

ORIGINAL ARTICLE

Does Internet Addiction Lead to Academic Procrastination among Pharmacy Students at a University in Türkiye? A Cross-Sectional Study

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Main Points

- There is a significant correlation between Internet addiction and time management.
- There is a positive and moderately significant relationship between Internet addiction and academic procrastination.
- Internet addiction is a significant predictor of academic procrastination.
- Internet addiction negatively affects academic performance.

Abstract

Pharmacy students belong to the age group with the highest use of the internet and they are at risk of unregulated and unnecessary internet addiction, which could have a negative impact on their learning behaviors, academic grades, and time management skills. This study aims to assess the time management skills, academic procrastination, and academic performance of pharmacy students in Türkiye and their relationship with internet addiction. A cross-sectional study was conducted among 622 pharmacy students in Türkiye. This study used Young's Internet Addiction Test (IAT) Time Management Inventory (TMI) and Tuckman Procrastination Scale (TPS) to evaluate internet addiction, time management and academic procrastination respectively. According to the results, no significant differences were found in IAT scores based on gender ($p = .096$). The study findings also revealed a significant correlation between pharmacy students' total IAT score and their overall TMI score. In contrast, there is a positive and moderately significant relationship observed between pharmacy students' total IAT and TPS scores. And internet addiction significantly predicted academic procrastination. In light of the findings, the study suggested that academic institutions and relevant authorities need to promote responsible internet usage among pharmacy students to increase their academic performance.

Keywords: addiction, pharmacy, procrastination, time management, universities

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Introduction

Science and technology are progressing at a rapid speed in modern life. Advancements in computer and internet technologies are two of the most visible instances of this evolution (Ceyhan, 2008). The Turkish Statistical Institute's 2019 Household Information Technologies Usage Survey indicates that 75.3% of Turkish households utilize the Internet, and this usage is highest among the 16 – 24 age group (90.8%;

Yılmazsoy & Kahraman, 2017). With the advent of 4G technologies and faster internet, pharmacy undergraduate students belonging to the age group of 18 – 24 can stay updated with instant access to global scientific databases and libraries. Moreover, their communication with the world has also increased through better video and audio conferencing apps (Ceyhan, 2008). However, excessive, uncontrolled, and non-purposeful use of these technologies could lead to internet addiction (Ceyhan, 2008).

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Most university students belong to the age group of 18–29 years with the highest use of the internet, and they are at risk of unregulated and unnecessary internet addiction, which could have a negative impact on their learning behaviors and grades (Mohammadi & Torabi, 2018). Studies reveal that the majority of college students in Türkiye have moderate levels of internet addiction (Sansgiry et al., 2006).

Time management involves coordinated task and organization management, and assessing and improving students' skills in allocating time effectively (Grissom et al., 2015). Uncontrolled Internet addiction is a significant factor that affects student's time management skills, which are necessary for effective academic learning (Mohammadi & Torabi, 2018; Öksüz et al., 2018). Students pursuing undergraduate pharmacy education need to allocate ample time for learning and understanding, and Internet addiction could hinder their career goals and negatively impact them as healthcare professionals. Additionally, academic procrastination, despite being often overlooked, can have irreversible consequences. Therefore, it's important that pharmacists, who play a crucial role in healthcare service delivery, effectively and efficiently manage their time (Sansgiry et al., 2006).

Excessive internet use is reportedly occupying various aspects of student life, both socially and academically (Ito et al., 2009). Studies have reported a direct relationship between internet addiction and lower academic achievements, postponement of exams, delay in completing assignments and projects, and not meeting student advisors (Kandemir, 2014; Lay, 1988). Procrastination is a common phenomenon among university students, who often procrastinate in completing academic tasks (Yang et al., 2019). Various studies have examined the relationship between academic procrastination and internet use (Lin et al., 2018; Mohammadi & Torabi, 2018). However, there are limited studies that assess the relationship between time management skills, academic procrastination, and academic performance of pharmacy students with internet addiction. This study aims to assess the relationship between the extent of internet addiction among pharmacy students in Türkiye and academic procrastination and time management skills.

Material and Methods

Study Design

This is a cross-sectional, descriptive study conducted between September and October 2023 in the Faculty of Pharmacy at a university in Turkey. In this study, sample size calculations were performed using G-Power (3.1.9.6). The computation was set for analysis of variance (ANOVA) with the expected effect size f at 0.20, an alpha level of 0.05 (two-tailed), and a power ($1 - \beta$ error probability) of 0.95. The required sample size was accordingly determined to be 470.

