







ORIGINAL RESEARCH

Prevalence of Risk for Substance-Related and Behavioral Addictions Among University Students in Turkey

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Main Points

- Men were found to be at higher risk for potential alcohol dependence, pathological gambling, gaming addiction, and sex/pornography addiction.
- Mild nicotine addiction, problematic internet use and possible smartphone addiction, food addiction, and gaming addiction were higher in the age group of 18-24 years than in older students.
- Screening for addiction risk in young people is crucial for effective prevention, early diagnosis, and treatment.
- The screening programs and treatment targeting men and women, and different age groups need to be designed selectively.

Abstract

This study aims to investigate the prevalence of risk for substance-related and behavioral addictions among university students in Turkey. In total, 612 students were included in this study, and they completed an online questionnaire consisting of the Fagerström Test for Nicotine Dependence, the Alcohol Use Disorders Identification Test, the Drug Abuse Screening Test, the Smartphone Addiction Scale-Short Version, the Young's Internet Addiction Test-Short Form, the South Oaks Gambling Screen, and the Burden of Behavioral Addiction Form. Results revealed that the rates of potential alcohol dependence, pathological internet use, and potential smartphone addiction were 2.0%, 11.4%, and 24.7%, respectively. Approximately 0.3% of students reported severe problems related to substance use. The rates of high risk of compulsive shopping, problematic social media use, food addiction, gaming addiction, and sex/pornography addiction were 2.0%, 3.6%, 3.4%, 4.9%, and 5.6%, respectively. The rates of potential alcohol dependence, pathological gambling, gaming addiction, and sex/pornography addiction were found to be higher in men. Mild nicotine addiction, problematic internet use and possible smartphone addiction, food addiction, and gaming addiction rates were higher in the age group of 18 to 24 years. In conclusion, screening for addiction risk among youth is important for effective prevention, early diagnosis, and treatment.

Keywords: Addiction, alcohol, tobacco, substance, behavioral addiction

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Introduction

Addiction was defined by Goodman (1990) as “a process whereby a behavior, that can function both to produce pleasure and to provide escape from inter-

nal discomfort, is employed in a pattern characterized by (1) recurrent failure to control the behavior (powerlessness) and (2) continuation of the behavior despite significant negative consequences (unmanageability).” A more recent definition by the Ameri-

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can Society of Addiction Medicine (ASAM) refers to addiction as “a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual’s life experiences.” People with addiction use certain substances or engage in behaviors that become compulsive and often continue their habit despite harmful consequences (ASAM, 2019). Alcohol and other drugs have long been recognized as addictive substances, and addiction is now considered in a broader context, including behavioral addictions such as internet use, smartphone use, food, sex, shopping, and gambling. The way addiction is presented has significantly changed from the first edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-I) to the fifth edition (DSM-V). Eventually, the chapter on addictions in the DSM-V was changed from “Substance-Related Disorders” (as titled in DSM-IV) to “Substance-Related and Addictive Disorders” to reflect the developments in understanding addictions. Among behavioral addictions, gambling is currently the only condition included in the subsection of “Nonsubstance-Related Disorders” in the category of “Substance-Related and Addictive Disorders” (APA, 2013).

The increasing prevalence of alcohol and substance use disorders and behavioral addictions is an important phenomenon for both individuals and societies. Although any addiction may potentially harm an entire society, the youth remain to be the most vulnerable segment. This is because the highest risk period for the first experience of drug use lies in early adolescence. According to the Turkish Monitoring Center for Drugs and Drug Addiction’s (TUBIM) General Population Survey Report of 2019, which collected data from 42,754 people through face-to-face interviews in 26 cities, the mean age for trying alcoholic beverages, tobacco, and substances for the first time was 19.94, 17.85, and 19.00 years, respectively. Participants in the age group of 15 to 34 years constituted the largest group (65%) among substance users (TUBIM, 2019). The periods of highest risk for drug use among youth are most often encountered during times of significant change in their physical development or social status. Furthermore, college years may be characterized by many problems such as the chaotic period of adolescence, being separated from home and family, adapting to a new environment, and uncertainty about the future. Therefore, tobacco, alcohol, and substance use may be increased among university students due to the excessive anxiety and stress associated with these problems (Lanier et al., 2001). This highlights the need to determine the risk of addiction in this young age group to prevent alcohol and substance use disorders and behavioral addictions.

