

# Possible Demographic, Physical, and Psychological Characteristics Associated with Internet Addiction in Turkish People

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## ABSTRACT

**Background:** Internet addiction, which affects people of all ages and backgrounds, is a worldwide issue that has to be addressed. To date, little is known about the demographic, physical, and psychological characteristics of Turkish adults with this addiction. Therefore, the aim of this study was to investigate the possible demographic, physical, and psychological characteristics associated with Internet addiction in Turkish adults, with the goal of informing prevention and intervention efforts.

**Methods:** The sociodemographic information collected included age, sex, dominant upper limb, educational status, employment status, size of place of residence, and smoking status. The Internet Addiction Scale was used to assess the participants' addiction. The International Physical Activity Questionnaire was used to assess physical activity levels. The Beck Depression Inventory was used to assess depression-related symptoms and the Pittsburgh Sleep Quality Index was used to assess sleep quality.

**Results:** The participants in the study had a mean age of 45 years with a standard deviation of  $\pm 9$  years, ranging from 18 to 65 years. The multinomial logistic regression analysis revealed that, among the variables studied, only moderate or severe depression was significantly associated with strong Internet addiction with an odds ratio of 11.496 ( $p=0.002$ ). None of the other variables showed a significant association with strong Internet addiction ( $p>0.05$ ).

**Conclusion:** Overall, the findings of this study highlight the importance of considering depression as a potential risk factor for Internet addiction. Future research could explore the underlying mechanisms and causal pathways between depression and this addiction, and investigate potential interventions to address the issue.

**Keywords:** Depression, Internet addiction, Physical activity, Sleep quality, Turkish people

## Türk Halkı'nda İnternet Bağımlılığıyla İlişkili Olası Demografik, Fiziksel ve Psikolojik Özellikler

### ÖZET

**Arka plan:** İnternet bağımlılığı, her yaşta ve farklı geçmişlere sahip bireyleri etkileyen, dünya çapında büyüyen bir endişe kaynağıdır. Bugüne kadar internet bağımlısı Türk yetişkinlerinin demografik, fiziksel ve psikolojik özellikleri hakkında yeterince bilgi bulunmamaktadır. Bu nedenle, bu çalışmanın amacı, önleme ve müdahale çabalarına bilgi vermek amacıyla Türk yetişkinlerinde internet bağımlılığıyla ilişkili olası demografik, fiziksel ve psikolojik özellikleri araştırmaktır.

**Yöntemler:** Bu çalışmada toplanan sosyodemografik bilgiler yaş, cinsiyet, baskın üst ekstremitte, eğitim durumu, çalışma durumu, ikamet edilen yerin büyüklüğü ve sigara kullanımını içermektedir. İnternet bağımlılığını değerlendirmek için İnternet Bağımlılığı Ölçeği kullanıldı. Fiziksel aktivite düzeylerini değerlendirmek için Uluslararası Fiziksel Aktivite Anketi kullanıldı. Depresyonla ilişkili semptomları değerlendirmek için Beck Depresyon Envanteri, uyku kalitesini değerlendirmek için Pittsburgh Uyku Kalitesi İndeksi kullanıldı.

**Bulgular:** Çalışmaya katılanların ortalama yaşı 45, standart sapması  $\pm 9$  yıl olup, 18 ile 65 arasında değişmektedir. Çok terimli lojistik regresyon analizi, incelenen değişkenler arasında yalnızca orta veya şiddetli depresyonun, 11.496 olasılık oranı ve 0.002 p değeri ile güçlü internet bağımlılığı ile anlamlı şekilde ilişkili olduğunu ortaya koydu. Diğer değişkenlerin hiçbirini güçlü internet bağımlılığı ile anlamlı bir ilişki göstermedi ( $p>0.05$ ).

**Sonuç:** Genel olarak, bu çalışmanın bulguları, depresyonu internet bağımlılığı için potansiyel bir risk faktörü olarak görmenin önemini vurgulamaktadır. Gelecekteki araştırmalar, depresyon ve internet bağımlılığı arasındaki altta yatan mekanizmaları ve nedensel yolları keşfedebilir ve bu konuyu ele almak için potansiyel müdahaleleri araştırabilir.

**Anahtar kelimeler:** Depresyon, İnternet bağımlılığı, Fiziksel aktivite, Uyku kalitesi, Türk insanı

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Internet addiction is a worldwide issue affecting people of all ages and backgrounds (1). Adult Internet addiction has developed in Türkiye as a result of the Internet's increased accessibility and availability. A variety of detrimental health and psychological effects, including sleep difficulties, anxiety, sadness, and social isolation, have been linked to this addiction (2).

