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# Status and sociodemographic correlates of pathological internet use among adolescents in Jordan: a cross-sectional study

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## Abstract

**Background** Pathological internet use (PIU) refers to excessive use of the internet and is commonly described using various terms, such as internet addiction disorder (IAD). It is a significant concern for mental health professionals in schools and primary care settings, especially among adolescents. Although in the sphere of psychological assessment, PIU is classified as a behavioral addiction and has been proven to be as serious as substance abuse, PIU is not officially classified as a psychological disorder in the Diagnostic and Statistical Manual of Mental Disorders. The aims of this study were to investigate the PIU status and explore the sociodemographic correlates of PIU among adolescents in Jordan.

**Methods** This study employed a descriptive–explorative design with a cross-sectional approach. The study participants were 735 adolescents, grades 9th–11th. Data were collected via valid and reliable self-report questionnaire related to the main study variables over a period ranging from the beginning of March to the end of April 2024. For the data analysis, *t* tests and ANOVAs were used to identify any significant differences in the mean PIU total score in relation to the sociodemographic variables.

**Results** The results revealed that among the 735 adolescents, 75.8% ( $n=557$ ) experienced PIU, with a significant difference in the mean PIU total score across grades ( $F=3.37, p<.05$ ) and academic performance levels ( $F=8.76, p<.05$ ), but not in terms of sex ( $t=.371, p>.05$ ), father's education level ( $F=.789, p>.05$ ), or family income level ( $F=1.076, p>.05$ ).

**Conclusion** This study provides practical findings that students with poor academic performance and lower grades have higher levels of PIU. It is recommended that an ongoing screening for PIU be conducted to intervene proactively through multidisciplinary collaboration to manage disproportionate internet use among adolescents. Furthermore, this study adequately raises awareness about the far-reaching consequences of PIU for adolescents of both sexes. Finally, the results will be utilized to guide future studies to highlight more sociodemographic correlates of PIU.

**Keywords** Pathological internet use, Adolescents, Sociodemographic correlates

## Introduction

### Background

In the technological prosperity epoch, the internet has become an essential pillar of individuals' daily lives across the globe. Internet-related activities such as social interaction, online gaming, and learning attract different social segments, particularly adolescents and young people. Globally, there are more than 5 billion internet users,

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accounting for 64.6% of the world's population. In Jordan, the prevalence of internet use has markedly increased from 6.87 million in 2022 to 9.95 million at the beginning of 2023, accounting for 66.8% and 88% of the total Jordanian population, respectively [1]. Despite the positive aspect of internet use, it has many adverse impacts on users, especially young people. In particular, adolescents who spend a substantial amount of time browsing various websites are easy targets for one of the most prevalent issues: pathological internet use [2]. Adolescence is a critical transition stage in an individual's life. During this age period, adolescents' tendency to engage in risky behaviors intensifies, which might be attributed to the moldable nature of adolescents' cognition in the face of environmental stimuli and limited resilience to handle external stressors [3]. This, ultimately, requires further investigation focusing on what constitutes and contributes to PIU and its consequences among adolescents.

Pathological internet use (PIU) is defined as compulsive use of the internet and is commonly described using various terms, such as "internet addiction disorder (IAD)," "internet dependence," "problematic internet use," and others [4]. Although, in the sphere of psychological assessment, PIU is classified as a behavioral addiction and has been proven to be as serious as substance abuse, PIU has not yet been officially classified as a psychological disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM) [5]. Multiple studies have indicated that PIU is predominant among young people and that there is an accelerated percentage of excessive internet use among adolescents in Middle East countries [6–8]. Accordingly, recent studies have shown that PIU is a prevalent problem necessitating specialized treatment [9, 10].

Previous Jordanian studies have seriously addressed the mental health disturbances that Jordanian adolescents have been suffering from in the last few decades. In particular, the COVID-19 pandemic caused severe turbulences in many of the major aspects of adolescents' lives. For example, Jordan, similar to other countries, enacted public health policies to prevent the spread of COVID-19, including the closing of schools and the complete shift to distance learning. This sudden and radical transformation in learning style may have evoked several cognitive and behavioral disturbances [11]. Since adolescents completely rely on the internet for education and are extremely immersed in the online world, the prevalence of PIU may have increased. Nonetheless, PIU was also reported by adolescents before the pandemic, as Jordanian studies revealed that approximately 6.3% of school students in Amman experienced PIU [12], with a higher prevalence reported by ongoing school adolescents at Zarqa governorate (8.5%) [13].

