

Physicians' Sleep Quality and Work Productivity: FoMO as a Mediator

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ABSTRACT

This study examined the relationship between Fear of Missing Out (FoMO), sleep quality, and work productivity among physicians. A total of 184 physicians aged 24–45 years participated, and data were collected online using the Fear of Missing Out Scale (FoMOS), Endicott Work Productivity Scale (EWPS), and Cumhuriyet Subjective Sleep Quality Scale (CSSQS). Correlation analyses showed that FoMO was positively associated with poorer sleep quality ($\rho=0.238$, $p=0.001$) and lower work productivity ($\rho=0.378$, $p<0.001$). Path analysis further indicated that FoMO mediated the relationship between sleep quality and productivity. Most participants were specialists (69.6%), mainly in internal medicine (79.6%), and frequently used platforms such as WhatsApp (95.7%), YouTube (87.9%), and Instagram (86.4%). These findings suggest that FoMO is linked to sleep disturbance and reduced productivity in physicians and may function as a key intermediary factor, warranting further research into its underlying mechanisms and potential interventions.

Keywords: FoMO, sleep quality, productivity, social media

Hekimlerin Uyku Kalitesi ve İş Üretkenliği: Bir Aracı Olarak FoMO

ÖZET

FoMO, son yıllarda çeşitli psikososyal faktörlerle ilişkileri nedeniyle dikkat çeken bir araştırma konusu olmuştur. Bu çalışma, FoMO'nun hekimlerde uyku kalitesi ve iş verimliliği ile ilişkisini incelemeyi amaçlamıştır. Araştırmaya 24–45 yaş aralığında 184 hekim dahil edilmiş; veriler çevrimiçi olarak Sosyal Ortamlarda Gelişmeleri Kaçırma Korkusu Ölçeği (SOGKKÖ), Endicott İş Verimliliği Ölçeği (EİVÖ) ve Cumhuriyet Öznel Uyku Kalitesi Ölçeği (CÖÜKÖ) kullanılarak toplanmıştır. İlişkiler korelasyon analizleriyle, aracılık etkisi ise yol analizi ile değerlendirilmiştir. Katılımcıların %69,6'sı uzman hekim olup en yüksek oran (%79,6)

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dahiliyededir. FoMO ile kötü uyku kalitesi ($\rho=0,238$, $p=0,001$) ve düşük iş verimliliği ($\rho=0,378$, $p<0,001$) arasında pozitif ilişki saptanmıştır. Ayrıca FoMO'nun uyku kalitesi ile iş verimliliği arasındaki ilişkide aracı rol oynadığı bulunmuştur. Bu bulgular, FoMO'nun hekimlerde uyku ve üretkenlik üzerinde önemli bir faktör olabileceğini göstermektedir.

Anahtar Kelimeler: FoMO, Uyku Kalitesi, Üretkenlik, Sosyal Medya

1. INTRODUCTION

Social media encompasses the web-based tools by which people share their feelings, experiences, and thoughts with others. Studies suggest that in addition to the many new features it offers, social media has the potential to induce stress among its users (Asghar et al, 2022). Just as the fact that the posts, updates, and shared photos reach a wide audience can trigger approval anxiety, users can also experience the anxiety called the fear of missing out (Wolfers, 2022).

FoMO, characterized by the apprehension of being left out of social events or experiences, refers to the anxiety experienced by individuals thinking that other people are experiencing rewarding experiences that they do not experience themselves and is characterized by the desire to constantly follow up and stay update and connect (Przybylski et al, 2013). This situation entails an unhealthy pattern of social media usage, leading to detrimental impacts on the individual's mental health (Fox and Moreland, 2015) . Recent studies have determined that FoMO is associated with many other problems or mental disorders such as online game addiction, social anxiety disorder, problematic mobile phone use, and a decrease in academic performance (Alinejad et al, 2022).

Sleep quality refers to the sum of all parameters related to whether the sleep process is restful and sufficient (Barbato, 2021). Being closely related to general health status, sleep quality is also affected by numerous mental disorders such as anxiety, depression, substance addiction, bipolar mood disorder and post-traumatic stress disorder (Rémi et al, 2019). Especially in recent times, researches has found that psychosocial elements like overuse of social networking platforms, addiction to social platforms, the fear of missing out on social interactions, and addiction to digital games are increasingly having a negatively impact on the quality of sleep (Brautsch et al, 2023). A study investigating nighttime social media engagement among university students revealed that individuals experiencing FoMO exhibited heightened cognitive activity before sleep, leading to a decline in sleep quality (Almeida et al, 2023). There has yet to be a study directly investigating the effect of poor sleep quality on FoMO. However, poor sleep quality appears to affect FoMO by increasing emotion regulation difficulties and interpersonal problems (Gustavsson et al, 2021 & Karhula et al, 2022).