Age, sex, educational attainment, and employment status were all factors included in the study. Young people are more likely than older people to develop an Internet addiction, as has been demonstrated numerous times (3). For instance, a study found that those between the ages of 18 and 24 are more likely than those between the ages of 25 and 34 to develop this addiction (4). The link between sex and Internet addiction is less obvious than it is with age (3). There is no difference between the sexes in terms of Internet addiction according to several studies (5-7). Sex is not a factor in Internet addiction, according to a Turkish study (8). Lower levels of addiction have been linked to higher levels of education (9). For instance, a Chinese study indicated that those with more education have lower rates of Internet addiction (10). The data supporting a link between employment status and Internet addiction are conflicting. While some studies have revealed a strong correlation between Internet addiction and unemployment, others have found no such correlation (11, 12). While there are some general trends in the data on demographics and Internet addiction, the relationship is complicated and could be influenced by contextual and cultural factors. There has been little systematic research on the connection between physical traits and Internet addiction. Body mass index (BMI) and Internet addiction appear to be positively correlated in some studies. According to this finding, those with higher BMIs are more likely to have online addiction. Elevated BMI has been linked to increased levels of Internet addiction according to several studies (13-15). Additionally, sleep issues such trouble falling asleep or waking up early have also been linked to this addiction (16). According to a Chinese study (17), Internet addiction is strongly linked to poor sleep quality. It is unclear whether physical exercise and Internet addiction are related. Higher levels of physical activity have been linked to decreased levels of Internet addiction in some studies, whereas no significant relationship has been observed in others (18-20). Internet use for extended periods has been linked to musculoskeletal problems such eyestrain and back and neck pain (21). Internet addiction was linked to greater prevalence of musculoskeletal issues according to a study performed in Türkiye (22). Overall, more research is required to clearly

correlate Internet addiction to certain physical traits, despite the fact that they are associated. Numerous correlations between numerous psychological traits and Internet addiction have been discovered. Higher levels of anxiety and despair have been linked to Internet addiction. For instance, a study indicated that people with this addiction had higher levels of anxiety and despair than people without it (23).

Lack of social support and social anxiety have been linked to Internet addiction. According to one study, people addicted to the Internet had lower levels of social support and higher levels of social anxiety than people not addicted (24). Internet addiction has been linked to specific personality features. For instance, research has shown that Internet addicts tend to be less pleasant and conscientious and more neurotic (25). Higher degrees of impulsivity have been linked to this addiction. According to a Chinese study, people addicted to the Internet had higher degrees of impulsivity than those who were not (26). In general, psychological variables appear to be significant in the emergence and perpetuation of this addiction. To completely comprehend the intricate connection between psychological traits and Internet addiction, more research is required.

The demographic, physical, and psychological traits of Turkish Internet addicts are still mostly unknown. In order to inform preventative and therapeutic efforts, the purpose of our study was to evaluate the potential associated demographic, physical, and psychological traits of Internet addiction in Turkish people.

## METHODS

### *Participants*

In January-February 2023, 100 adults (55 females, 45 males) voluntarily participated in the study (Table 1). All measurements were performed at Çankırı Karatekin University's Department of Occupational Therapy. The local ethics committee of Çankırı Karatekin University approved the protocol for the study (Protocol ID: ee880d6501f54d5c). All participants provided informed consent before enrollment.

This cross-sectional study was conducted with data obtained in January-February 2023 in Türkiye and investigated the relationship between characteristics (demographic, physical, and psychological) and internet addiction. All participants signed a consent form explaining the study's aims and procedures. The study was performed

in line with the principles of the Declaration of Helsinki. Informed consent was obtained from all the participants. Those with certain abnormalities, such as cognitive or neurological disorders, pain in the upper extremities, functional limitations, or cognitive impairments, were excluded from the study to ensure appropriate norms. The sample consisted of 100 adults aged 18-65 years. All were literate and all reportedly routinely used internet. Fourteen participants were excluded because they had not filled out the information forms adequately. The results of a similar study investigating factors influencing smartphone addiction among adults in Brazil were used to estimate the appropriate sample level. Based on the logistic regression results in that study, 94 participants was chosen as the minimum required sample size for a study with an expected odds ratio of 1.9 at the 80% confidence interval. Considering 10% data loss, it was decided to carry out the study with at least 104 people (27).

### *Main Outcomes*

#### **Sociodemographic Information**

Age, sex, dominant upper limb, educational status, employment status, size of place of residence, and cigarette and alcohol consumption were recorded. The instrument was designed by the researchers based on a population survey.