In addition, gender plays an important role in addiction. Various experiences and cultural backgrounds may differentially affect the vulnerability to addiction of males and females. There are also some biological differences between females and males that might influence their response to drugs of abuse and engagement in addictive behaviors (Becker et al., 2017). For instance, women exhibit withdrawal symptoms that are more unpleasant than those experienced by men while attempting to quit using drugs (abstinence) such as cocaine and amphetamine. Similarly, female smokers report increased negative affect during withdrawal and experience a greater stress response compared with males. In contrast, men exhibit more serious withdrawal symptoms when trying to quit alcohol consumption (Becker, 2016). From

a historical perspective, women were exposed to a greater level of shame about drinking and intoxication compared with men; however, this feeling of guilt seems to be gradually disappearing among younger women. Although male students are generally more likely to report drug use and abuse, female students are still more likely to drink and binge drink. Women are drinking more excessively and frequently than they did in the past (Ait-Daoud et al., 2019). The TUBIM report indicates that the lifetime rates of tobacco use, alcohol use, and substance use at least once for men were 61.9%, 34.3%, and 6.1%, respectively, whereas those for women were 32.2%, 10.7%, and 0.3%, respectively, in Turkey (TUBIM, 2019).

Alcohol and other substances are widely used, and they are among the leading causes of human suffering. Besides, these have become important global problems with regard to public health and socioeconomic issues. Alcohol consumption is a considerable public health concern. Health problems and negative effects on society associated with alcohol use have been particularly threatening. Although patterns of alcohol consumption differ among continents and countries, increased levels of alcohol consumption among young adults are a concern of utmost priority globally (Davoren et al., 2016). The research conducted by the Turkish Green Crescent Society in 2006 reported that the age of starting alcohol consumption declined to 11 years and that the rate of alcohol drinkers was 15.4% among primary school students. The same research reported that this rate increased to even 45% to 50% among secondary school students, and the rate of students who drank alcohol at least once was 16.5% overall (31.5% for boys and 10.6% for girls). The prevalence of alcohol use ranged from 43.0% to 53.9% among college students (Varol, 2011). Substances of abuse also cause severe problems in youth and university students. However, substance use is often underdiagnosed, as students do not seek help and tend to hide their problems. Thus, it is essential to acknowledge the actual prevalence of substance use. The results of a study carried out in Turkey with 396 students reported that lifetime tobacco, alcohol, and illicit drug use rates were 73.2%, 56.6%, and 9.6%, respectively. Cigarette, alcohol, and substance use were higher in male students compared with females (Turhan, 2011).

Tobacco use is a major public health problem affecting billions of people. According to the World Health Organization’s Report on Tobacco Epidemic, more than 8 million people will die because of tobacco use each year by 2030 unless measures are taken against it (WHO, 2008). Cigarette smoking takes the lead among tobacco products because of its widespread use and relationship with serious chronic diseases that may result in death. Most tobacco users start smoking in their adolescence, and those who start smoking at a younger age are more likely to develop nicotine addiction and have problems with quitting (Öztürk et al., 2020). Research indicated that people often start smoking at a young age and that 80% of smokers start smoking before the age of 18 years (Doğan & Ulukol, 2010). According to the Turkish Statistical Institute’s (TSI) Health Interview Survey Report, the rate of daily tobacco use was 28% among individuals aged 15 years and above (41.3% among men and 14.9% among women) (TSI, 2019).

Gambling disorder refers to persistent and recurrent problematic gambling behavior leading to clinically significant impairment or

distress (APA, 2013). Gambling disorder is associated with numerous negative consequences and is often highly correlated with other high-risk behaviors in college students, such as drinking, drug abuse, and unsafe sexual practices (Engwall et al., 2004). Gambling is also prevalent among adolescents. A study conducted with 339 university students in Turkey found out that the rate of those who gambled at least once in their lifetime was 20%. In addition, 1.2% of the students had pathological gambling disorder, and they were all male participants (Vayisoğlu, 2019).

The internet is commonly used for academic ambitions, entertainment, socializing, and many other purposes all over the world. In addition to the undeniable convenience of the internet, excessive or uncontrolled use may sometimes cause problems. Internet addiction, which may be conceptualized as a behavioral addiction, is one of the issues that need to be addressed, especially in adolescents and young adults. Although there are no universally agreed diagnostic criteria yet, internet addiction may be defined as spending excessive time on the internet, losing control while using the internet, and showing symptoms such as nervousness, anxiety, depression, and disruption in professional or educational life when it is not possible to connect to the internet (Dalbudak, 2016). In Turkey, when the data by the TSI on computer and internet usage rates with regard to age group and gender of individuals were examined, it was found that 68% of the youth in the age group of 16 to 24 years used computers and that the number of internet users was 87.2%. In the age group of 24 to 35 years, computer use was 59% and internet use was 85.7%. The report also revealed that individuals in the age group of 16 to 24 years accounted for the highest rates of computer and internet usage (TSI, 2017). Currently, smartphones with many additional features have replaced ordinary cell phones that were used solely for communication. Although smartphones bring a lot of convenience to daily life, they may have many negative consequences by affecting interpersonal relationships and physical and mental health. Although different terms have been used to describe and classify individuals' use of their smartphones in a way that leads to the neglect of other areas of their lives, the most frequently used term has been smartphone addiction. Globally, the prevalence rates of smartphone addiction among youth have been reported to be 19.9% in Switzerland, 30.9% in South Korea, 10.0% in the United Kingdom, and 6.4% in Turkey. Although some studies have reported a predominance of female individuals addicted to their smartphones, others have revealed greater smartphone use rates and more serious problems among males (Derevensky et al., 2019).