Factors such as shift working order, possibility of emergency call, and extended working hours negatively affect the sleep quality of physicians (Dey et al, 2020). A study conducted with the participation of primary care physicians concluded that about one-third of the physicians needed to use hypnotics (Mohammadbeigi et al, 2016). There is limited research in the existing literature exploring how social media usage and related factors impact the

sleep quality of physicians. A study conducted in India highlighted physicians' poor sleep quality and daytime sleepiness, however failed to establish a connection between these issues and social media habits (Rozgonjuk et al, 2020). Conversely, research on medical faculty students revealed a significant correlation between poor sleep quality and excessive mobile phone usage (L Hur et al, 2013).

It is believed that individuals with high FoMO will be more alert to notifications and will have poorer concentration due to a part of their attention sources being busy, ultimately affecting their work productivity negatively (Azizi et al, 2019). Particularly studies conducted on young individuals have suggested that social media use decreases academic performance by negatively affecting cognitive skills such as attention, memory, and learning (Park et al, 2018). FoMO, which is a concept closely associated with social network use, aggravates efficient spare time management and multiple-task tracking and reduces academic adaptation (Yılmaz and Bekaroğlu, 2022).

An examination of existing literature reveals studies indicating a notable connection between FoMO and both diminished sleep quality and a decline in academic performance. Nevertheless it's important to highlight that these investigations mainly centered on adolescents and university students, with none of them measuring work productivity. We reasoned that physicians who require ongoing education and who are concerned about not being able to stay current may be particularly susceptible to FoMO (Dempsey et al, 2019). In our research exploring the association between FoMO, sleep quality, and work productivity in physicians, our hypotheses are outlined as follows:

- High scores obtained from FoMOS are associated with poor sleep quality.
- High scores obtained from FoMOS are associated with low work productivity.
- Low work productivity is linked to poor sleep quality.
- FoMO mediates the relationship between work productivity and sleep quality.

The results of our study may increase physicians' awareness of FoMO, highlight the relationship between work productivity and sleep quality, and guide the arrangements to be made in this regard.

2. METHODS

1.1. Study Participants

Individuals over the age of 45 may be less active on social media due to low digital literacy rates, difficulties with technological adaptation, and privacy concerns. As the participants needed to use social networks actively to test the hypotheses of the research, by reviewing the literature, being older than 45 years was determined as an exclusion criterion (Gökler et al, 2016; Scott et al, 2018; Gong and Ren, 2023). Snowball sampling method was used.

Self-report scales were sent to the physicians online. The data were collected between 15 December 2023 - 1 January 2024. Informed consent was obtained from participants online. The sample size was determined utilizing G-Power version 3.1.9.4 software. By referring to the impact size ($p=0.36$) in the study conducted by Scott and Woods (Sarıçam, 2022), with a type 1 error value of 0.05 and power value of 0.95, the minimum number of participants was calculated as 94.

1.2. Ethics Committee Approval

The study received ethical approval from the Ordu University Clinical Research Ethics Committee on December 8, 2023 (2023/326).

1.3. Data Collection Tools

1.3.1. Fear of Missing Out Scale

Przybylski and colleagues (2013) devised a 10-item, 5-point likert scale to measure FoMO, without any predefined threshold. Scores range from 5 to 50, with higher scores indicating more severe FoMO. The scale exhibits strong reliability, boasting a Cronbach's alpha coefficient of 0.89. Gokler et al. (2016) conducted a reliability and validity assessment of this scale for Turkish use.

1.3.2. Cumhuriyet Subjective Sleep Quality Scale

The scale was developed by Saricam (2022) to evaluate sleep quality. The scale development study was conducted with two participant groups. The scale consists of 18 items under three subscales, which are psychosomatic effects, sleep process, and sleep satisfaction. The scale as a whole exhibited a reliability coefficient of .91, with individual subscale coefficients of .84 for psychosomatic effects, .87 for sleep processes, and .84 for sleep satisfaction.

