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The Relationship Between Nomophobia with Physical Activity and Sleep Quality In Community-Dwelling and Non-Frail Older Adults

Toplumda Yaşayan ve Kırılgan Olmayan Yaşlı Yetişkinlerde Nomofobi ile Fiziksel Aktivite ve Uyku Kalitesi Arasındaki İlişki

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ABSTRACT

Objective: Lack of physical activity, sleep problems and nomophobia are serious problems in adults. This study aimed to investigate the relationship between nomophobia with physical activity and sleep quality in non-frail older adults living in the community.

Materials and Methods: The participants' fragility status was determined using the "Tilburg Frailty Indicator Survey," while nomophobia levels were assessed with the "Nomophobia Questionnaire," physical activity levels were measured using the "International Physical Activity Questionnaire-Short Form," and sleep quality was evaluated with the "Pittsburgh Sleep Quality Index (PSQI).

Results: A total of 158 participants, 73 (46.8%) male and 85 (53.2%) female, were included in the study. While 5 (3.2%) of the participants were not nomophobic, 153 (96.8%) had nomophobia. 29 (18.4%) of the participants had no sleep problems, and 129 (81.6%) had sleep problems. As a result of the analysis, a weak negative correlation (r: -0.338, p<0.001) was found between physical activity and nomophobia. A positive and negligible correlation was observed between use of sleep medication, daytime dysfunction sub-scales, total PSQI scores and nomophobia (r:0.167-r:0.193, p<0.05).

Conclusions: It was determined that as nomophobia increased in non-frail adult people, their physical activity levels decreased, and their sleep quality was negatively affected.

Keywords: Physical activity, non-frail adult, mobile phone addiction, sleep quality

ÖZ

Amaç: Yaşlı bireylerde fiziksel aktivite eksikliği, uyku problemleri ve nomofobi ciddi sorunlardır. Bu çalışmada toplum içinde yaşayan kırılgan olmayan yaşlılarda nomofobinin fiziksel aktivite ve uyku kalitesi ile ilişkisinin araştırılması amaçlanmıştır.

Materyal ve Metot: Katılımcıların kırılganlık durumlarını belirlemek amacıyla "Tilburg Kırılganlık Göstergesi Anketi" kullanılırken, nomofobi düzeyleri "Nomofobi Anketi" ile, fiziksel aktivite düzeyleri "Uluslararası Fiziksel Aktivite Anketi-Kısa Formu " ile ve uyku kalitesi ise "Pittsburgh Uyku Kalitesi İndeksi (PUKİ)" ile değerlendirildi.

Bulgular: Çalışmaya 73 (%46,8) erkek ve 85 (%53,2) kadın olmak üzere toplam 158 katılımcı dahil edildi. Katılımcıların 153'ü (%96,8) nomofobik iken, 5'i (%3,2) nomofobi yaşamamaktaydı. Katılımcıların 29'u (%18,4) uyku problemleri yaşamazken, 129'u (%81,6) uyku problemleri yaşıyordu. Yapılan analiz sonucunda, fiziksel aktivite ile nomofobi arasında negatif yönlü zayıf bir ilişki (r: -0,338, p<0,001) bulundu. Aynı zamanda, uyku ilacı kullanımı, gündüz işlevselliği alt ölçekleri, toplam PUKİ puanları ile nomofobi arasında pozitif ve ihmal edilebilir bir ilişki gözlendi (r:0,167-r:0,193, p<0,05).

Sonuç: Sonuç olarak, kırılgan olmayan erişkin bireylerde nomofobi arttıkça, fiziksel aktivite düzeyleri azalmakta ve uyku kaliteleri olumsuz etkilenmektedir.

Anahtar Kelimeler: Fiziksel aktivite, kırılgan olmayan yaşlı bireyler, mobil telefon bağımlılığı, uyku kalitesi

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INTRODUCTION

In recent years, determining adult individuals who are frail or have the risk of frailty and developing appropriate treatment and approach methods for them have been one of the basic issues of geriatrics. Frailty is defined as a syndrome covering dysfunction of immunity, endocrine, stress, and energy regulation systems and is characterised by a decrease in individuals' strength, endurance, and physiological functions.[1] All these lead to an increase in individuals' risk of falling and getting injured and a decrease in their physical activity levels.[2,3]