Furthermore, adolescents' psychological profiling highlights that the residual effects of COVID-19 could be manifested as psychological complaints. This assumption was supported by a Jordanian study [11] that revealed that depression and anxiety were detected at high rates among school students who had received online education during the pandemic, with a higher prevalence among females than males. Another rigorous study validated the assertion that anxiety and depression may reduce the threshold of suicide and other diseases among this age group [14]. In addition, a recent national study [15] revealed that substance use is one of the riskiest behaviors and is predominant among adolescents, especially males. It is also projected to be one of the major threats to mental well-being, as this use might develop into substance addiction. Moreover, female adolescents also have a greater tendency to suffer from eating disorders, as social comparison fuelled by media connectedness leads to disturbances in their perception and satisfaction with their body shape [16].

However, such mental disturbances might be due to PIU, which has never been investigated before and is connected to various significant factors that directly affect and are associated with PIU. Thus, such variables are the main concern of this study. According to ecological theory, psychosocial factors serve as catalysts or inhibitory agents throughout adolescents' developmental processes [17]. Therefore, sociodemographic factors (i.e., individual- and family-related factors) are of considerable concern, as they are significantly correlated with PIU [18]. Among the individual-related factors, age is negatively associated with PIU. It has been reported that as age increases, adolescents achieve greater cognitive maturation, which leads them to realize the actual magnitude of performing goal-oriented activities [19]. Thus, they exhibit a lower inclination toward engaging in behavioral addictions such as PIU [20]. Another factor is sex; females have a higher threshold for engaging in PIU than males [19]. As females experience greater supervision by their families, their time browsing the internet might be restricted, negatively affecting their urge to use the internet [21]. Furthermore, adolescents who possess greater academic achievement are less inclined to excessively use the internet, as they have a greater ability to control and mask their urges toward various captivating platforms [12].

Families play a key role in exacerbating or buffering the intensity of any young person's life-related issues. For example, family support serves as a protective agent in relation to substance use among school students [15]. Therefore, the associations between behavioral addictions, such as PIU, and many family-related factors, such as household income level and parents' educational level,

among adolescents are well established in the research. For example, adolescents living with high-income families tend to experience PIU more, as they have greater availability of and easier access to smart devices such as smartphones and iPads [18]. Furthermore, adolescents whose parents have lower educational levels report a higher rate of PIU [8]. In light of the literature, individual factors (i.e., sex, age, and academic performance), alongside family factors (i.e., father's educational level and family income level), are associated with PIU among adolescents.

To the best of the author's knowledge and on the basis of an extensive literature review, studies concerning the status of PIU and its sociodemographic correlates in Jordan are rare. Thus, this issue warrants further investigation because, if left unaddressed, many far-reaching consequences could threaten the mental well-being of promising generations. Therefore, the current study highlights this issue and attempts to provide a clear understanding of the PIU status and sociodemographic correlates (i.e., individual and familial) among adolescents in Jordan.

### **Purpose of the study**

The purpose of this study was to investigate the status and sociodemographic correlates of PIU among adolescents in Jordan.

### **Research questions**

1. What is the status of pathological internet use among adolescents in Jordan?
2. Are there any differences in pathological internet use in relation to selected sociodemographic characteristics (sex, grade, academic performance level, father's educational level, and family income level)?

### **Methods**

#### **Study design**

This study employs a descriptive–explorative design with a cross-sectional approach. Data were collected via valid and reliable self-report questionnaire from high school students in relation to the main study variables over a period ranging from the beginning of March to the end of April 2024.

#### **Settings**

This study was conducted at nine schools (six government schools and three private schools) located in the central district of Jordan. These schools were randomly selected from a list of all schools provided by the Jordanian Ministry of Education (MOE) using a lottery method. The district selected for this study was based on

the fact that this district is the largest populated district (65% of the Jordanian population) and thus includes the largest number of schools in Jordan. Moreover, students at these schools represent diverse sociocultural backgrounds, which ensures maximum variation in the study population and that the population represents most students in Jordan.

### **Population and sampling**

The target population of this study was all school-aged adolescents in Jordan. However, the accessible population was adolescents who were studying in the above-mentioned selected secondary schools.