Instrument Development

The first section of the questionnaire consists of demographic information about the study participants, including their age, gender, purpose and frequency of Internet use, academic performance, and internet usage habits. The second section consists of a combination of three questionnaires, namely Young's Internet Addiction Test, The Time Management Inventory, and the Tuckman Procrastination Scale.

Young's Internet Addiction Test

The assessment of students' internet addiction levels was conducted using the IAT (Young, 2009). The Turkish version of the IAT, including its validity and reliability, was established through a study conducted by Çakır and Horzum (Balta & Horzum, 2008). This questionnaire comprises 19 items, each rated on a six-point Likert scale, with responses ranging from 0 (does not apply) to 5 (always applies). The total scores range from 0 to 95, with scores between 0 and 30 indicating non-addictive internet usage. Scores falling within the ranges of 31 to 49, 50 to 79, and 80 to 95 correspond to mild, moderate, and severe internet addiction, respectively. The scale comprises three sub-dimensions. The first sub-dimension, titled "Preferring Online Activities Over Daily Life," consists of a total of eight items; the second sub-dimension, "Desire to Increase Online Time," consists of seven items; and the third sub-dimension, "Issues Arising from Online Activities," includes four items. The Cronbach's alpha coefficient of IAT was 0.89.

Time Management Inventory (TMI)

The TMI was employed to assess the students' time management skills. Originally developed by Britton and Tesser in 1991 (Britton & Tesser, 1991), the Turkish validity and reliability of the TMI were confirmed by Alay and Koçak (Alay & Koçak, 2002). The TMI comprises a total of 27 items distributed across three subscales. The "Time Planning" subscale consists of 16 items that investigate participants' short-term planning regarding time utilization. The "Time Attitudes" subscale includes seven items that assess participants' attitudes towards time management. Lastly, the "Time Wasting" subscale comprises four items that pertain to participants' tendencies to use time inefficiently. The TMI employs a 5-point Likert scale, with response options ranging from "1-never" to "5-always." Total TMI scores range from 27 to 135, with higher scores indicating more proficient time management skills. In the Turkish validity and reliability study of the TMI, Cronbach's alpha coefficient was 0.87. In our study, the Cronbach's alpha coefficient for the TMI was 0.89.

Tuckman Procrastination Scale (TPS)

The TPS is used to assess procrastination tendencies among college-level students and comprises 16 items with a uni-dimensional structure (Tuckman, 1991). In the translated Turkish version, the scale is composed of 14 items and employs a 5-point Likert-type response format. It was validated by Uzun-Ozer et al. in 2013 (Özer et al., 2013). When aggregating all items, the total scale score can range from a minimum of 14 to a maximum of 70. A higher score indicates a greater tendency towards AP. In our study, the Cronbach's alpha coefficient for the TPS was 0.86.

Data Collection

Before data collection, study participants were briefed on the study's objectives, voluntary participation, and anonymity and confidentiality of the collected data. Written informed consent was obtained from students who willingly agreed to participate. A total of 642 students participated in the study. Data from twenty participants were excluded from the analysis due to identified errors and deficiencies. Subsequently, the analysis was conducted using data obtained from 622 participants.

Ethical Consideration

Ethical approval was obtained from the Atatürk University Clinical Research Ethics Board (IRB Approval No: B.30.2.ATA.0.01.00/722).

Data Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences SPSS v.26 (IBM SPSS Corp.; Armonk, NY, USA). The normality of the variables was assessed using the Shapiro – Wilk test, and the data were determined to follow a normal distribution. Descriptive statistical methods of frequency, percentage, minimum, maximum, mean, and standard deviation were utilized to characterize the participants' demographics, levels of Internet addiction, academic procrastination, and time management skills. Pearson's correlation analysis and regression analysis were employed to explore the relationships between scale scores. Independent samples t-tests and ANOVA were employed to compare participants' demographics with their levels of Internet addiction, academic procrastination, and time management skills. To identify group differences, the Tukey HSD test was applied. The significance level for the study was set at $p < .05$.

Results

A total of 622 students participated in the study. The demographic characteristics of pharmacy students are presented in Table 1. The pharmacy students, with an average age of 21.32 years, were predominantly female (73%), mostly with an average academic achievement level and average socio-economic status. The majority of students lived in dormitories (66.7%), had personal computers (71.5%), and used the Internet to communicate with friends (78.8%; Table 1).

The overall IAT, TMI, and TPS scores of pharmacy students are presented in Table 2. Pharmacy students achieved an average score of 31.60 ± 13.52 on the IAT, which shows a low level of internet addiction. Furthermore, over 50% of students showed no addiction, followed by mild addiction (38.6%). The results showed an average TMI score of 84.26 ± 14.37 among pharmacy students, which indicates a moderate level of time management skills. Furthermore, pharmacy students received an average score of 37.43 ± 9.58 on the TPS, indicating a slightly above-average level of procrastination (Table 2).