In line with the developments in technology and social life, new behavioral addictions such as internet gaming disorder, compulsive shopping, pornography and sex addiction, and food addiction have been proposed as diagnostic entities. It is important to note that the onset of many of these behavioral addictions has been shown to occur in childhood, adolescence, and/or early adulthood (Derevensky et al., 2019). Among these proposed diagnoses, only internet gaming disorder has been included in the DSM-V as a condition requiring further study. The remaining behavioral addictions related to sex, exercise, and shopping were discussed but not included, as the committee concluded that "at this time there is insufficient peer-reviewed evidence to establish the diagnostic criteria and course descriptions needed to identify

these behaviors as mental health disorders" (APA, 2013). Internet gaming disorder is defined as persistent and recurrent gaming leading to clinically significant impairment or distress in several aspects of a person's life (APA, 2013). Gaming, when performed excessively, may result in some undesirable consequences such as financial loss, psychological detachment, sleep deprivation, eating disorders, and nutritional problems (Derevensky et al., 2019). Sex addiction is another behavioral addiction, and it is defined as compulsively having sexual activity despite its negative consequences. A subgroup of this addiction is specifically related to the excessive use of pornographic material for sexual satisfaction. Compulsive and/or uncontrolled buying is defined by the presence of repetitive impulsive and excessive buying activities that lead to personal and familial distress (Lejoyeux et al., 1996). Food addiction provides a similar theoretical framework to substance addiction, and it is defined as excessive craving of some foods and inability to control the amount of their consumption (Unubol, 2019).

The increasing prevalence of alcohol and substance use disorders and other behavioral addictions pose serious problems for both individuals and societies. In this regard, especially the young population is at risk for addiction. They are also more vulnerable to the potential harmful consequences of any type of addiction. Effective prevention, early diagnosis, and treatment of addiction might significantly reduce these problems. Therefore, this study aims to investigate the prevalence of risk for substance-related and behavioral addictions among university students in Turkey. We also aim to compare the risk of addiction with regard to the gender and age groups.

Methods

Participants

A total of 628 university students aged above 18 years who accepted to complete the questionnaire were included in the study; 16 participants were excluded from the study as they provided incomplete data. Therefore, 612 students were taken into account for further analyses.

Procedure

An online questionnaire developed by the researchers via Google Forms was distributed to potential participants who took part in an online teaching forum or to students who were studying at different universities. The first part of the questionnaire consisted of questions about the demographic characteristics of the participants. This part was followed by a series of questionnaires that were used to screen for risk of substance or behavioral addiction. The questionnaires were presented to each participant in a fixed order. The participants were offered to take part in a draw for 20 books or 10 gift cards as an incentive.

Instruments of Assessment

Demographic Form: This form was developed by the researchers, and it consisted of questions about the age and gender of the participants.

Fagerström Test for Nicotine Dependence (FTND) (Heather et al., 1991): This test has often been used as a measure of physical dependence on nicotine. It consists of 6 questions, each of

which has specific scores assigned to its answer. The total score of the FTND was classified as mild nicotine dependence if it was ≤ 4 , moderate nicotine dependence if it was 5, and severe nicotine dependence if it was ≥ 6 . The Turkish version of the scale was used in this study (Uysal et al., 2004).

Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al., 1993): This scale consists of 10 items aimed at detecting alcohol consumption, drinking behavior, and problems related to alcohol. It is a 5-point Likert-type scale (0-4), and the total scores range from 0 to 40. Participants were included in the nonhazardous drinking group if the total score was ≤ 7 , hazardous drinking group if the score was between 8 and 14, and potential alcohol dependence group if the score was ≥ 15 . The Turkish version of the scale was used in this study (Saatçioğlu et al, 2002).

Drug Abuse Screening Test (DAST-10) (Skinner, 1982): This is a 10-item self-report scale that is designed to identify drug use-related problems. Each item is scored 1 point for a “yes” response and 0 points for a “no” response, except for item 3 that is scored reversely. The DAST-10 total score may range from 0 to 10. The total score was considered nonproblematic if it was 0, mildly problematic if it was 1 to 2, moderately problematic if it was between 3 and 5, and severely problematic if it was ≥ 6 . The Turkish version of this scale was used in this study (Evren et al., 2013).