A multistage cluster random sampling technique was employed. Initially, the selected schools were clustered into three geographical areas (Amman, Al-Balqa'a, and Al-Zarqa'a). Systematic random sampling was used to calculate the sample size for each cluster. Consequently, one section from each grade (9th to 11th) was chosen randomly. Finally, the current author contacted the school counsellor and administrator to obtain a list of student names. From these lists, the eligible students were selected by using a systematic random sampling technique, in which every  $k$  student was selected after the interval width was calculated, and the first participant was selected randomly using a list of random numbers.

### **Inclusion and exclusion criteria**

The inclusion criteria for adolescents were as follows: (1) they were adolescents attending school in the 2023–2024 academic year; (2) they were students in grades ninth to eleventh; (3) they were students who were using the internet; and (4) they were students who could read and write Arabic fluently. With respect to school recruitment, only high schools were included. The exclusion criteria for adolescents were as follows: (1) suffering from neurocognitive impairment (the student's health records at the school were checked or the case was reported by the school counsellor); (2) having a psychological disorder; and (3) problems reading and writing.

### **Ethical considerations and consent forms**

Ethical approval was obtained from the Ethics Research Committee at XYZ University, and approval was obtained from the MOE prior to data collection. With respect to the instrument used in this study, preceding the data collection, the author confirmed with the original author that the scale was available open access and that the scale could be freely used. The participants were fully informed about the nature, purpose, expectations, and significance of the study, as well as the benefits and risks of the study and the types of data that would be collected. All participation was voluntary, and informed consent to

protect the participant's autonomy rights was requested at the end of the questionnaire's cover letter. To ensure anonymity, the participants' names were coded for the purpose of data analysis. In addition, their confidentiality was maintained; all the data were collected and saved securely in a locked place in the research supervisor's office at the university, and no one except the researcher and supervisor had access to the data.

#### **Data collection procedure**

After obtaining ethical approval from the Research and Ethics Committee at XYZ University, the MOE was approached for their approval and support to conduct the study at their schools. The MOE website was accessed to obtain a list of all secondary schools located in the central district of Jordan. Nine schools were then selected randomly, three from each site (two government schools and one private school). The author then contacted the administrator and counsellor of each school and explained the executive summary of the study, including the research question, purpose, and significance. A time for data collection during the student's free class was then determined. One section was randomly selected from each grade (9th–11th). A list of the students who attended that class was subsequently obtained. Students were selected via a systematic random sampling technique; every  $k$  student was selected after the interval width was calculated. The researcher introduced the study and distributed the invitation letter to the students in each class. Those who expressed their willingness were included by the researcher, who had attended the class at the time the invitations were distributed to explain the study, to provide them with all the information about the study's purpose and significance and to guarantee their anonymity. The students were informed that the study was approved by the ethics committee at the School of Nursing, the XYZ University, and the school where they were studying. Then, on the basis of the students' confirmation, they were asked to sign a consent form before participating to ensure their agreement. They were also informed that they had the right to freely accept or refuse participation without any negative consequences to their academic status. A package consisting of a consent form, a cover letter, a researcher-generated sociodemographic form, and a self-report scale was distributed to all randomly selected students who were willing to participate in the study. Informed consent encompassed information concerning the study title, purpose, and significance, and a clarified statement to inform the participants that their confidentiality would be assured. Their anonymity was maintained through the use of a self-administered questionnaire in which the participants were provided codes by computer-generated random numbers; thus,

their identity could not be discovered and only the data was disclosed. Additionally, the students were assured that their participation was voluntary and that they had the right to withdraw their participation without any overt or covert influence on their academic status. The students were instructed to freely ask any explanatory questions. The researcher's contact information was provided to the students and also included in the cover letter. The data were collected from the eligible students at one point during their class. Importantly, each participant was given 30 min to complete the questionnaire, and students either returned the questionnaire directly to the researcher or in a sealed envelope. This process was repeated until the required sample size was achieved. The data entry phase directly followed the data collection phase. All the collected data were saved securely in a locked place in the research supervisor's office at the university, and no one except the researcher and supervisor had access to the data. The computerized data sheet was saved on the researchers' personal computer, which only the researchers had access to. With respect to the policy of the ethical committee, a hard copy of the questionnaire was retained at the School of Nursing, and it will be saved for five years before being discarded.