Table 3 shows a negative but significant correlation between student's IAT and TMI scores ($r = -0.283, p < .05$), preference for online activities over daily life and TMI score ($r = -0.268, p < .05$) and desire to increase online time and TMI total score ($r = -0.276, p < .05$). In contrast, a positive and significant relationship was observed between pharmacy students' total IAT and TPS scores ($r = 0.558, p < .05$), preference for online activities over daily life and the total TPS score ($r = 0.514, p < .05$) and desire to increase online time and total TPS score ($r = -0.513, p < .05$; Table 3).

Table 4 presents a comparison of the personal characteristics of pharmacy students with their average IAT scores. A significant difference was observed in the level of Internet addiction concerning students' school grade ($p < .05$), and the time spent on the Internet ($p < .05$). Specifically, pharmacy students in the fifth

Table 1.
Personal Characteristics of the Pharmacy Students ($N = 622$)

General Characteristics	Mean \pm SD	N (%)
Age	21.32 \pm 1.99	
Gender		
Female		454 (73.0)
Male		168 (27.0)
School grade (year)		
First grade		112 (18.0)
Second grade		128 (20.6)
Third grade		118 (19.0)
Fourth grade		133 (21.4)
Fifth grade		131 (21.1)
Academic grade		
<2.50		31 (4.9)
≥ 2.50		591 (95.1)
Place of residence		
Alone at home		63 (10.1)
Dorm		415 (66.7)
At home with the family		144 (23.2)
Income status		
Low (< 20,000 TL)		82 (13.2)
Below average (20,000 – 30,000 TL)		198 (31.8)
Average (30,000 – 40,000 TL)		263 (42.3)
High (> 40,000 TL)		79 (12.7)
Owning a personal computer		
Yes		445 (71.5)
No		177 (28.5)
Daily Internet use		
1 – 3 h		211 (33.9)
3 – 6 h		318 (51.1)
>6 h		93 (15.0)
Purposes of social networking ^a		
Communicate with friends		490 (78.8)
Create a social circle		147 (23.6)
Make new friends		64 (10.3)
Share information		348 (55.9)
Share video, sound		396 (63.7)
Play games and spend time		269 (43.2)
Other		118 (19.0)

^aMore than one option is marked.

grade who spent more than 6 hours on the Internet exhibited significantly higher levels of Internet addiction (33.73 ± 14.00 ; 41.65 ± 15.09 , respectively). However, no significant differences were found in IAT scores based on gender ($p = .096$), place of residence ($p = .062$), ownership of a personal computer ($p = .268$), or income

Table 2.
IAT, TMI and TPS Scores of Pharmacy Students

		Mean ± SD N (%)	Low Score	High Score	Score Range
IAT	Preferring Online Activities Over Daily Life	11.85 ± 6.63	3	33	0 – 40
	Desire to increase online time	13.41 ± 5.98	4	32	0 – 35
	Issues arising from online activities	5.97 ± 3.14	0	18	0 – 20
	IAT total	31.60 ± 13.52	8	73	0 – 95
	No addiction (0–30)			317 (50.9)	
	Mild (31–49)			240 (38.6)	
	Medium (50–79)			65 (10.5)	
TMI	Time planning	48.91 ± 11.62	17	80	16 – 80
	Time attitudes	21.92 ± 4.01	10	35	7 – 35
	Time - wasting	13.44 ± 2.84	4	20	4 – 20
	TMI total	84.26 ± 14.37	41	122	27 – 135
TPS	TPS total	37.43 ± 9.58	14	66	14 – 70

Note: IAT = Young’s Internet Addiction Test; TMI = Time Management Inventory; TPS = Tuckman Procrastination Scale.

status ($p = .136$). However, female students, whose academic grade is below 2.5, those living with their families, and/or belonging to high-income families and/or having personal computers generally have higher IAT scores. Furthermore, a significant difference was identified between the gender of pharmacy students and their tendency to prefer online activities over daily life ($p = .025$). Female students tended to engage in online activities more frequently due to Internet addiction. Additionally, a significant difference was observed between the school grades of pharmacy students and their inclination to prefer online activities over daily life, the desire to increase online time, and issues arising from online activities ($p < .05$). Students in the fifth grade displayed a higher preference for online activities over daily life and a stronger desire to increase online time compared to students in other grades. Another significant difference was found between the time spent by pharmacy students on the Internet and their inclination to prefer online activities over daily life, the desire to increase online time, and issues arising from online activities ($p < .05$). Students who spent 6 hours or more on the Internet showed a

higher tendency toward preferring online activities over daily life, a stronger desire to increase online time, and more issues arising from online activities. Also, a positive and weak but significant correlation was found between pharmacy students’ total IAT scores and their age ($r = 0.089, p = .027$). Furthermore, there were positive and weak but significant relationships between age and the preference for online activities over daily life and the issues arising from online activities ($r = 0.084, p = .036; r = 0.092, p = .021$), respectively (Table 4).