1.3.3. Endicott Work Productivity Scale

The Scale was created with the aim of assessing the productivity of individuals in their work (Endicott & Nee, 1997). The 25-item, 5-point Likert-type scale is designed to gauge work productivity, with a scale ranging from 0 to 100, higher scores indicate poorer productivity. The original scale boasts a Cronbach's alpha coefficient exceeding 0.90. Uguz et al. (2004) conducted a Turkish adaptation study, as well as reliability and validity assessments for the Endicott Work Productivity Scale tailored to the Turkish population.

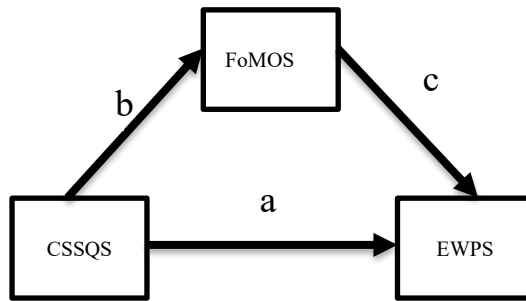
1.4. Statistical Analysis

The research employed IBM SPSS version 23.0 and JASP version 0.15 software for data analysis. Descriptive statistics for continuous variables included mean \pm standard deviation (mean \pm sd), median, first quartile, third quartile, and minimum and maximum values. Categorical variables were represented by numbers and percentages. The normal distribution of continuous variables was evaluated using the Kolmogorov-Smirnov test. Pearson correlation test was employed for continuous variables when normality assumption was met, while Spearman rank correlation test was used when normality assumption was not met.

Path analysis was performed to explore the intermediary function of FoMOS in the association between CSSQS and EWPS. Standardized regression coefficients in the path analysis model were estimated using the unweighted least squares method, along with reliability intervals. The adequacy of the path analysis model was evaluated by examining the fit indices CFI, GFI, and RMSEA with the dataset. Statistical significance level was set at $p < 0.05$.

Path analysis was employed to investigate if FoMOS acts as a mediator in the connection between sleep quality and work productivity. A graphical representation of the model is illustrated in Figure 1.

Figure 1. Mediation Model Established Between FoMOS, CSSQS and EWPS



FoMOS: Fear of Missing Out Scale, CSSQS: Cumhuriyet Subjective Sleep Quality Scale, EWPS: Endicott Work Productivity Scale

2. RESULTS

When the sociodemographic and clinical data were examined, it was seen that the mean age of the participants was 31.26 ± 4.92 , 59.8% were female, and 59.2% were married. Approximately two-thirds of the participants (69.6%) worked as specialist physicians. The majority of the specialist physicians (78.4%) worked in internal medicine. Regarding social network use frequency, the top three applications were WhatsApp (95.7%), YouTube (87.9%), and Instagram (86.4%).

The great majority of the participants (85.9%) did not have a diagnosed psychiatric disorder. The sociodemographic and clinical data are presented in Table 1.

Table 1. Descriptive Statistics of the Participants

	n	%
Age		
Mean±SD	31.26±4.92	
Min-Max	24-45	
Median (Q ₁ -Q ₃)	31.00 (28.00-33.75)	
Gender		
Female	110	59.8
Male	74	40.2

Marital Status		
<i>Single</i>	75	40.8
<i>Married</i>	109	59.2
Field of Specialty		
<i>Specialist physician in surgical sciences</i>	23	12.5
<i>Specialist physician in internal sciences</i>	102	55.4
<i>Specialist physician in basic sciences</i>	3	1.6
<i>Practitioner</i>	56	30.4
Social Network Use^a		
<i>WhatsApp</i>	176	95.7
<i>YouTube</i>	160	87.0
<i>Instagram</i>	159	86.4
<i>Twitter</i>	91	49.5
<i>Facebook</i>	55	29.9
<i>Pinterest</i>	23	12.5
<i>Linkedin</i>	16	8.7
<i>Other</i>	1	0.5
Psychiatric Disorder Diagnosis		
<i>Yes</i>	26	14.1
<i>No</i>	158	85.9

SD: Standard deviation, Q₁:1st quartile, Q₃:3rd quartile

^a Multiple-choice question; the percentages were calculated over all participants.