#### **Measurement**

##### ***Sociodemographic characteristics form***

A sociodemographic characteristics form was developed by the authors. The form included multiple questions concerning sex, grade, academic performance level, father's education level, mother's education level, family income level, having a smartphone, preferred social media platforms, internet supply device (router) availability at home, number of years of internet use, preferred internet access facility, and time of internet use (hours/day). The author provided several choices to answer these questions.

##### ***Internet Addiction Scale***

The Internet Addiction Test (IAT), developed by Young in 1998, was used to measure pathological internet use among adolescents. The IAT has 20 items, and each item is rated on a six-point Likert scale ranging from 0 (not applicable) to 5 (always). A higher IAT total score indicates greater internet use compulsivity and was categorized as follows: 0–30, 31–49, 50–79, and 80–100, indicating normal, mild, moderate, and high internet addiction, respectively. The IAT is considered a valid and reliable tool for measuring the severity of PIU. The Cronbach's alpha value for this scale is 0.91 in another population aged 18–29 [22]. For the purposes of the current study, the term "addiction" is changed to "pathological use" when the IAT scores are discussed.

### Data analysis

The Statistical Package for Social Science (IBM-SPSS version 28.0 for Windows) was used for the data analyses. Preliminary data analyses using descriptive statistics were utilized to describe and summarize all the sociodemographic variables. Central tendency measures (means and medians) and dispersion measures (standard deviations and ranges) are used to describe the continuous variables; PIU and frequency and percentage statistics were used to describe the nominal and ordinal variables of sex, grade, academic performance level, father's education level, mother's education level, family income level, having a smartphone, preferred social media platforms, router availability at home, number of years of internet use, preferred internet access facility, and time of internet use (hours/day). Independent samples *t* tests were conducted to identify any potential significant differences in the mean PIU total score between males and females. One-way between-groups analysis of variance (ANOVA) was conducted to determine if there were any significant differences in the mean PIU total score in relation to grade, academic performance level, father's education level, or family income level.

### Results

#### Adolescents' sociodemographic characteristics

A total of 735 adolescents completed the questionnaire in this survey. Among them, 50.6% ( $n=372$ ) were males, and 49.4% ( $n=363$ ) were females. The number of students in ninth, tenth, and eleventh grades was 32.1% ( $n=236$ ), 32.1% ( $n=236$ ), and 35.8% ( $n=263$ ), respectively; the majority of students had excellent academic performance (37.8%), while 7.8%, 21.5%, and 32.9% had poor, good, and very good levels, respectively; 75.9% had a middle level of family income; the proportion of parents with an educational level of a bachelor's degree was the highest: 29.9% for fathers and 34.8% for mothers; 52.9% of students had used the internet for more than 5 years; 37.1% had spent 3–4 h/day on the internet; and 88.4% had reported using smartphones as their preferred method to browse the internet (see Table 1).

In terms of internet connectivity, 94.4% of the participants reported having an internet supply device (router) at their homes, 91.3% had a smartphone, and Instagram was the most commonly used platform by 86.8% of the students (see Table 2).

#### Variables of the study

##### *Pathological internet use*

The scale analysis revealed that the mean PIU total score was 39.1 (SD=17.67), with a minimum value of 1.0 and a maximum value of 93.0. According to Young's criteria,

**Table 1** Descriptive statistics of the sociodemographic characteristics of the adolescents ( $N=735$ )

Variable	Categories	<i>n</i>	%
Sex	Male	372	50.6
	Female	363	49.4
Grade	Ninth	236	32.1
	Tenth	236	32.1
	Eleventh	263	35.8
Academic performance level	Poor	57	7.8
	Good	158	21.5
	Very good	242	32.9
	Excellent	278	37.8
Family income level	Poor	68	9.3
	Middle	558	75.9
	High	109	14.8
Father's education level	Illiterate	17	2.3
	Primary level	44	6.0
	Secondary level	204	27.8
	Diploma	96	13.1
	Bachelor's	220	29.9
	Master	92	12.5
	Doctoral	62	8.4
Mother's education level	Illiterate	8	1.1
	Primary level	36	4.9
	Secondary level	197	26.8
	Diploma	117	15.9
	Bachelor's	256	34.8
	Master	99	13.5
	Doctoral	22	3.0
Number of years of internet use	< 1 year	54	7.3
	3–5 years	292	39.7
	> 5 years	389	52.9
Preferred internet access facility	Smartphone	650	88.4
	Tablet	31	4.2
	Laptop	49	6.7
	School's computers	1	0.1
	Internet café	4	0.5
Time of internet use (hr/day)	1–2	123	16.7
	3–4	273	37.1
	5–6	185	25.2
	> =7	154	21.0

among the 735 adolescents, 75.8% ( $n=557$ ) were experiencing pathological internet use with various degrees of severity, including mild 50.5% ( $n=371$ ), moderate 23.1% ( $n=170$ ), and severe of 2.2% ( $n=16$ ) (see Table 3).