Table 5 provides a comparison of the personal characteristics of pharmacy students with their TMI and TPS score averages. A significant difference was observed between the gender ($p = .006$), school grade ($p < .05$), and daily internet use ($p < .05$) of pharmacy students and their level of time management skills. Specifically, it was concluded that pharmacy students who used the internet for 1 – 3 hours daily, female students, and 1st-grade students exhibited significantly higher levels of adequate time management skills. However, no significant differences were

Table 3.
Relationships Between IAT and TMI/its Subscales and TPS

IAT and Subscales	TMI and Subscales					TPS Total
		Time Planning	Time Attitudes	Time - Wasting	TMI Total	
Preferring Online Activities Over Daily Life	<i>p</i>	.000	.000	.000	.000	.000
	<i>r</i> ^a	–0.164*	–0.343*	–0.200*	–0.268*	0.514*
Desire to Increase Online Time	<i>p</i>	.000	.000	.000	.000	.000
	<i>r</i> ^a	–0.178*	–0.289*	–0.260*	–0.276*	0.513*
Issues Arising from Online Activities	<i>p</i>	.320	.004	.000	.000	.000
	<i>r</i> ^a	–0.40	–0.115*	–0.234*	–0.111*	0.290*
IAT total	<i>p</i>	.000	.000	.000	.000	.000
	<i>r</i> ^a	–0.169*	–0.337*	–.262*	–0.283*	0.558*

Note: IAT = Young’s Internet Addiction Test; TMI = Time Management Inventory; TPS = Tuckman Procrastination Scale.

^aPearson correlation analysis.

* $p < .05$.

Table 4.
Comparison of the Personal Characteristics of the Students With Their IAT Score Averages

General Characteristics	Preferring Online Activities Over Daily Life Mean \pm SD	Desire to Increase Online Time Mean \pm SD	Issues Arising From Online Activities Mean \pm SD	IAT Total Mean \pm SD
Age				
<i>r</i> ^c	0.084*	0.044	0.092*	0.089*
<i>p</i>	.036	.270	.021	.027
Gender				
Female	12.21 \pm 6.62	13.62 \pm 6.00	5.92 \pm 3.03	31.15 \pm 13.60
Male	10.87 \pm 6.58	12.83 \pm 5.90	6.10 \pm 3.45	29.12 \pm 13.25
<i>t</i> ; <i>p</i>	2.246 ^a ; .025*	1.467 ^a ; .143	- 0.615 ^a ; .539	1.667 ^a ; .096
School grade				
First grade	9.19 \pm 4.97	11.37 \pm 5.25	5.03 \pm 2.92	25.06 \pm 10.70
Second grade	11.73 \pm 5.98	14.02 \pm 5.79	6.76 \pm 3.24	30.69 \pm 13.07
Third grade	13.25 \pm 7.10	13.64 \pm 6.39	6.42 \pm 3.37	32.79 \pm 14.50
Fourth grade	11.48 \pm 7.00	13.23 \pm 5.67	6.14 \pm 3.15	30.17 \pm 13.41
Fifth grade	13.34 \pm 6.96	14.50 \pm 6.31	6.40 \pm 2.86	33.73 \pm 14.00
<i>F</i> ; <i>p</i>	7.940 ^b ; .000* 5 > 1-2-4** 4 > 1-3-5** 3 > 13 > 1-4** 2 > 1-5** 1 > 2-3-4-5**	4.898 ^b ; .001* 1 > 21 > 21 > 21 > 21 > 2-3-4-5**	4.058 ^b ; .003* 5 > 1** 4 > 1** 3 > 1** 1 > 3-4-5**	7.566 ^b ; .000* 5 > 1 - 4** 4 > 1 - 5** 3 > 1** 2 > 1** 1 > 2-3-4-5**
Academic grade				
<2.50	13.87 \pm 6.41	13.32 \pm 4.37	5.39 \pm 2.58	32.10 \pm 11.87
\geq 2.50	11.74 \pm 6.63	13.41 \pm 6.06	6.00 \pm 3.17	30.52 \pm 13.61
<i>t</i> ; <i>p</i>	1.747 ^a ; .081	- - 0.079 ^a ; .937	- - 1.056 ^a ; .292	0.631 ^a ; .0629
Place of residence				
Alone at home	11.90 \pm 6.27	13.02 \pm 4.97	6.76 \pm 3.54	31.08 \pm 12.28
Dorm	11.52 \pm 6.66	13.08 \pm 6.03	5.86 \pm 3.12	29.74 \pm 13.59
At home with the family	12.76 \pm 6.65	14.51 \pm 6.16	5.92 \pm 3.01	32.89 \pm 13.66
<i>F</i> ; <i>p</i>	1.861 ^b ; .156	3.207 ^b ; .041* 3 > 2**	2.267 ^b ; .104	2.965 ^b ; .062
Income status				
Low	12.21 \pm 6.96	13.22 \pm 5.86	5.83 \pm 2.92	30.62 \pm 13.44
Below average	11.80 \pm 6.55	13.42 \pm 6.33	5.66 \pm 3.04	30.24 \pm 13.67
Average	11.33 \pm 6.47	13.17 \pm 5.71	5.98 \pm 3.19	29.88 \pm 13.32
High	13.30 \pm 6.89	14.34 \pm 6.10	6.85 \pm 3.33	33.89 \pm 13.71
<i>F</i> ; <i>p</i>	1.895 ^b ; .129	0.806 ^b ; .491	2.792 ^b ; .040* 4 > 1 - 2-3**	1.855 ^b ; .136
Owning a personal computer				
Yes	11.94 \pm 6.71	13.48 \pm 5.99	6.19 \pm 3.14	30.98 \pm 13.59
No	11.62 \pm 6.43	13.21 \pm 5.96	5.41 \pm 3.09	29.65 \pm 13.35
<i>t</i> ; <i>p</i>	0.536 ^a ; .592	0.501 ^a ; .617	2.795 ^a ; .005*	1.109 ^a ; .268
Daily Internet use				
1 - 3 h	9.37 \pm 5.21	10.42 \pm 4.75	5.01 \pm 2.84	24.39 \pm 10.39
3 - 6 h	12.02 \pm 6.28	14.01 \pm 5.52	6.13 \pm 2.99	31.50 \pm 12.59