Young’s Internet Addiction Test-Short Form (YIAT-SF) (Young, 1998): This is a 12-item test developed to screen for internet addiction. It is a 5-point Likert-type scale (1-5) in which higher scores indicate a higher likelihood of internet addiction. A total score <30 was considered as a normal level of internet use, scores between 30 and 36 were considered problematic, and if the score was ≥ 37 , pathological internet use was suspected. The Turkish version of the scale was used in this study (Kutlu et al., 2016).

Smartphone Addiction Scale-Short Version (SAS-SV) (Kwon et al., 2013): This is a 10-item self-report scale designed to screen for smartphone addiction. It is a 6-point Likert-type scale (1-6) where higher scores suggest higher levels of smartphone addiction. Participants were included in the potential addiction group if they scored ≥ 33 . The Turkish version of the scale was used in this study (Noyan et al., 2015).

South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987): This is a screening test developed to measure the severity of gambling. In the original 20-item form of the screening test, a total score of 5 or more was classified as potential pathological gambling. The Turkish version of the scale, with a cut-off score of 8, was used in this study (Duvarci & Varan, 2001).

Burden of Behavioral Addiction Form: This form was developed to screen for the symptoms that may be present in problematic social media use, compulsive shopping, and food, gaming, or sex/pornography addiction. It is an 11-point Likert-type form (0-10), and the total score ranges from 0 to 60. The form questions the 6 biopsychosocial aspects of behavioral addictions: excessive focus on the problematic behavior/craving, changes in mood/feelings of relief, tolerance, withdrawal effects, social/occupational im-

pairment, and relapse. Scores on this form could be interpreted to refer to no behavioral addiction if they were 0. The other scores were interpreted by considering the norms of the Turkish population for the relevant behavioral addictions. If the individuals’ scores were below the Turkish norms, they were classified in the low-to-moderate risk group. If their scores were above the norms of the population, they were classified in the high-risk group. This form was previously used in the Turkish Addiction Risk Profile and Mental Health Map Project (TURBAHAR) (Unubol & Hizli Sayar, 2019).

Statistical Analysis

All statistical analyses were performed using SPSS Statistics for Windows, version 22.0 (IBM SPSS Corp; Armonk, NY, USA). Demographic data of the participants were analyzed with descriptive statistics, and they were reported as mean (standard deviation) or frequency (percentage). Independent samples’ t test and Chi-square test were used to make comparisons between groups. Statistical significance was set at a p value of <0.05 .

Ethical Approval

This study received ethics committee approval from the Clinical Research Ethics Committee of Tokat Gaziosmanpaşa University, and an electronic informed consent form was signed by the participants before taking part in the study.

Results

The mean age of the participants was 25.58 (5.74) years and 86.1% of them were female (n=527). As for the FTND scores, mild, moderate, and severe nicotine dependence rates were 23.4%, 2.8%, and 3.4%, respectively. The nonhazardous drinking rate was 38.4%, whereas the hazardous drinking rate was 2.5%, and the potential alcohol dependence rate was 2.0%. In total, 10.3% of students reported a low level of problems with substance use, 1.3% reported a moderate level of problems, and 0.3% reported a severe level of problems with regard to the DAST-10 scores. The rate of problematic internet use was 17.2%, whereas the pathological internet use rate was 11.4%. The rate of potential smartphone addiction was 24.7%; 15.5% of participants had nonpathological gambling and 2.0% had potential pathological gambling. The rates of high risk of compulsive shopping, problematic social media use, food addiction, gaming addiction, and sex/pornography addiction were 2.0%, 3.6%, 3.4%, 4.9%, and 5.6%, respectively. Demographic features and distribution of level of addiction risks are presented in Table 1.

Table 2 presents the group comparisons of addiction risk with regard to gender. There were no differences between the groups in terms of age, smoking habit, substance use, internet use, smartphone use, compulsive shopping, problematic social media use, and food addiction. Women were more likely to drink nonhazardously compared with men ($p<0.001$). Men were almost 9 times more likely to have alcohol dependence than women ($p<0.001$). Women were more frequently classified as nonpathological gamblers than men ($p<0.05$). Men were over 3 times more likely to have potential pathological gambling ($p<0.05$), over 5 times more likely to be at risk for high-risk gaming addiction ($p<0.001$), and over 7 times at higher risk of high-risk sex/pornography addiction ($p<0.001$) than women.