#### *Sociodemographic correlates of PIU*

An independent two-sample *t* test was used to identify any potential significant differences in the mean PIU total



**Table 2** Descriptive statistics of the internet connectivity variables (N = 735)

	Yes	
	n	%
Internet supply device at home (router)	694	94.4
Having a smartphone	671	91.3
Primary social media platform	Facebook	256 34.8
	Instagram	638 86.8
	Snapchat	400 54.4
	Tiktok	256 34.8
	Twitter	111 15.1

**Table 3** Descriptive statistics of the mean PIU total scores (N = 735)

Scale	M (SD)	Min	Max	n	%
Internet Addiction Scale	39.11(17.67)	1	93		
Normal				178	24.2
Mild				371	50.5
Moderate				170	23.1
Severe				16	2.2
Total				735	100.0

**Table 4** Differences in the mean PIU total score in relation to students' sex (N = 735)

Sex	M (SD)	t	df	p
Male	38.87 (SD=.88)	.371	733	.711
Female	39.35 (SD=.96)			

score between males and females. As shown in Table 4, the mean PIU total score was 38.87 (SD=0.88) for males and 39.35 (SD=0.96) for females. The results suggest that there is no significant sex difference in terms of the mean PIU total score ( $t=0.371, p>0.05$ ).

With respect to the students' grades, the analysis (see Table 5) revealed that the mean PIU total score were 41.14 (SD=17.75), 39.36 (SD=17.89), and 37.06 (SD=17.23) for 9th, 10th, and 11th grade students, respectively. ANOVA revealed that there was a significant difference in the mean PIU total score across grades ( $F=3.37, p<0.05$ ). Post hoc comparison (Bonferroni correction) was used to determine the differences among the groups. The analysis revealed significant differences in the mean PIU total score across the three grades (9th, 10th, and 11th). The analysis also revealed that the mean PIU total score of 9th grade students was significantly higher than that of 11th grade students. No

**Table 5** Differences in the mean PIU total score in relation to selected sociodemographic variables (N = 735)

Variable		n	M (SD)	F	p
Grade	9th	236	41.14 (SD=17.75)	3.37	.035
	10th	236	39.36 (SD=17.89)		
	11th	263	37.06 (SD=17.23)		
Academic performance	Poor	57	49.79 (SD=19.39)	8.76	.001
	Good	158	39.96 (SD=17.90)		
	Very good	242	38.45 (SD=16.32)		
	Excellent	278	37.00 (SD=17.58)		
Father's education level	Illiterate	17	44.76 (SD=22.53)	.789	.578
	Primary	44	36.34 (SD=18.22)		
	Secondary	204	40.04 (SD=17.42)		
	Diploma	96	37.85 (SD=16.19)		
	Bachelor's	220	38.35 (SD=17.28)		
	Master	92	39.46 (SD=18.71)		
Family income level	Poor	68	37.7 (SD=19.57)	1.076	.342
	Middle	558	38.99 (SD=17.1)		
	High	109	40.98 (SD=19.2)		

other differences between the mean PIU total score were significant.

Regarding students' academic performance, the analysis (see Table 5) showed that the mean PIU total score of the 7.8% ( $n=57$ ) of students with poor academic performance was 49.79 (SD=19.39), and that of the 37.8% ( $n=278$ ) of students with excellent academic performance was 37.0 (SD=17.58). ANOVA revealed that there was a significant difference between the mean PIU total score across the participants' academic performance levels ( $F=8.76, p<0.05$ ). Post hoc comparison (Bonferroni correction) was used to determine which pairs of means were significantly different from each other, with a  $p$  value of  $<0.05$ . The analysis also revealed significant differences in the mean PIU total score between those with poor academic performance and those with good, very good, and excellent academic performance, with a  $p$  value  $<0.05$ . The mean PIU total score of participants with poor academic performance was significantly higher than those of students with good, very good, and excellent academic performance. The greatest difference in the mean PIU total score was found between the students with poor academic performance and those with excellent academic performance.