(Continued)

Table 4.
Comparison of the Personal Characteristics of the Students With Their IAT Score Averages (Continued)

General Characteristics	Preferring Online Activities Over Daily Life Mean ± SD	Desire to Increase Online Time Mean ± SD	Issues Arising From Online Activities Mean ± SD	IAT Total Mean ± SD
>6 h	16.86 ± 7.68	18.12 ± 6.37	7.59 ± 3.53	41.65 ± 15.09
F ; p	47.602 ^b ; .000*	69.380 ^b ; .000*	24.210 ^b ; .000*	65.109 ^b ; .000*
	3 > 1 – 2**	3 > 1 – 2**	3 > 1 – 2**	3 > 1 – 2**
	2 > 1 – 3**	2 > 1 – 3**	2 > 1 – 3**	2 > 1 – 3**

Abbreviation: IAT, Young’s internet addiction test.

^aIndependent groups T test.

^bANOVA.

^cPearson correlation analysis.

**p* < .05.

**LSD test.

found in time management skills based on academic achievement (*p* = .846), place of residence (*p* = .105), ownership of a personal computer (*p* = .764), and income status (*p* = .455). It was determined that pharmacy students with academic achievements of 2.50 and above, those living alone, having higher income status, and owning a personal computer generally demonstrated more effective time management skills. Moreover, a significant difference was identified between the time planning, time attitudes, and time-wasting subscales and the pharmacy students’ gender (*p* < .05), school grade (*p* < .05), and daily internet use (*p* < .05). A significant difference was also found between the place of residence (*p* = .024) of pharmacy students and their time-wasting subscale. Students with academic achievements of 2.50 and above exhibited better time planning, more positive time attitudes, and less time-wasting tendencies. Additionally, a positive and weak but significant correlation was found between the total TMI, time attitudes-time wasting subscales scores of pharmacy students and their age (*r* = −0.106, *p* = .008; *r* = −0.108, *p* = .007; *r* = −0.134, *p* = .01). A significant difference was observed in the level of academic procrastination among pharmacy students based on their school grades (*p* < .05), place of residence (*p* = .007), and daily internet use (*p* < .05). It was determined that the academic procrastination level of pharmacy students who used the internet for more than 6 hours daily, those living with their family, and 3rd-grade students was significantly higher. However, no significant differences (*p* > .05) were found in academic procrastination levels based on gender (*p* = .178), academic achievement (*p* = .654), income status (*p* = .873), or ownership of a personal computer (*p* = .122). Nevertheless, it was observed that female pharmacy students, those with academic achievements below 2.50, individuals with below-average income status, and those without personal computers exhibited higher academic procrastination levels. Additionally, no correlation was found between pharmacy students’ total TPS score and their age (*r* = 0.054, *p* = .178; Table 5).