The minimum and maximum scores obtained from FoMOS were 10 and 46, and the scale mean score was calculated as 22.03±6.67. Half of the participants scored 20.5 and above on FoMOS. The minimum and maximum scores obtained from CSSQS were 2 and 46, and the scale mean score was found as 22.67±9.05. Regarding the subscales, the mean score for the Psychosomatic Effects subscale was determined as 7.96±3.07, for the Sleep Process subscale as 7.97±4.52, and for the Sleep Satisfaction subscale as 6.74±3.62. The minimum and maximum scores obtained from EWPS were 0 and 75, with a mean score of 31.20±15.78. Half of the participants scored 30.5 and above on EWPS. Table 2 presents the mean scores of the scales and descriptive values.

Table 2. Descriptive Statistics Regarding FoMOS, CSSQS, and EWPS Scores

	Mean±SD	Min- Max	Median (Q₁-Q₃)
FoMOS	22.03±6.67	10 - 46	20.50 (17.00-26.00)
CSSQS	22.67±9.05	2 - 46	23.00 (16.00-29.00)
Psychosomatic Effects Subscale	7.96±3.07	0 - 15	8.00 (5.00-10.00)
Sleep Process Subscale	7.97±4.52	0 - 20	7.00 (5.00-11.00)

Sleep Satisfaction Subscale	6.74±3.62	0 - 17	6.50 (3.00-9.00)
EWPS	31.20±15.78	0 - 75	30.50 (20.00-43.00)

SD: Standard Deviation, Q₁:1st quartile, Q₃:3rd quartile, FoMOS: Fear of Missing Out Scale, CSSQS: Cumhuriyet Subjective Sleep Quality Scale, EWPS: Endicott Work Productivity Scale

Correlations between the scales were examined through the Spearman rank and Pearson correlation tests. As a result of the analyses, it was found that there was a positive and weak correlation between CSSQS and FoMOS (Spearman’s rho=0.238, p=0.001), a positive and weak correlation between EWPS and FoMOS (Spearman’s rho=0.378, p<0.001), and a positive and weak correlation between CSSQS and EWPS (r=0.384, p<0,001). The correlations were statistically significant. Table 3 presents a summary of the correlations between the scales.

Table 3. Correlations Between FoMOS, CSSQS, and EWPS

	FoMOS		EWPS	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value
CSSQS	0.238	0.001¹	0.384	<0.001²
EWPS	0.378	<0.001¹		

¹Spearman rank correlation test, ²Pearson correlation test

FoMOS: Fear of Missing Out Scale, CSSQS: Cumhuriyet Subjective Sleep Quality Scale, EWPS: Endicott Work Productivity Scale

When the results obtained from the mediation model were examined, it was seen that CSSQS had a positive and statistically significant effect on EWPS ($\beta=0.580$, $p<0.001$) CSSQS on FoMOS ($\beta=0.150$, $p<0.001$), and FoMOS on EWPS ($\beta=0.600$, $p<0.001$). The indirect effect of CSSQS on EWPS through the mediation of FoMOS was also found to be positive and statistically significant ($\beta=0.090$, $p<0.001$). In this case, it was concluded that FoMOS had a mediating role in the relationship between CSSQS and EWPS. The fit indices which show that the path analysis model in which the mediating effect of FoMOS was investigated fit with the data were found to be in acceptable values with CFI:1.000 (>0.95 very good fit), GFI:1.000 (>0.95 very good fit) and RMSEA: 0.000 (<0.05 very good fit). Accordingly, it can be stated that the established path analysis model fitted the data very well. The results regarding the mediating model are presented in Table 4.

Table 4. The Results of the Path Analysis Model Established Between FoMOS, CSSQS, and EWPS

	Standardized β	Confidence Interval	p-value
<i>Direct Effect</i> CSSQS → EWPS	0.580	0.578-0.582	<0.001

CSSQS	→	0.150	0.148-0.152	<0.001
FoMOS				
FoMOS	→	0.600	0.596-0.605	<0.001
EWPS				
<i>Indirect Effect</i>				
CSSQS	→			
FoMOS	→	0.090	0.089-0.091	<0.001
EWPS				

CFI: 1.000, GFI: 1.000, RMSEA: 0.000. FoMOS: Fear of Missing Out Scale, CSSQS: Cumhuriyet Subjective Sleep Quality Scale, EWPS: Endicott Work Productivity Scale

3. DISCUSSION

The study included 184 physicians, and their sociodemographic and clinical data, along with their scale scores, are detailed in Tables 1 and 2. Correlations between the scales were analyzed, revealing positive but weak correlations among CSSQS and FoMOS, EWPS and FoMOS, as well as CSSQS and EWPS. Path analysis was conducted to explore the mediating role of FoMOS, indicating that it indeed mediated the relationship between CSSQS and EWPS.