#### **Internet Addiction Scale (IAS)**

The IAS was developed in 2009 and its validity and reliability were confirmed (28). The scale consists of 35 items and has four subdimensions: deprivation, difficulty in control, impairment in functioning, and social isolation. Items are evaluated using a 5-point Likert-type scale (completely agree, agree, undecided, disagree, and strongly disagree) and each item is scored from 5 to 1. All items of the scale are for addiction and no score conversion was conducted. In the evaluation of the score obtained from the scale, two-stage clustering analysis was performed with the total scores obtained from the participants and addiction status. They were classified into 4 groups: the addicted group (>118), the group at risk of addiction (90-118), the threshold group (67-90), and the non-dependent group (<67).

#### **International Physical Activity Questionnaire (IPAQ)**

Eight items are used in the IPAQ to gauge how much time and effort people devote to physical exercise in various contexts, including work, transit, housework, and leisure. The degrees of physical activity are divided using the IPAQ (29). Accordingly, the metabolic equivalent of task (MET)

can be divided into low, moderate, and high categories. Less than 600 MET-min/week is considered low (sedentary, inactive), 601-3000 MET-min/week is considered moderate, and more than 3000 MET-min/week is considered high physical activity.

#### **Beck Depression Inventory (BDI)**

The BDI assesses symptoms related to depression. It is a scale consisting of 21 items and measures the cognitive, emotional, behavioral, somatic, and motivational symptoms of depression. Symptoms in the scale include sadness, pessimism, dissatisfaction with oneself, sleep-related problems, and depressive complaints such as fatigue. Each question in the scale includes four different options, ranging from zero to three, from mild to severe. Total scoring ranges from 0 to 63. Depression is determined by summing the scores for all questions. The higher the total score, the higher the severity of depression. If the BDI total score is between 0 and 9, it means "no depression", between 10 and 16 "mild depression", between 17 and 29 "moderate depression", and between 30 and 63 "severe depression" (30).

#### **Pittsburgh Sleep Quality Index (PSQI)**

The PSQI was developed to determine the sleep quality of individuals. Eighteen of the questions are self-report questions. Although 5 questions are answered by the spouse or roommate of the individual, they are excluded from the scoring. Each of the components is included in the calculation by giving a score between 0 and 3. By summing the scores of the 7 components, the total PSQI score is obtained. The total score ranges from 0 to 21. If the total PSQI score is greater than 5, sleep quality is considered poor (30).

### *Statistical Analysis*

Using SPSS Statistics (v.28.0), descriptive and inferential statistical analysis of the data acquired was performed. While numerical variables were expressed as mean and standard deviation, qualitative variables were expressed as relative (%) and absolute (n) frequencies. Inferential statistics were used to assess several dichotomized variables. In the bivariate analysis, Pearson's chi-squared test, raw odds ratios (ORs), and their corresponding confidence intervals (CIs) were used to find correlations between the dependent variable (degree of Internet addiction) and the other variables. Multivariate logistic regression was then carried out. A 5% level of statistical significance was used to obtain adjusted OR values and their corresponding CIs.

## RESULTS

The participants in the study had an average age of 45 years with a standard deviation of  $\pm 9$  years, ranging from 18 to 65 years. The mean BMI was 26.5 with a standard deviation of  $\pm 4.4$ . The average IPAQ score was 2711.7 with a standard deviation of  $\pm 2447.9$ . The mean BDI score was 12.4 with a standard deviation of  $\pm 7.9$ . The mean IAS score was 74.7 with a standard deviation of  $\pm 30.4$ . Lastly, the mean PSQI score was 5.8 with a standard deviation of  $\pm 2.9$ . The predominant sociodemographic and lifestyle characteristics of the sample were as follows: 55.0% of the participants were female (n=55), 46.0% had a middle school education (n=46), 52.0% were employed (n=52), 56.0% lived in rural areas (n=56), 64.0% were non-smokers (n=64), 89.0% reported no alcohol consumption (n=89), 48.0% had a moderate level of physical activity (n=48), 40.0% reported mild depression (n=40), 48.0% had a moderate level of physical activity (n=48), 39.0% were not addicted to the Internet (n=39), and 52.0% reported poor sleep quality (n=52) (Table 1).