Table 1.
Demographic characteristics of the participants and distribution of their level of addiction risk

Variable	Category	M (SD) / n (%)
Demographics	Gender, female	527 (86.1)
	Age (years)	25.58 (5.74)
Smoking	Nonsmoker	431 (70.4)
	Mild nicotine dependence	143 (23.4)
	Moderate nicotine dependence	17 (2.8)
	Severe nicotine dependence	21 (3.4)
Alcohol use	No alcohol use	350 (57.2)
	Nonhazardous drinking	235 (38.4)
	Hazardous drinking	15 (2.5)
	Potential alcohol dependence	12 (2.0)
Substance use	No substance use	523 (85.5)
	No problems	16 (2.6)
	Low level of problems	63 (10.3)
	Moderate level of problems	8 (1.3)
Internet use	Severe level of problems	2 (0.3)
	Normal level of internet use	437 (71.4)
	Problematic internet use	105 (17.2)
Smartphone use	Pathological internet use	70 (11.4)
	No addiction	461 (75.3)
Gambling	Potential addiction	151 (24.7)
	No gambling	505 (82.5)
	Non-pathological gambling	95 (15.5)
Compulsive shopping	Potential pathological gambling	12 (2.0)
	No compulsive shopping	160 (26.1)
	Low-to-moderate risk	440 (71.9)
Problematic social media use	High risk	12 (2.0)
	No problematic use	107 (17.5)
	Low-to-moderate risk	483 (78.9)
Food addiction	High risk	22 (3.6)
	No food addiction	107 (17.5)
	Low-to-moderate risk	484 (79.1)
Gaming addiction	High risk	21 (3.4)
	No gaming addiction	333 (54.4)
	Low-to-moderate risk	249 (40.7)
Sex/pornography addiction	High risk	30 (4.9)
	No sex/pornography addiction	330 (53.9)
	Low-to-moderate risk	248 (40.5)
	High risk	34 (5.6)

Table 3 presents the group comparisons of addiction risk with regard to the age groups (i.e., 18-24 years and ≥ 25 years). There were no differences between the groups in terms of gender, alcohol use, substance use, gambling, compulsive shopping, problematic social media use, and sex/pornography addiction. Older participants had 3 times more severe nicotine dependence compared with the younger group ($p < 0.05$). Younger students were over 2 times more likely to have pathological internet use ($p < 0.001$), over 1.5 times more likely to have smartphone addiction ($p < 0.001$), over 2.5 times more likely to be at higher risk for food addiction ($p < 0.05$), and over 2 times more likely to be at risk of high-risk gaming addiction ($p < 0.05$) than older students.

Discussion

The increasing prevalence of alcohol and substance use disorders and other behavioral addictions, especially in young adults, and the numerous negative consequences of these conditions are a major concern for both individuals and societies. This study investigated the prevalence of tobacco, alcohol, and substance use and behavioral addictions among university students and their risk of addiction. We also compared the results with regard to gender and age groups to identify any differences. According to the scores of the scales, mild, moderate, and severe nicotine dependence rates were 23.4%, 2.8%, and 3.4%, respectively. The nonhazardous drinking rate was 38.4%, hazardous drinking rate was 2.5%, and potential alcohol dependence rate was 2.0%; 0.3% of participants reported a severe level of problems with substance use. The pathological internet use rate was 11.4%, potential smartphone addiction rate was 24.7%, and potential pathological gambling rate was 2.0%. High risk of compulsive shopping, problematic social media use, food addiction, gaming addiction, and sex/pornography addiction rates were 2.0%, 3.6%, 3.4%, 4.9%, and 5.6%, respectively. Potential alcohol dependence and the potential pathological gambling rate were higher in men. A high risk of gaming addiction and sex/pornography addiction was more prevalent in men. Severe nicotine dependence was higher among those aged 25 years and above, whereas pathological internet use and the potential smartphone addiction rate were higher in the age group of 18 to 24 years. In addition, a high risk of food addiction and gaming addiction was also more prevalent in the age group of 18 to 24 years.

Tobacco, Alcohol, and Substance Use

This study determined the rates of mild, moderate, and severe nicotine dependence to be 23.4%, 2.8%, and 3.4%, respectively. A study conducted with 1,522 Turkish students, among whom the number of students who smoked was 379, reported the nicotine dependence rate to be 30.2%, being higher in men compared with women (Havaçeliği Atlam & Yuncu, 2017). However, there was no difference between the male and female participants of our study with regard to nicotine dependence rates. This result may be because women started to consume tobacco products more frequently than they did in the past as sociocultural pressure on them declined. Severe nicotine dependence was higher among those aged 25 years and above, whereas mild nicotine dependence was higher in the age group of 18 to 24 years. Consistent with the report by the TSI, this result may be related to earlier tobacco use, and the level of addiction may be affected over time with long-term tobacco use (TSI, 2019).

