.016	0.777	0.102	0.055
Screen time	0.006	0.600	0.016	0.233	-0.007	0.603
Surfing preference	-0.245	**<0.001****	-0.318	**<0.001****	-0.114	0.056

TP: Task Performance CP: Contextual Performance CWP: Counterproductive Work Behavior

*: Significant difference, **: Highly significant difference

Linear regression analysis showed that TP and CP were significantly associated but negatively correlated with bed time surfing ($p<0.001$). Also, TP was significantly associated with the rural residence ($p=0.006$). None of the domains of IWPQ was associated with other risk factors (Table 3).

Discussion

Personnel in the medical field are getting more dependent on smartphones for daily working activities. They use mobile apps for reading, texting, calculating and communicating with each other (Moore and Jayewardene, 2014).

The current study focused on the diurnal web surfing time and its effect on the work performance among consultant physicians. Bedtime surfers represented 26.5% of the studied group (Figure 1). They were significantly at older age and mostly were females (Table 1). Older physicians, specially surgeons, may be having heavy schedules during day time with back- to back tasks leaving them with very limited or even no free time. Females also, are usually busy during the day time taking care of their families after work hours. Their own "me time" would be only available at bedtime or even once they were already in bed (Kroese et al., 2014).

Bedtime surfers were also mostly residents of urban areas (Table 1). The loud noisy life of the crowed non-sleeping cities encourages people to stay awake till bedtime hours scrolling down their smartphones and laptops.

Bedtime surfers had significantly shorter screen time (Table 2). This is mostly because their waking night time was limited by the need to sleep enough hours before getting up early in the morning to get to work in time and because they get already tired by the end of the day with very short "me time". The purpose of web surfing did not differ significantly between the 2 groups, with an obvious domination for social media (Table 2).

The impact of web surfing on work performance has always been a matter of debate. Black et al., 2013 expressed their opinion on the level of Facebook use by the medical staff in the clinical practice as "unacceptable" and there should be a limited use of social networks at the worksite. They found that the mean use of Facebook during night shift was about 5 times higher (19.8 min/h) than the day time shift (4.3min/h) (p value <0.001).

However, the majority of the published studies focused on the effect of web surfing during work on work performance or studied its effect on the quality of sleep at night. Coker, 2011, suggested that web surfing during work time would have a positive effect on work performance as long as it did not

exceed 12% of the total work hours.

Bedtime surfing showed significant negative effect on all three domains of the IWPQ. Bedtime surfers showed significantly worse TP, CP and CWP than daytime surfers (Figure 2). After regression analysis, TP and CP remained significantly negatively associated with bed time surfing (Table 3).

Alan et al., 2021, studied the effect of smartphone addiction on the job performance of 262 health care workers in Turkey. Over half of the participants were females and 40% of them were physicians. Their mean time of daily use of smartphones was 4.33±1.96 h, mostly in the afternoon and at night. They had found a weak negative but statistically significant correlation between smartphone addiction and job performance. They found that "deprivation" subscale of smartphone addiction has the strongest relationship with employee performance. According to Bragazzi and Del Puente, 2014, "deprivation behavior" subscale includes continuous checking for messages or calls, continuous non-turning off their phones and keeping the phone beside the bed. These finding were highly consistent with the findings in the present where the 2 groups had almost the same mean of working hours, however, bedtime surfers had a significantly higher mean of sleeping hours. They were more frequently checking their phone during night and this might have exposed them to more interrupted sleep pattern which finally led to morning oversleep and inability to wake up attentive in the morning and negatively affecting their TP.

Noghan et al., 2023, studied the effect of smartphone use on the clinical performances of nurses in Iran and reported a decrease in clinical nursing performance with the increase of smartphone dependency (e.g. not turning off smartphone), effects of smartphone dependency (e.g. body pain and discomfort), and smartphone use while working.

Adelantado-Renau et al., 2019, found that web use time was a significant mediator between the poor sleep quality and low academic performance among 269 high school student from 2015-2017 in Spain. The same was reported by Rathakrishnan et al., 2020, who found a significant negative effect of smartphone addiction and poor quality of sleep on the academic performance of 323 university students in Malaysia.

You et al., 2020, had observed another mediating effect of bedtime procrastination and rumination between the web addiction and the poor quality of sleep at night among 1104 Chinese university students. In the Arab region, very close results were found in a study done by Alotaibi et al., included 545 university students in Saudi Arabia 2021.

One attention grapping study in Japan, 2019, found that high problematic web use was negatively associated with the interdependent happiness scale and school performance (expressed in the number times of arriving late for school even or skipping the whole day) among 1258 university students (Kitazawa et al., 2019).

Conclusion

Web surfing is an indispensable activity in physician's life. Bedtime web surfing was more prevalent among females, older participants and urban residents. It had significantly negative effect on both the task and contextual performance. It is worth noting that social media browsing was the main purpose of web surfing.

Recommendations

A follow up about the study aim, internet addiction and physicians work performance is recommended.

Limitations of the study

The study took a long time to reach the target calculated sample size to be completed as the physicians were busy. Cross sectional study indicate only association between risk factor (bedtime surfing) and outcome (work performance), but didn't indicate causation.

Funding

This study received no funding or financial support.

Conflict of Interest

All authors have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

We would like to thank all consultant physicians' who participated in the study.

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