	Mean $\pm$ SD	n (%)
<b>Age</b>	45.4 $\pm$ 9.2	
<b>Sex</b>		
female		55 (55%)
male		45 (45%)
<b>Weight</b>	74.8 $\pm$ 12.9	
<b>Height (cm)</b>	168.4 $\pm$ 8.9	
<b>BMI</b>	26.5 $\pm$ 4.4	
<b>Educational Status</b>		
elementary school		7 (7%)
middle school		46 (46%)
high school		19 (19%)
bachelor's degree or higher		28 (28%)
<b>Working Status</b>		
employed		52 (52%)
non-employed		48 (48%)
<b>Living Status</b>		
rural		56 (56%)
urban		44 (43%)
<b>Smoking</b>		
smoker		36 (36%)
non-smoker		64 (64%)
<b>Alcohol Consumption</b>		
yes		11 (11%)
no		89 (89%)

<b>Physical Activity (IPAQ)</b>	2711.7 $\pm$ 2447.9	
low (<600)		26 (26%)
moderate (600-3000)		48 (48%)
high (>3000)		26 (26%)
<b>Depression (BDI)</b>	12.4 $\pm$ 7.9	
no depression (0-9)		34 (34%)
mild depression (10-16)		40 (40%)
moderate or severe depression (17-63)		26 (26%)
<b>Internet Addiction (IAS)</b>	74.7 $\pm$ 30.4	
addicted (>118)		
risk of addiction (90-118)		
threshold (67-90)		
non-addicted (<67)		
		<b>STRONG</b>
		<b>WEAK</b>
<b>Sleep Quality (PSQI)</b>	5.8 $\pm$ 2.9	
poor (>5)	52 (52%)	
good ( $\leq$ 5)	48 (48%)	

*Abbreviations: SD: Standard deviation, BMI: Body Mass Index, IPAQ: International Physical Activity Questionnaire, BDI: Beck Depression Inventory, IAS: Internet Addiction Scale, PSQI: Pittsburgh Sleep Quality Index.*

The multinomial logistic regression analysis revealed that among the variables studied only moderate or severe depression was significantly associated with strong Internet addiction (n=30; 30%) with an OR of 11.496 and a p-value of 0.002. None of the other variables showed a significant association with strong Internet addiction (p>0.05) (Table 2).

## DISCUSSION

The results of our study revealed that moderate or severe depression was significantly associated with strong Internet addiction, as demonstrated by the multinomial logistic regression analysis. Participants who reported moderate or severe depression were approximately 11 times more likely to exhibit strong Internet addiction compared to those without depression. However, none of the other variables studied, including age, BMI, physical activity level, education, employment status, alcohol consumption, smoking status, rural/urban residence, and sleep quality, showed a significant association with strong Internet addiction.

**Table 2. Association of Variables with Strong Internet Addiction Based on Multinomial Logistic Regression Analysis**

Variable	Internet Addiction		Raw OR (95% CI)	p-value
	Weak n (%)	Strong n (%)		
<b>Age</b>				
(>45) (Ref)	42	17	1	
(≤45)	28	13	1.692	0.233
<b>Sex</b>				
male (Ref)	32 (45.8)	13 (43.3%)	1	
female	38 (54.2%)	17 (56.7%)	0.916 (0.249-3.372)	0.895
<b>Educational status</b>				
elementary school (Ref)	4 (5.6%)	3 (10%)	1	
middle school	37 (52.9%)	9 (30%)	0.425 (0.044-4.083)	0.458
high school	13 (18.6%)	6 (20%)	0.540 (0.046-6.284)	0.623
bachelor's degree or higher	16 (22.9%)	12 (40%)	1.286 (0.122-13.587)	0.835
<b>Working Status</b>				
employed (Ref)	40 (57.2%)	18 (60%)	1	
not employed	30 (42.8%)	12 (40%)	1.722 (0.474-6.260)	0.409
<b>Living Status</b>				
urban (Ref)	30 (42.9%)	14 (46.7%)	1	
rural	40 (57.1%)	16 (53.3%)	1.488 (0.436-5.076)	0.526
<b>Smoking</b>				
non-smoker (Ref)	47	17 (56.7%)	1	
smoker	23	13 (43.3%)	2.481 (0.710-8.663)	0.155
<b>Physical activity</b>				
high (>3000) (Ref)	19 (27.1%)	7 (23.3%)	1	
moderate (600-3000)	31 (44.3%)	17 (56.7%)	1.182 (0.299-4.669)	0.811
low (<600)	20 (28.6%)	6 (20%)	0.336 (0.069-1.628)	0.176
<b>Depression</b>				
no depression (0-9) (Ref)	27 (38.5%)	7 (23.3%)	1	
mild depression (10-16)	35 (50%)	5 (16.7%)	0.750 (0.162-3.479)	0.714
moderate or severe depression (17-63)	8 (12.5%)	18 (60%)	11.496 (2.466-53.581)	0.002
<b>Sleep quality</b>				
good (≤5) (Ref)	35 (50%)	13 (43.3%)	1	
poor (>5)	35 (50%)	17 (56.7%)	1.737 (0.519-5.815)	0.370

Abbreviations: Ref: reference, OR=odds ratio; 95% IC=95% confidence interval. Chi-squared test, \*= $p<0.05$ .