Table 2.
Group comparisons of addiction risk with regard to gender

Variable	Category	Women M (SD) / n (%)	Men M (SD) / n (%)	χ^2 / t
Age (years)		25.70 (5.90)	24.82 (4.56)	1.31
Smoking	Mild nicotine dependence	105 (77.8)	38 (82.6)	0.67
	Moderate nicotine dependence	14 (10.4)	3 (6.5)	
	Severe nicotine dependence	16 (11.9)	5 (10.9)	
Alcohol use	Nonhazardous drinking	197 (92.1) ^a	38 (79.2) ^b	19.72**
	Hazardous drinking	13 (6.1) ^a	2 (4.2) ^a	
	Potential alcohol dependence	4 (1.9) ^a	8 (16.7) ^b	
Substance use	No problems	13 (22.8)	3 (9.4)	2.62
	Low level of problems	38 (66.7)	25 (78.1)	
	Moderate level of problems	5 (8.8)	3 (9.4)	
	Severe level of problems	1 (1.8)	1 (3.1)	
Internet use	Normal level of internet use	382 (72.5)	55 (64.7)	3.96
	Problematic internet use	84 (15.9)	21 (24.7)	
	Pathological internet use	61 (11.6)	9 (10.6)	
Smartphone use	No addiction	391 (74.2)	70 (82.4)	2.62
	Potential addiction	136 (25.8)	15 (17.6)	
Gambling	Non-pathological gambling	70 (93.3) ^a	25 (78.1) ^b	5.21*
	Potential pathological gambling	5 (6.7) ^a	7 (21.9) ^b	
Compulsive shopping	No compulsive shopping	130 (24.7)	30 (35.3)	5.81
	Low-to-moderate risk	385 (73.1)	55 (64.7)	
	High risk	12 (2.3)	0 (0.0)	
Problematic social media use	No problematic use	92 (17.5)	15 (17.6)	0.44
	Low-to-moderate risk	415 (78.7)	68 (80.0)	
	High risk	20 (3.8)	2 (2.4)	
Food addiction	No food addiction	93 (17.6)	14 (16.5)	0.45
	Low-to-moderate risk	415 (78.7)	69 (81.2)	
	High risk	19 (3.6)	2 (2.4)	
Gaming addiction	No gaming addiction	311 (59.0) ^a	22 (25.9) ^b	48.69**
	Low-to-moderate risk	200 (38.0) ^a	49 (57.6) ^b	
	High risk	16 (3.0) ^a	14 (16.5) ^b	
Sex/pornography addiction	No sex/pornography addiction	312 (59.2) ^a	18 (21.2) ^b	70.13**
	Low-to-moderate risk	199 (37.8) ^a	49 (57.6) ^b	
	High risk	16 (3.0) ^a	18 (21.2) ^b	

Note. Different subscript letters denote a subset of gender groups, the proportions of which differ significantly from each other at a level of 0.05. *p<0.05, **p<0.001

Patterns of alcohol consumption differ among continents and countries. A previous study found the hazardous drinking rate to be 40.1% and the potential dependence rate to be 9.6% among students at English universities (Partington et al., 2013). In another study conducted to determine alcohol use in a sample of 936 Brazilian adolescents between 15 and 19 years of age, the potential alcohol dependence rate was 16.4%, and female adolescents were less likely to exhibit potential dependence in comparison with males (Martins-Oliveira et al., 2016). The results of a study including 1,518 Turkish university students showed that the al-

cohol addiction rate was 3.0%, and this rate was higher among men (Havaçeliği Atlam & Yuncu, 2017). This study reported the hazardous drinking rate to be 2.5% and the potential alcohol dependence rate to be 2.0% among university students. In addition, the potential alcohol dependence rate was higher among men, which is consistent with previous results. These differences in the prevalence of potential alcohol dependence between countries may be due to Turkey's social, economic, and cultural characteristics. There was no statistically significant difference in alcohol use between age groups in our study.