For frail adult individuals, their mobile phones have an important place in establishing communication with their environment. Research has shown that older adults use their mobile phones more to establish communication with their family members, peers, and caregivers, meet their needs, and maintain their social interaction.[4] Although it provides an advantage from a social perspective, excessive use of technology can sometimes bring pathological consequences. "Nomophobia" is one of these pathological consequences. Nomophobia is the total nervousness, anxiety, and restlessness symptoms displayed by individuals separated from their mobile phones.[5] Although recent research has demonstrated that university students are the population most affected by nomophobia, this situation also affects the elderly.[6,7] These situations that can be solved individually in the young population bring along the fear of losing communication in the adult when combined with the medico-social problems caused by advanced age.[8] In individuals who socialise through their mobile phones, a decrease in physical activity appears inevitable.[9] This digital disorder leads to psychological, behavioral, and cognitive diseases that cause an inactive lifestyle, obesity, and insomnia.[10] Sleep quality is rather important for better cognitive and emotional functions. Overusing smartphones has been listed among the factors that negatively affect sleep.[11] Only a few studies have examined the relationship between nomophobia and insomnia, but these studies have been conducted on young adults.[11,12]

Although nomophobia has been examined in young individuals, its impact on the elderly is unknown. Therefore, this study aims to investigate the association between nomophobia and physical activity and sleep quality among non-frail elderly adults. According to our hypothesis, an increase in nomophobia levels will be correlated with a decrease in physical activity levels and a negative impact on sleep quality.

MATERIALS AND METHODS

Ethics Committee Approval: The study was approved by the KTO Karatay University Faculty of Medicine Non-Pharmaceutical and Medical Device Studies Ethics Committee (Date: 17.06.2022, decision no: 2022/051). Informed consent was obtained from the participants before the study, and the Declaration of Helsinki was complied with at all stages of the study.

***Study design and participants*:** The study was conducted with non-frail adult volunteers aged 65 and overusing smartphones between June and July 2022. The study's data were collected through Google Forms, which is an effective method of data collection, and the participants were community-dwelling individuals.

The study sample was calculated using G*Power (Version 3.0.10; Franz Foul, Universitat Kiel, Germany). As a result of the power analysis, the sample size was calculated as at least 156 individuals in each group, with a Type I error of 0.05 and a power of 85%. Two hundred eighteen people participated in the study, but 60 older adults got more than 5 points from the Tilburg Frailty Indicator (TFI) questionnaire. So, 158 non-frail older adults formed the sample of the study.

The study's inclusion criteria were being over 65 years old, living in a community, getting less than 5 points on TFI questionnaire, and using a smartphone. The study's exclusion criteria were living in a nursing home, having any problem that prevents physical activity, and having any diagnosed sleep problem.

Sociodemographic Data Form: Sociodemographic and clinical characteristics of the participants, such as age, marital status, living environment, number of children, chronic diseases, education level and the type of phone (smartphone or not), were questioned.

The Tilburg Frailty Indicator Questionnaire: The Tilburg Frailty Indicator questionnaire was used for assessing multidimensional frailty among community-dwelling older people. The scale has Turkish validity and reliability.[13] It is a 25-item scale including two parts. While ten questions in the first part examine chronic diseases and sociodemographic characteristics, 15 questions in the second part examine frailty's physical, psychological, and social components. Scoring on the scale is over 15 points, and a score of 5 and above is considered frailty.[13]

Nomophobia Questionnaire: A 7-point Likert-type Nomophobia scale consisting of 20 questions developed by Yildirim and Correia [14] was used to evaluate the nomophobia levels of the participants. The scale consists of four sub-dimensions: "not being able to communicate", "losing connectedness", "not being able to access information", and "giving up convenience". The value of "1" on the scale represents the statement of "strongly disagree", and the value of "7" represents the statement of "strongly agree". The

nomophobia levels of the participants are calculated by taking the sum of the scores obtained from the scale. It is accepted that those with a total score of less than 20 do not have nomophobia, those with a score between 21 and 59 have mild nomophobia, those with a score between 60 and 99 are considered moderate, and those with a score between 100 and 140 have extreme nomophobia.

International Physical Activity Questionnaire – Short Form: The International Physical Activity Questionnaire Short Form (IPAQ-SF) was used to assess the participants' physical activity. The Turkish validity and reliability of the questionnaire was performed by Saglam et al.[15] The form consists of seven questions that provide information about the number of days in which the participant did high, moderate and low-intensity activities in the last seven days, the time allocated for activities and the time spent sedentary.[15]

Pittsburgh Sleep Quality Index (PSQI): The Pittsburgh Sleep Quality Index was used to determine the participants' sleep quality. Agargun et al. performed its Turkish validity and reliability.[16] PSQI is a Likert scale of 19 questions that evaluates seven subparameters (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction). Scoring: 0 if it never happened, one if it is less than once a week, two if it is 1-2 times a week, and three if it is three or more times a week. Although high values indicate that sleep quality is impaired, a general score of 5 and above indicates that sleep quality is clinically impaired.[16]