With respect to the students' father's education level, the analysis (see Table 5) revealed that the mean PIU total score of the 2.3% ( $n=17$ ) of students whose fathers were illiterate was 44.76 (SD=22.53), and that of the 6% ( $n=44$ ) of students whose fathers completed primary level education was 36.34 (SD=18.22). ANOVA revealed

that there was no significant difference in the mean PIU total score in relation to fathers' education level ( $F=0.789, p>0.05$ ).

With respect to the students' family income level, the analysis (see Table 5) revealed that the mean PIU total score of the 9.3% ( $n=68$ ) of students with a poor family income level was 37.7 ( $SD=19.57$ ), and that of the 75.9% ( $n=558$ ) of students with a middle family income level was 38.99 ( $SD=17.1$ ), whereas that of the 14.8% ( $n=109$ ) of students with a high family income level was 40.98 ( $SD=19.2$ ). ANOVA revealed that there was no significant difference in the mean PIU total score across students' family income levels ( $F=1.076, p>0.05$ ). However, the mean PIU total score of students with a poor family income level was much lower than those of the middle- and high-income level students.

## Discussion

PIU is a significant concern for mental health professionals in schools and primary care settings. This study investigated the status and sociodemographic correlates of PIU in an attempt to establish a link between such problematic behaviors and sociocultural roles among school adolescents. We found that school-aged adolescents, in this study, experienced PIU, with the highest percentage representing those with mild severity. The results indicate the exponential penetration rate of PIU over the past few years, especially among adolescents in Jordan. The widespread use of smartphones and overreliance on electronic devices, especially during the COVID-19 pandemic, explain the extensive use of the internet leading to mild to moderate levels of PIU among adolescents. The accessibility and availability of internet services at the homes of the vast majority of adolescents have also expanded the scope of internet use to include learning, entertainment, social interaction, and others. Although the numbers may not seem high in terms of the magnitude of intensive use of the internet, the psychological consequences of such misuse do warrant the concerns of mental healthcare professionals and counsellors due to the long-term negative mental health consequences of PIU. Although this prevalence of PIU in this study was similar to that reported in previous studies investigating the prevalence of PIU among adolescents in Arab countries such as Saudi Arabia and Egypt [6, 7], the prevalence is much greater than that of another study conducted in Jordan with the same population [12]. Notably, the Jordanian study was conducted prior to the era of COVID-19, which may also explain the negative role of COVID-19 in the increased prevalence of PIU, as the pandemic forced the whole world to abide by a curfew and global public health restrictions and to rely on online education and communication. Furthermore, our figures are also higher

than those reported by other studies conducted in other culturally similar countries, such as Lebanon [23]. This could be attributed to the technological prosperity of Jordan in relation to other MENA regions [24].

In terms of sex differences, this study revealed no significant difference in the mean PIU total scores between males and females. This could be attributed to provoking factors (i.e., easy way to escape from stressors, constant availability of the internet, affordable costs for online services, and others), rather than sex [25]. Moreover, the prevalence of PIU was slightly greater among females, which could be attributed to the Jordanian culture, in which males engage more in physical recreation [26], whereas females rely on online activities in which the internet serves as a scaffolding between them and the preferable online world. Further support for this sex difference can be observed in the findings of other studies, in which female adolescents reported higher levels of depressive feelings and anxiety [11] and much greater use of avoidance coping mechanisms [27]. Therefore, once internet use is considered an easy way to escape from stressors, it might be highly employed as a form of behavioral avoidance to cope with anxiety among females in Jordan. Similar findings were reported in a previous study [28]. In contrast, studies have reported that males have a significantly greater tendency to develop PIU than females do [29].