In the regression analysis, multicollinearity was not a concern (for all predictors: tolerance values > 0.1 and VIF < 5). A forward linear regression with Internet addiction score as the dependent variable showed that higher academic procrastination (β = .60; *p* < .005) scores were significantly related to Internet addiction. Additionally, 32% variance in Internet addiction is explained by academic procrastination and time management (R^2 = 0.32,

p < .001). A second forward linear regression with academic procrastination score as the dependent variable found that higher Internet addiction (β = .42; *p* < .001), and lower time management (β = −.48; *p* < .001) were significantly related to higher academic procrastination. Furthermore, 52% variance in academic procrastination is explained by internet addiction and time management (R^2 = 0.52, *p* < .001). A third forward linear regression with time management score as the dependent variable found that lower academic procrastination (β = −.95; *p* < .001) was significantly related to higher time management. Moreover, 36% variance in time management is explained by academic procrastination and Internet addiction (R^2 = 0.36, *p* < .001; Table 6).

Discussion

The study findings showed that pharmacy students in Türkiye have mild internet addiction. These results showed similarity with pharmacy students in the USA, where university students also showed lower levels of internet addiction, but contrasted with a study conducted in Egypt, where pharmacy students showed a moderate level of internet addiction (Sayed et al., 2022; Younes et al., 2016).

The results of this study highlighted a statistically significant correlation between the total IAT scores of pharmacy students and their age, and these results coincide with the findings of a similar study in Türkiye (Alarçin & Şirin, 2021). However, in a study conducted with university students in Egypt, no correlation was found between internet addiction and the age group of students (Sayed et al., 2022).

The results of this study found that female students in Türkiye exhibited a higher prevalence of internet addiction, which is inconsistent with other documented studies conducted in Türkiye and other parts of the developed world (Upadhayay & Guragain, 2017; Younes et al., 2016). Despite higher internet usage, the findings of this study reported that the time management skills of female pharmacy students were significantly higher than those of male students, which was also supported by previously conducted studies around the world (Gayef et al., 2017; Mishra et al., 2014). The findings of this study reported no significant difference between pharmacy students’ grades and time management skills, which is in contrast to another study conducted among nursing students in Türkiye (Altiner Yas et al., 2022).

Table 5.*Comparison of students' personal characteristics with their TMI and TPS score averages*