Statistical Analysis: Statistical Package for the Social Sciences software version 25 (IBM Corp., Armonk, NY, USA) was used to analyse the data. Kolmogorov-Smirnov tests were used to test the suitability of the data for normal distribution. Spearman correlation analysis was used for the data that did not fit the normal distribution. Results were given as mean ± standard deviation (X ± SD), number (n), and percentage (%). The relationship between nomophobia and physical activity and sleep was analysed with the Spearman correlation test (negligible (0 - .20), weak (0.21 -0.40), moderate (0.41-0.60), strong (0.61-0.80), or very strong (0.81-1.00)). All statistical analyses were evaluated at a $p<0.05$ significance level.[17]

RESULTS

The study was conducted with 158 participants aged 65-87 years. All our participants were using smartphones. 112 (70.9%) participants had a chronic disease, and 46 (29.1%) had no chronic disease. The mean Nomophobia value of the participants was 58.82 ± 28.34. While 5 (3.2%) of the participants were not nomophobic, 77 (48.7%) had mild, 64 (40.5%) had moderate, and 12 (7.6%) had high nomophobia. The mean PSQI value of the participants was 6.82 ± 2.96. 29 (18.4%) of the participants had no sleep problems, and 129 (81.6%) had sleep problems. The sociodemographic and clinical characteristics of the participants are given in Table 1.

Table 1. Sociodemographic and clinical characteristics of the participants.

Characteristics		**Data**
Age (year), X±SD		69.80 ± 4.24
BMI (kg/m^2), X±SD		27.76 ± 4,25
Gender, n (%)	Male	73 (46.2)
	Female	85 (53.8)
Chronic Disease, n (%)	Yes	112 (70.9)
	No	46 (29.1)
Nomophobia scores, X±SD		58.82 ± 28.34
Nomophobia levels, n (%)	Not	5 (3.2)
	Mild	77 (48.7)
	Moderate	64 (40.5)
	High	12 (7.6)
The Tilburg Frailty Indicator Questionnaire, X±SD		3.03 ± 1.25
Sleep problems, n (%)	Yes	129 (81.6)
	No	29 (18.4)
PSQI-subscales, X±SD	Subjective sleep quality	1.19 ± 0.58
	Sleep latency	1.77 ± 0.89
	Sleep duration	0.91 ± 0.85
	Habitual sleep efficiency	0.28 ± 0.54
	Sleeping disturbances	1.78 ± 0.78
	Use of sleep medications	0.18 ± 0.61
	Daytime dysfunction	0.72 ± 0.81
	Total score	6.82 ± 2.96

X: mean; SD: standard deviation; BMI: body mass index; kg: kilogram; m: meter; n: number; %: percentage; PSQI: Pittsburgh Sleep Quality Index.

The mean IPAQ-SF value of the participants was 1043.39 ± 862.81 MET.min/week. As a result of the analysis, a negative correlation (r: -0.338, $p<0.001$) was found between physical activity and nomophobia. A positive and significant correlation was observed between use of sleep medication, daytime dysfunction sub-scales, total PSQI scores and nomophobia ($p<0.05$) (Table 2).

DISCUSSION AND CONCLUSION

In the study, the relationship of nomophobia with physical activity and sleep quality in non-frail elderly living in the community was examined, and nomophobia was detected in most adults. In addition, a negative relationship was found between nomophobia and physical activity level and sleep quality, and it was concluded that as nomophobia increased, physical activity decreased. In the case of nomophobia, individuals tend to limit their physical activity due to excessive phone use.

The decrease in physical capacity that develops along with ageing results in less participation of geriatric individuals in social activities. It is known that health and happiness, especially in elderly individuals, depend on their social and emotional relations with family members/friends.[18] Especially among

Table 2. Relationship between nomophobia and sleep quality.

	Nomophobia	Subjective sleep quality	Sleep latency	Sleep duration	Habitual sleep efficiency	Sleeping disturbances	Use of sleep medications	Daytime dysfunction	Total PSQI score
Nomophobia	1								
Subjective sleep quality	0.104	1							
Sleep latency	0.060	0.170^{*}	1						
Sleep duration	0.069	0.226^{**}	0.067	1					
Habitual sleep efficiency	0.134	0.387^{**}	0.379^{**}	0.288^{**}	1				
Sleeping disturbances	0.030	0.430^{**}	0.201^{*}	0.076	0.289^{**}	1			
Use of sleep medications	0.179^{*}	0.105	0.021	0.055	-0.024	0.063	1		
Daytime dysfunction	0.193^{*}	0.375^{**}	0.140	0.167^{*}	0.162^{*}	0.415^{**}	0.219^{**}	1	
Total score	0.167^{*}	0.608^{**}	0.539^{**}	0.450^{**}	0.552^{**}	0.665^{**}	0.249^{**}	0.651^{**}	1

*: $p<0.05$; **: $p<0.001$, PSQI: Pittsburgh Sleep Quality Index.