One significant finding of this study is the variation in PIU among adolescents of different grade levels. We found that 9th grade adolescents reported higher levels of PIU than 11th grade adolescents did. This result might be rationalized by the fact that adolescents achieve higher maturity levels with age; thus, they recognize the importance of performing purposeful activities. Furthermore, one of the Jordanian educational system rules imposes on students to pass Jordan's general secondary national exam (Tawjihi) in the 12th grade, which is a mandatory requirement to register at Jordanian universities. Thus, 11th grade students might be occupied with preparing for the Tawjihi rather than other activities. These findings echo an earlier study [30] in a country whose education guidelines mimic those of Jordan. In contrast, another study suggested that higher-grade adolescents report a greater prevalence of PIU [28], which might be explained by families in other cultures relaxing their supervision of adolescents as their age increases, thus providing more opportunities for them to self-control their activities.

This study revealed that students with poor academic performance reported higher levels of PIU than students with other levels of academic performance. This result could be explained by the fact that students with poor academic performance have lower self-confidence and face many school-related challenges. Therefore, since

internet use comprises a reward mechanism, excessive internet use might be reinforced [31]. Moreover, experiencing PIU provides a significant justification for poor academic achievement, as a recent study revealed that PIU adversely affects students' academic motivation, which in turn negatively affects their academic achievement [32]. This study result supports previous research findings [8].

In terms of family-related factors, this study revealed no significant differences in the mean PIU total score according to adolescents' father's educational level. The explanation for this result is that fathers' higher education level might not guarantee their sufficient awareness of the negative consequences of PIU, which in turn might lead them to show more control over their adolescents and limit their internet use. These findings align with those of a previous study [29], but are in contrast to the findings of another study, in which fathers' educational level was a significant predictor of PIU among adolescents and the higher the father's education was, the lower the PIU level among their adolescents [8].

In relation to family income level, this study revealed no significant differences in PIU total scores among adolescents with different family income levels. This could be attributed to the affordable cost of internet services, as telecommunication companies provide many offers due to competition among internet providers. In this study, since the vast majority of the adolescents reported a middle level of family income, this cost neither imposed an extra burden on their income nor increased their monthly expenses. This result aligns with earlier study findings [30] but is in contrast to the findings of another study [29].

### Limitations

The limitations of this study are related to the setting of only nine schools in the central district of Jordan and the narrow age period of adolescents. Furthermore, in this study, the tool used (IAT) for assessing PIU is not specific for capturing sex differences in PIU. Thus, females should be assessed for social media addiction, and males should be assessed for gaming addiction.

### Conclusions

Pathological internet use (PIU) is a problematic technological outbreak-related issue and is classified as a behavioral addiction. Personal- and family-related factors are considered significant determinants in promoting, controlling, and prohibiting the exacerbation of such phenomena. The research findings revealed that there was a significant difference in the PIU prevalence according to adolescents' grade and academic performance level; students with poor academic performance

and in a lower grade reported a higher prevalence of PIU. However, the findings revealed no significant differences in PIU prevalence in terms of sex, father's education level, or family income level. The recommendations of this study highlight the importance of conducting ongoing screening for PIU to intervene proactively through multidisciplinary collaboration, incorporating parents, teachers, school nurses, counsellors, and so forth to manage, mitigate, or even prevent the disproportionate use of the internet among adolescents. Thus, there is an urgent need to minimize excessive reliance on the virtual world for communication purposes among adolescents. Furthermore, awareness of the far-reaching outcomes of PIU among students of both sexes, especially those who have poor academic performance and those in early adolescence, regardless of their father's educational level and family economic level, should be increased. Likewise, the results will be utilized to guide future studies with the need for larger samples and wider age periods and highlighting more sociodemographic correlates of the PIU phenomenon.

### Abbreviations

PIU	Pathological internet use
DSM	Diagnostic and Statistical Manual of Mental Disorders
MOE	Ministry of Education
IAT	Internet Addiction Test
TRC	Telecommunications Regulatory Commission

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### Authors' contributions

FA data collection, analysis, and writing of the original draft; AH-M writing and reviewing of the draft.

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### Availability of data and materials

The dataset used for this study is available from the corresponding author [F A] and can be obtained upon a judicious request according to IRB approval guidelines.

### Declarations

#### Ethics approval and consent to participate

Ethical approval was obtained from the Ethics Research Committee at XYZ University on Feb 4th, 2024, prior to data collection. No animals were included in this research. All human research procedures employed in this study abided by the ethical standards of the committee responsible for human experimentation (institutional and national) and aligned with the Helsinki Declaration of 1964, as revised in 2009.

#### Consent for publication

Written informed consent was obtained from all participants included in this study.

#### Competing interests

The authors declare that they have no competing interests.



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