According to these findings, depression may be a serious risk factor for the emergence of this addiction. This is in line with earlier studies that established a connection between depression and problematic Internet use, as people with depression may use the Internet as a coping technique or a means of escape (31, 32). The propensity of depressed people to look for solace, diversion, and social engagement online, which results in excessive and compulsive Internet use, may be the explanation for the link between depression and Internet addiction (33, 34). Age, education, employment status, and rural/urban residence

may not have been strong predictors of Internet addiction in this particular sample, based on the lack of significant associations between other sociodemographic and lifestyle characteristics and strong Internet addiction in our study. It is crucial to keep in mind that we used a specific sample with certain features and, as a result, the conclusions may not apply to other groups (35, 36). To fully comprehend the complicated relationship between Internet addiction and different sociodemographic and lifestyle aspects, more research is required.

To gain a deeper knowledge of the risk factors for problematic Internet use, future studies may examine additional possible predictors of Internet addiction, such as personality traits, cognitive factors, and social factors. Additionally, longitudinal research could shed light on the underlying mechanisms and causal pathways relating these two phenomena and assist in clarify the temporal association between depression and Internet addiction. Furthermore, to contribute to clinical practice and public health policies addressing this expanding problem, therapies that focus on depression as a risk factor for Internet addiction might be created and assessed.

Nevertheless, it is important to acknowledge that the remaining variables examined in this study did not exhibit a statistically significant correlation with severe Internet addiction. The variables examined in this study encompassed a diverse range of factors, such as age, BMI (Body Mass Index), level of physical activity, educational attainment, employment status, alcohol consumption, smoking habits, rural or urban residence, and sleep quality. The study's findings indicate that these variables may not significantly influence the likelihood of developing strong Internet addiction, consistent with mixed literature on the relationship between these variables and addiction. Previous research examining the influence of age on Internet addiction has produced inconclusive results, as certain studies have indicated a positive relationship (37), while others have found no significant correlation (38). The lack of a substantial correlation between variables such as BMI, physical activity level, educational attainment, and employment status, and the occurrence of Internet addiction in our research prompts intriguing inquiries and necessitates additional investigation. While prior studies have indicated a possible correlation between these factors and Internet addiction, our research findings are consistent with an expanding body of scholarly work that has produced contradictory outcomes (6,13,39). There are several possible explanations that could contribute to the absence of observed associations in our study. Firstly, it is plausible that the influence of these variables on Internet addiction is intricate and subject to diverse individual, cultural, and contextual factors. In our study, we did not directly assess psychological factors such as self-esteem or body image dissatisfaction, which may potentially mediate the relationship between BMI and Internet addiction. Moreover, the impact of one's level of physical activity on the development of Internet addiction may depend on various factors such as the specific type and intensity of activities involved, as well as the presence of alternative leisure choices. Furthermore, the complex

nature of education and employment status could potentially account for the inconclusive results. Nevertheless, it is imperative to conduct further investigation in order to comprehend the intricate mechanisms that underlie these relationships.

It is crucial to be aware of the limitations of the present study, including the use of a narrowly defined sample and the cross-sectional nature of the data, which precluded drawing inferences about causation. However, the research adds to the expanding body of knowledge on Internet addiction and offers insightful information about how depression plays a part in this phenomenon. It is necessary to conduct more studies to fully comprehend the underlying mechanisms and potential treatments for depression as a risk factor for Internet addiction.

## CONCLUSION

Overall, the study's findings emphasize the significance of taking depression into account as a potential risk factor for Internet addiction. Clinicians and practitioners may need to screen and intervene for depression in people at risk for developing this addiction. They should be aware of the link between depression and problematic Internet use. Future studies should examine the underlying causes and causal chains that link depression to Internet addiction and look into new treatment options.

## DECLARATIONS

### *Funding*

None.

### *Conflict of Interest*

There is no conflict of interest.

### *Ethics Approval*

Written informed consent was obtained from the individuals participating in the study and their parents (Protocol ID: ee880d6501f54d5c).

### *Authors' Contributions*

Conceived and designed the analysis: CT, NŞ, TA, MYG; Collected the data: NŞ, TA; Contributed data or analysis tools: CT, NŞ, TA, MYG; Performed the analysis: CT; Wrote the paper: CT, NŞ; Final review; MYG

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