Table 3.
Group comparisons of addiction risk with regard to age groups

Variable	Category	18-24 years n (%)	≥25 years n (%)	χ ²
Sex	Female	284 (84.3)	243 (88.4)	2.12
	Male	53 (15.7)	32 (11.6)	
Smoking	Mild nicotine dependence	78 (87.6) ^a	65 (70.7) ^b	8.37*
	Moderate nicotine dependence	6 (6.7) ^a	11 (2.0) ^a	
	Severe nicotine dependence	5 (5.6) ^a	16 (17.4) ^b	
Alcohol use	Nonhazardous drinking	104 (89.7)	131 (89.7)	0.07
	Hazardous drinking	7 (6.0)	8 (5.5)	
	Potential alcohol dependence	5 (4.3)	7 (4.8)	
Substance use	No problems	9 (18.8)	7 (17.1)	0.34
	Low level of problems	33 (68.8)	30 (73.2)	
	Moderate level of problems	5 (10.4)	3 (7.3)	
	Severe level of problems	1 (2.1)	1 (2.4)	
Internet use	Normal level of internet use	222 (65.9) ^a	215 (78.2) ^b	13.64**
	Problematic internet use	64 (19.0) ^a	41 (14.9) ^a	
	Pathological internet use	51 (15.1) ^a	19 (6.9) ^b	
Smartphone use	No addiction	239 (70.9) ^a	222 (80.7) ^b	7.84**
	Potential addiction	98 (29.1) ^a	53 (19.3) ^b	
Gambling	Nonpathological gambling	38 (82.6)	57 (93.4)	0.12
	Potential pathological gambling	8 (17.4)	4 (6.6)	
Compulsive shopping	No compulsive shopping	87 (25.8)	73 (26.5)	0.97
	Low-to-moderate risk	245 (72.7)	195 (70.9)	
	High risk	5 (1.5)	7 (2.5)	
Problematic social media use	No problematic use	55 (16.3)	52 (18.9)	4.97
	Low-to-moderate risk	265 (78.6)	218 (79.3)	
	High risk	17 (5.0)	5 (1.8)	
Food addiction	No food addiction	48 (14.2) ^a	59 (21.5) ^b	8.64*
	Low-to-moderate risk	273 (81.0) ^a	211 (76.7) ^a	
	High risk	16 (4.7) ^a	5 (1.8) ^b	
Gaming addiction	No gaming addiction	168 (49.9) ^a	165 (60.0) ^b	8.50*
	Low-to-moderate risk	147 (43.6) ^a	102 (37.1) ^a	
	High risk	22 (6.5) ^a	8 (2.9) ^b	
Sex/pornography addiction	No sex/pornography addiction	176 (52.2)	154 (56.0)	3.71
	Low-to-moderate risk	137 (40.7)	111 (40.4)	
	High risk	24 (7.1)	10 (3.6)	

Note. Different subscript letters denote a subset of age groups, the proportions of which differ significantly from each other at a level of 0.05. *p<0.05, **p<0.01

Illicit substances are also a serious problem among youth and university students. In a previous study, the lifetime prevalence of illicit substance use was 11% in Turkey (Dayi et al., 2015). Another study reported illicit drug use prevalence to be 9.6% (Turhan et al., 2011). Consistent with previous studies, our findings demonstrated that the rate of substance use was 14.5% and that 0.3% of the participants had a severe level of problems with substance use. The TUBIM report shows that the rate of substance use at least once in a lifetime is 0.3% for women and 6.1% for men (TUBIM, 2019). Besides, a previous study conducted with

Turkish students demonstrated that substance use was higher in males (Turhan et al., 2011). There was no difference between men and women in terms of their total DAST-10 scores in our study.

Internet Use

Although the internet is commonly used in daily life, it may be problematic when utilized excessively. In studies conducted especially with university students in Turkey, the rates of internet addiction have been reported to be between 7.2% and 12.2% (Dalbudak et al., 2013). In line with previous reports, the pathological

internet use rate was 11.4% in our study. The TSI report revealed that individuals in the age group of 16 to 24 years accounted for the highest rates of computer and internet use (TSI, 2017). Our findings, being consistent with this report, demonstrated that the problematic internet use rate was higher in the age group of 18 to 24 years. Although some previous studies have reported that the rate of internet addiction was higher among men (Dalbudak et al., 2013), the results of this study found no statistically significant difference between men and women with regard to the rate of pathological internet use.

Smartphone Use

Uncontrolled and problematic use of smartphones is another significant issue that needs to be addressed among young adults. Globally, smartphone addiction prevalence rates among youth were reported to be 19.9% in Switzerland, 30.9% in South Korea, and 10.0% in the United Kingdom (Deverensky, 2019). The results of the study designed by Aker et al. (2017) revealed that the rate of smartphone addiction among students was 6.47%. This study found the smartphone addiction rate to be 24.7%. The discrepancies between the results of these studies may be due to social, economic, and cultural characteristics. Different clinical rating scales that have been used in these studies may have also affected the results. In addition, no statistically significant association was determined between students' ages or gender and smartphone addiction (Aker et al., 2017). In contrast, other studies reported smartphone addiction to be more prevalent in women than men (e.g., Choi et al., 2015; Demirci et al., 2015) and found a negative correlation between age and smartphone addiction (Lopez-Fernandez, 2015). In this study, the rate of potential smartphone addiction was higher in the age group of 18 to 24 years, and there was no difference in terms of smartphone addiction between men and women. However, the results of these studies about the association between smartphone addiction and age or gender are still far from being conclusive.

Gambling

Gambling, which has become an important social problem due to its prevalence worldwide and its rapidly increasing popularity, especially among young people, is an issue to be focused on. In a previous meta-analysis evaluating the prevalence of gambling among university students for the last 30 years, the prevalence rate was found to be 6.13% (Nowak, 2018). The results of a Turkish study in which 339 university students were included revealed that 1.2% of the students had pathological gambling and that they were all men (Vayısoğlu et al., 2019). In our study, the potential pathological gambling rate was 2.0%. Although the prevalence of pathological gambling in our study was lower than the global average, our results were consistent with Turkish literature. Our findings revealed that the prevalence of gambling was higher in men than in women. This finding has repeatedly been reported in the literature (Derevensky et al., 2019; Vayısoğlu et al., 2019). Although the rate of potential pathological gambling was higher in the age group of 18 to 24 years, this difference was not statistically significant.