Reviewing the literature reveals inconsistent findings regarding the correlation between sleep quality and FoMO. A research project with a significant number of college students revealed a link between the quality of sleep and addiction to social media, however did not find a significant relationship with FoMO (Zhu et al., 2023). In a study involving 283 university students, a theoretical model examining the connections among interpersonal stress, FoMO, sleeplessness, and mental health was assessed through path analysis. Results indicated that heightened interpersonal stress and FoMO correlated with increased levels of sleeplessness and poorer mental health. Notably, the study revealed that interpersonal stress exhibited a stronger correlation with sleeplessness compared to FoMO (Adams et al., 2020). Amid the COVID-19 pandemic, research into mobile phone addiction indicated that FoMO acted as a mediator in the relationship between mobile phone addiction and declining sleep quality (Huang et al., 2023). A qualitative study that investigated the factors affecting sleep quality in the early years of university concluded that socialization, FoMO, and social/technological attention distracting factors negatively affected sleep quality (Adams et al., 2017). In the current study, a positive and weak correlation was shown between FoMOS scores and increased CSSQS scores that indicated a poorer quality of sleep. This finding aligns with outcomes reported in several studies within the literature. Nevertheless, almost all studies conducted in this regard have been conducted with the participation of university students. In the research we conducted on a sample of physicians, the mean age was higher compared to the studies in the literature, and it is possible that sleep quality was affected by factors related to the profession. Furthermore, our study may be limited by the lack of assessment of factors known to impact sleep quality, such as nighttime social media usage and duration of screen exposure. In summary, additional research is required to elucidate the correlation between FoMO and sleep quality specifically within the physician population.

The literature contains few studies on the connection between FoMO and work productivity. A 2020 study addressed this gap, involving 748 participants. It revealed a positive correlation between FoMO and the use of social media, as well as daily living and work productivity (Rozgonjuk et al., 2018). In a study involving university students, it was discovered that FoMO was linked to difficulties in adjusting to university life and coursework. Additionally, in the context of academic adaptation, FoMO was recognized as a mediator in the relationship between involvement in social media and academic adjustment (Alt et al., 2018). It can be stated that our study obtained results consistent with the limited literature data on the relationship between FoMO and academic performance and work productivity.

The strength of our study is that it is the first time that the mediating role of FOMO in the relationship between sleep quality and work productivity has been studied. We believe that it is valuable to investigate this relationship in the medical profession, where sleep quality is of great importance. The model we established should be expanded in future studies using variables such as sociodemographic variables, nighttime social media use, and work stress. In addition, the relationships in the model we established are probably reciprocal. For example, although the model presumes that poor sleep quality can increase FoMO and that this could be related to low work productivity, this decrease in work productivity may increase work-related stress, which may negatively affect sleep quality. Measuring sleep quality via a self-report questionnaire is a limitation. Another limitation is that potential confounders (e.g. age, gender, working hours) were not controlled for among the variables. The study sample was created using the snowball method. This sampling method may not adequately represent the general population and may contain potential biases. Data collected using objective methods such as actigraphy or polysomnography may contribute to the expansion of the relevant literature.

Despite all these limitations, our research provides initial evidence concerning the correlation between FoMO and both sleep quality and work productivity among a group of physicians. Furthermore, it explores the mediating function of FoMO in the connection between sleep quality and work productivity within this sample. The findings of our study provide a concrete target for strategies aimed at improving physicians' mental health and work performance. For example, preventive mental health services such as regulating social media usage habits, digital detox programs, and stress management training can be planned for physicians to reduce the negative impact of FoMO. Experimental methods to be used in future studies, various quantitative data collection tools, including different variables that might be related to sleep and work productivity, and examining how variables such as age, gender, and work department intersect with the mediation model we established will contribute significantly to the literature on FoMO.

Statement of Research and Publication Ethics

All processes of this manuscript were conducted in accordance with the research and publication ethics principles of the Manisa Celal Bayar University Journal of Health Sciences Institute.

Authors' Contributions

The authors contributed equally to the study.

Conflict of Interest Statement

The author declares no conflict of interest with any person or organization

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