General characteristics	Time planning Mean \pm SD	Time attitudes Mean \pm SD	Time - wasting Mean \pm SD	TMI total Mean \pm SD	TPS total Mean \pm SD
Age					
<i>r</i>	-.061	- .108*	-.134*	-.106*	0.054
<i>p</i>	.126	.007	.001	.008	.178
Gender					
Female	49.92 \pm 11.24	21.55 \pm 3.92	13.76 \pm 2.64	85.23 \pm 14.36	37.77 \pm 9.75
Male	46.18 \pm 12.21	22.91 \pm 4.08	12.56 \pm 3.17	81.65 \pm 14.10	36.49 \pm 9.06
<i>t</i> ; <i>p</i>	3.596 ^a ; .000*	-3.797 ^a ; .000*	4.780 ^a ; .000*	2.776 ^a ; .006*	1.487 ^a ; .138
School grade					
First grade	52.46 \pm 10.82	23.21 \pm 4.22	14.61 \pm 2.30	90.28 \pm 13.89	33.97 \pm 8.85
Second grade	49.02 \pm 11.75	21.97 \pm 4.70	13.26 \pm 2.66	84.25 \pm 14.96	37.63 \pm 9.51
Third grade	46.14 \pm 9.89	21.40 \pm 3.40	13.35 \pm 2.81	80.79 \pm 12.37	39.40 \pm 8.95
Fourth grade	48.44 \pm 12.25	21.84 \pm 3.86	13.27 \pm 3.02	83.55 \pm 14.66	36.96 \pm 10.04
Fifth grade	48.73 \pm 12.31	21.40 \pm 3.51	12.87 \pm 3.03	82.99 \pm 14.25	38.88 \pm 9.62
<i>F</i> ; <i>p</i>	4.441 ^b ; .002* 1 > 2-3-4-5**	4.297 ^b ; .002* 1 > 2-3-4-5**	6.557 ^b ; .000* 1 > 2-3-4-5**	7.248 ^b ; .000* 1 > 2-3-4-5**	5.913 ^b ; .000* 1 > 2-3-4-5** 3 > 4**
Academic grade					
<2.50	49.06 \pm 10.08	21.77 \pm 3.78	12.94 \pm 2.09	83.77 \pm 12.65	38.42 \pm 9.38
\geq 2.50	48.90 \pm 11.70	21.93 \pm 4.02	13.47 \pm 2.87	84.29 \pm 14.46	37.37 \pm 9.59
<i>t</i> ; <i>p</i>	0.077 ^a ; .938	- .205 ^a ; .838	- .1013 ^a ; .312	- .194 ^a ; .846	0.592 ^a ; .654
Place of residence					
Alone at home	49.60 \pm 12.48	22.76 \pm 3.61	12.68 \pm 3.15	85.05 \pm 14.69	35.94 \pm 10.01
Dorm	49.29 \pm 11.32	21.99 \pm 4.07	13.64 \pm 2.74	84.92 \pm 14.11	36.91 \pm 9.30
At home with the family	47.50 \pm 12.05	21.33 \pm 3.94	13.20 \pm 2.93	82.03 \pm 14.82	39.56 \pm 9.92
<i>F</i> ; <i>p</i>	1.395 ^b ; .249	3.019 ^b ; .050	3.773 ^b ; .024*	2.266 ^b ; .105	5.006 ^b ; .007* 3 > 1-2**
Income status					
Low	50.23 \pm 11.11	21.87 \pm 4.01	13.44 \pm 2.69	85.54 \pm 14.55	37.41 \pm 9.68
Below average	48.58 \pm 12.60	21.89 \pm 4.25	13.68 \pm 2.86	84.15 \pm 15.10	37.83 \pm 9.73
Average	48.17 \pm 10.76	21.83 \pm 3.92	13.44 \pm 2.81	83.44 \pm 13.29	37.08 \pm 9.30
High	50.80 \pm 12.21	22.33 \pm 3.70	12.84 \pm 2.99	85.96 \pm 15.72	37.57 \pm 10.12
<i>F</i> ; <i>p</i>	1.459 ^b ; .225	0.324 ^b ; .808	1.678 ^b ; .171	0.873 ^b ; .455	0.233 ^b ; .873
Owning a personal computer					
Yes	49.11 \pm 11.38	21.95 \pm 4.03	13.31 \pm 2.90	84.37 \pm 13.82	37.05 \pm 9.50
No	48.39 \pm 12.23	21.83 \pm 3.96	13.77 \pm 2.66	83.99 \pm 15.70	38.37 \pm 9.74
<i>t</i> ; <i>p</i>	0.699 ^a ; .485	0.343 ^a ; .732	- .1828 ^a ; .068	0.301 ^a ; .764	- .1547 ^b ; .122
Daily Internet use					
1 - 3 h	50.56 \pm 11.98	22.48 \pm 3.91	13.87 \pm 2.92	86.91 \pm 14.69	34.75 \pm 8.68
3 - 6 h	48.51 \pm 11.18	21.94 \pm 3.82	13.42 \pm 2.67	83.86 \pm 13.84	37.57 \pm 9.37
>6 h	46.53 \pm 11.85	20.58 \pm 4.53	12.55 \pm 3.06	79.66 \pm 14.23	42.99 \pm 9.86
<i>F</i> ; <i>p</i>	4.319 ^b ; .014* 1 > 2 - 3**	7.392 ^b ; .001* 3 > 1 - 2**	7.124 ^b ; .001* 3 > 1 - 2**	8.683 ^b ; .000* 1 > 2 - 3** 2 > 1 - 3**	25.842 ^b ; .000* 1 > 2 - 3** 2 > 1 - 3**

Abbreviation: TMI, time management inventory; TPS, Tuckman procrastination scale.

^aIndependent groups T test.^bANOVA.**p* < .05.

**LSD test.

Table 6.
Regression Analysis

Model 1: Linear Regression Taking the Internet Addiction score as the Dependent Variable						
Variable	R ²	Unstandardized β	Standardized β	p	Tolerance	VIF
Academic procrastination	0.32	.85	.60	<.001	0.645	1.550
Time management		.08	.07	.06	0.645	1.550
Model 2: Linear Regression Taking the Academic Procrastination Score as the Dependent Variable						
Variable	R ²	Unstandardized β	Standardized β	p	Tolerance	VIF
Internet addiction	0.52	.30	.42	<.001	0.920	1.087
Time management		-.32	-.48	<.001	0.920	1.087
Model 3: Linear Regression Taking the Time Management Score as the Dependent Variable						
Variable	R ²	Unstandardized β	Standardized β	p	Tolerance	VIF
Internet addiction	0.36	.08	.07	.06	0.689	1.452
Academic procrastination		-.95	-.64	<.001	0.689	1.452