geriatric individuals, amidst the challenges brought about by ageing, establishing human relationships through mobile telephones is considered easier and more accessible, and the fear of being deprived of the mobile phone over time can lead to the development of emotions of not reaching/being deprived of loved ones.[19] Due to the developing nomophobia, decreasing physical activity levels and functionalities in daily life becomes inevitable.[20] Excessive use of smartphones leads to mental exhaustion, decreased physical activity levels, decreased cardiovascular fitness, decreased muscular mass, and increased fatty tissue.[21-22] In addition to excessive use of smartphones, a decrease in physical activity is observed as the level of nomophobia increases.[23] However, these studies have usually been conducted on young adults, and no study that examined the relationship between nomophobia and physical activity in geriatric individuals was encountered in the literature. The present study supports the literature related to young adults. The present study also determined that as nomophobia increased in geriatric individuals, physical activity decreased. We believe that in addition to the decrease in physical capacity developing with age in geriatric individuals, making calls through smartphones, sending and receiving messages, downloading applications, using these applications frequently, and spending time in the internet environment encourage a sedentary life. Technology can positively affect the quality of life by reducing social isolation feelings.[18] However, the negative effects of internet use for a long time are also known. Excessive internet use brings along problems such as depression, anxiety, and social isolation, as well as leading to sleep problems.[10]

In the present study, it was determined that as nomophobia increased in non-frail adult individuals living in a society, their sleep quality decreased. Quality sleep is necessary for all individuals' health and quality of life, but it can be affected by environmental factors, general health conditions, and social life. Today, excessive use of mobile phones is one of the significant environmental factors that could affect sleep quality.[24] It was found that the electromagnetic radiation emitted from mobile phones had a negative effect on sleep electroencephalograms and prevented melatonin secretion.[25] Especially nomophobic individuals may habitually use their smartphones late at night. A decrease in sleep quality causes individuals to feel tired all day and prevents housework, spare time activities, and sports habits.[26] Using smartphones until late at night leads to insomnia, and the electromagnetic waves that one is exposed to reduce rapid eye movement sleep latency.[27,28] Additionally, excessive use of smartphones and social media deteriorates sleep quality and leads to sleep problems.[29,30] When the literature is reviewed, it is seen that studies that examined the relationship between nomophobia and sleep were conducted on young adults. In the present study, in support of the literature, we found that, similar to young adults, an increase in nomophobia among geriatric individuals was associated with decreased sleep quality. We believe that sleep quality decreased in aged individuals participating in our study due to the effects of the electromagnetic field and melatonin hormone.

In conclusion, it was determined that as nomophobia increased in non-frail adult people, their physical activity levels decreased, and their sleep quality was negatively affected. This study has provided valuable insights into the relationship between nomophobia, physical activity, and sleep quality among non-frail older adults. The results of this study have confirmed our initial hypothesis that higher levels of nomophobia are associated with decreased physical activity levels and poorer sleep quality in this population. The findings align with existing literature regarding the detrimental impact of excessive technology use on health outcomes, extending this understanding to the unique context of older adults. Additionally, identifying these associations highlights the importance of addressing the challenges posed by technology dependence in geriatric care and public health interventions.

The present study has limitations. The study's limitations are that it was not questioned how long and when the participants used their smartphones daily, and current chronic diseases were not included in the analysis. Using the nomophobia measurement tool in this study as a subjective measure implies that participants' self-assessments might be influenced by their judgments when evaluating their own experiences. This circumstance could complicate the objective assessment of nomophobia levels. Similarly, measurements of physical activity and sleep quality should also be considered as relying on participants' subjective perceptions.

To increase physical activity levels and improve sleep quality in geriatric individuals, it is recommended that social responsibility programs that will decrease the duration of smartphone use and get these individuals to gain fun and sustainable exercise habits should be disseminated. It is also recommended that the situations of geriatric individuals living in nursing homes and society should be compared in future studies. The findings of this study carry implications for clinical practitioners working with older adults. Clinicians should assess and address nomophobia as a potential barrier to physical activity engagement and sleep quality. Incorporating questions about technology use and dependency during routine assessments can help identify at-risk individuals. Furthermore, the findings of this study can guide the development of programs and policies

to manage technology use habits and nomophobia levels of elderly individuals.

Ethics Committee Approval: The study was approved by the KTO Karatay University Faculty of Medicine Non-Pharmaceutical and Medical Device Studies Ethics Committee (Date: 17.06.2022, decision no: 2022/051).

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – BSU; Supervision – AA, AA; Materials – HG, CSP, EC; Data Collection and Processing – BSU, HG, CSP, EC; Analysis and Interpretation – HG, AA, AA; Writing – BSU, HG, CSP, EC.

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