Problematic Social Media Use, Compulsive Shopping, Food Addiction, Gaming Addiction, and Sex/Pornography Addiction

New behavioral addictions have been described based on the developments in technology and changes in social life. Although there is

no consensus on their diagnostic criteria yet, these addictions have become important issues to be taken into account during clinical practice. The results of a meta-analysis indicated that the compulsive shopping rate was 8.3% in university student samples (95% CI: 5.9%-11.5%) and that being young and female was associated with an increased tendency (Maraz et al., 2016). Burrow et al's (2018) systematic review with meta-analysis reported that the mean prevalence of food addiction diagnosis was 16.2%. Internet gaming disorder among adolescents was 4.6% (95% CI: 3.4%-6.0%) and male adolescents generally reported a higher prevalence rate (6.8%; 95% CI: 4.3%-9.7%) than female adolescents (1.3%; 95% CI: 0.6%-2.2%) in another meta-analysis (Fam, 2018). A previous report from Turkey suggested that the rates of high risk of compulsive shopping, problematic social media use, food addiction, gaming addiction, and sex/pornography addiction risk were 42.6%, 43.7%, 43.7%, 32.0%, and 23.0%, respectively (TURBAHAR, 2019). This study found the rates of high risk of compulsive shopping, problematic social media use, food addiction, gaming addiction, and sex/pornography addiction risk to be 2.0%, 3.6%, 3.4%, 4.9%, and 5.6%, respectively. Furthermore, in this study, the high risk of gaming addiction and high risk of food addiction were higher among individuals in the age group of 18 to 24 years. Besides, gaming addiction risk and sex/pornography addiction risk were higher in men.

Possible Clinical Implications

The results of this study indicated that the risk for both substance-related and behavioral addictions was highly prevalent among university students in Turkey. This highlights the need for extensive resource allocation to studies focusing on identifying risk factors and increasing the availability of treatment options for this risk group. The results also demonstrated that the risk for addictions differ between men and women and also among different age groups. Therefore, screening programs and treatment targeting men and women and different age groups need to be designed selectively. Any therapeutic attempt to decrease the risk of addictions in emerging adults might have positive consequences in the long term and hence should be actively pursued before high-risk individuals cross the threshold to meet the full diagnostic criteria for addictions. Efforts aimed at early intervention and risk reduction for addictions need to be enforced and disseminated throughout the country to protect the mental and physical well-being of emerging adults.

Limitations and Directions/Suggestions for Future Research

This study has some limitations. This was a cross-sectional study, in which data were collected through an online questionnaire, and only self-report scales, being subject to social desirability, were carried out for screening purposes. No diagnostic clinical interview was conducted. Therefore, the results may only correspond to a risk for addictions and not for addictive disorders per se.

In contrast, this study focused on the prevalence of a wide range of behavioral addictions in addition to substance-related addictions, and any data collected on these disproportionately less-researched addictions may inform clinicians and policy makers on the need for possible interventions to reduce their risk. Thus, as the number of individuals seeking help for these conditions potentially increases, it is imperative to gather information on these behaviors and their clinical correlates to continue improving public health initiatives.

Further research on addiction risk and its demographic and clinical correlates is required. Results of future studies might shed light on the neurobiological and psychosocial underpinnings of addiction risk, which may facilitate a thorough understanding of the potential ways to overcome conversion to addictive disorders. Therefore, implementation of widespread training for brief interventions and motivational interviewing for addictive disorders with frontline health care workers (i.e., primary care, family and emergency department physicians, psychologists, counselors, social workers, and even teachers) might help mitigate the current risk in emerging adulthood.

In conclusion, the findings of this study indicated that the rates of consumption of alcohol, tobacco and other substances, internet addiction, and pathological gambling were consistent with the results of previous studies that were conducted in Turkey. Men were found to be at higher risk for potential alcohol dependence, pathological gambling, gaming addiction, and sex/pornography addiction. In addition, it was noteworthy that mild nicotine addiction, problematic internet use and possible smartphone addiction, food addiction, and gaming addiction were higher in the age group of 18 to 24 years than in older students. As a result, screening for addiction risk in young people is crucial for effective prevention, early diagnosis, and treatment. In addition, screening programs and treatment targeting men and women and different age groups need to be designed selectively.

Ethics Committee Approval: Ethics committee approval was received for this study from the Clinical Research Ethics Committee of Tokat Gaziosmanpaşa University (20-KAEK-132).

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