The results also showed that internet addiction among pharmacy students in Türkiye was not related to their academic performance. Similar results have been reported among students in Egypt (Sayed et al., 2022). However, studies conducted in Slovenia and the USA have shown that internet addiction may affect students’ academic performance, as students tend to spend most of their time using the internet (Li et al., 2015; Macur et al., 2016). Studies examining the relationship between university students’ academic performance and time management skills have revealed that students who use their time effectively also achieve higher academic grades (Altiner Yas et al., 2022; Siddiqi & Memon, 2016). Our study showed that there was no difference between students’ academic performance levels and the time planning, time attitudes, and time-wasting subscales, which is inconsistent with another study conducted among nursing students in Türkiye (Altiner Yas et al., 2022).

The study results also showed that pharmacy students who live with their families use the Internet more frequently. It has been reported that engaging in sports and other healthy social activities can help minimize stress and internet addiction among students and also keep them physically and mentally fit (Upadhyay & Guragain, 2017). Another factor reported in this study was that there was no difference between internet addiction and the income level of students, which is consistent with the findings of another study conducted among Malaysian students (Radeef & Faisal, 2020). Our study showed that pharmacy students who had personal computers had higher levels of internet addiction because they can access the internet in the comfort of their homes, which increases internet utilization and subsequently addiction. Similar findings have been reported by a study conducted among nursing students (Turan et al., 2020).

Excessive Internet usage is a significant indicator of addiction (Griffiths, 2005). The results of this study highlighted a strong correlation between daily Internet usage time and Internet addiction, in line with the results of another study conducted among university students in Türkiye (Savci & Aysan, 2017). However, another study reported that Internet addiction scores did not differ significantly based on the duration of daily Internet use (Eroğlu & Bayraktar, 2017).

Academic procrastination among pharmacy students increases with an increase in Internet addiction, which contradicts previous findings that found no significant relationship between academic procrastination and internet use (Odaci, 2011). Specifically, the preference for online activities over daily life, the desire to increase online time, and issues arising from online activities significantly raise the academic procrastination levels of pharmacy students in Türkiye. Similarly, many studies have confirmed that there is a strong relationship between internet use and procrastination. For example, Davis et al. reported a strong and positive relationship between procrastination and Internet use (Davis, 2001). Similarly, Kandemir showed that there is a strong and positive relationship between academic procrastination and the degree of internet addiction (Kandemir, 2014). In addition, the regression analysis results of our study showed that internet addiction significantly predicted academic procrastination, in line with the results of another study conducted in Thailand (Nadarajan et al., 2023).

The findings of this study also reported that internet addiction negatively affects students’ time management skills, which was reported in studies conducted with university students in Türkiye and Pakistan (Altiner Yas et al., 2022; Siddiqi & Memon, 2016). More specifically, the results of this study highlighted that the preference for online activities over daily life, the desire to increase online time, and issues arising from online activities significantly diminish the effective time management skills of pharmacy students.

Limitations and Directions/Suggestions for Future Research

In our study, internet addiction was found to be a significant predictor of academic procrastination. Some studies emphasize that this relationship could be bidirectional. Therefore, further research is needed. In addition, a significant relationship was found between internet addiction and time management. It is anticipated that intervention studies on time management will be planned and studies on reducing internet addiction will be useful for university students. The study has some limitations. Firstly, the results may not be generalizable to all pharmacy students in Türkiye. Secondly, data collection based on student self-report is considered a limitation, as self-report bias may occur.

This study has provided valuable insights into the relationship between academic procrastination, time management, and internet addiction among pharmacy students in Türkiye. This study revealed that with the increased use of the internet, pharmacy student's time management skills diminish, and academic procrastination increases. Furthermore, it was found that students' internet addiction has a negative impact on their academic grades. In particular, a significantly higher level of internet addiction was found among students spending more than 6 hours on the internet. It was also found that students who used their time management skills effectively achieved better academic grades. In light of these findings, it is suggested that interventions aimed at promoting responsible internet usage and mitigating academic procrastination tendencies should be developed among pharmacy students.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: This study was approved by the Atatürk University Clinical Research Ethics Board (IRB Approval No: B.30.2.ATA.0.01.00/722).

Informed Consent: Written informed consent was obtained from the participants who agreed to take part in the study.

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Ulutaş Deniz et al. The Effect of Internet Addiction on Academic Procrastination

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