A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

THE RELATIONSHIP BETWEEN INTERNET ADDICTION AND PERSONALITY TRAITS IN MOROCCAN NURSING STUDENTS

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SUMMARY

Background:
Internet addiction has been identified as a major mental health problem, particularly among young nursing students. The purpose of this study was to determine the relationship between the Big Five personality traits and Internet addiction in this population.

Material/ Methods:
This study adopts a descriptive, quantitative, and correlational approach among 388 nursing students enrolled in a Higher Institute of Nursing Professions and Health Techniques in Morocco. The Internet Addiction Test (IAT), the Big Five Inventory (BFI) were used. A student-test was used to compare the differences in Internet addiction between different categorical groups. Pearson correlation was used to determine correlations between Internet addiction and personality traits. Linear regression analysis was performed to explore the effects of independent variable groups on Internet addiction.

Results:
The overall prevalence of Internet addiction was 68.3% (AI>30). There were significant differences in Internet addiction by age group (p=0.001), gender (p=0.004), grade (p=0.003), and reasons for using the Internet (p=0.004). Neuroticism (β=.493, p< .05) and extraversion (β=.479, p<.05) were positive predictors of Internet addiction, whereas agreeableness (β=-.461 p< 05) and conscientiousness (β=-.395, p<.05) were negative predictors.

Conclusions:
Personality traits are critical contributors when designing individualized intervention strategies that contribute to the prevention and reduction of Internet addiction in nursing students.

Key words: Internet addiction, Big Five personality model, nursing students, Morocco

INTRODUCTION

The benefits of the Internet in our daily lives are clearly innumerable, including increased access to information as well as expanded opportunities for communication and entertainment (Kim et al., 2016; Echeburúa & De Corral, 2010; Young, 2004).

However, excessive or even compulsive use could lead to the development of a behavioral Internet addiction phenomenon (Hadlington, 2017; López-Fernandez, 2015; Sanchez-Carbonell et al., 2008; Choi et al., 2017).

This type of "addiction" could include a variety of problems due to the diversity of activities available online (gaming, social networking, cybersex, etc.). Most researchers agree that misuse of the internet causes psychological distress and impairs a person's functioning in important areas of their life (Hou et al., 2019; Müller et al., 2020; Turel et al., 2018; Yao et al., 2020 Kardefelt-Winther et al., 2017; Saunders, 2017; Shaw et al., 2008).

According to some authors, the terms -Internet addiction or dependence- are sometimes used synonymously to refer to the situation of individuals who experience difficulties in controlling their use of the Internet to the point of triggering or amplifying psychosocial dysfunctions and a number of health disorders such as depression, social isolation, low self-esteem, conflicts with family, and academic or professional difficulties (Cartierre et al, 2011; Tran et al., 2017; Ho RC et al, 2014; Panova & Carbonell , 2018; Echeburúa et al, 2010; Buckner, Castille, & Sheets, 2012, Young, 1998). It is also worth noting that Internet Gambling Disorder has been listed in Section 3 of the DSM-5 as a behavioral addiction (American Psychiatric Association, 2013).

The problem of Internet addiction is nowadays strongly present in the school and university field. Indeed, according to a meta-analysis study conducted in China, confirmed that the overall prevalence of Internet addiction among university students reaches 11.3% (Lii et al., 2018). On the other hand, in Malaysia, the percentage of students with high internet addiction is 9.6% (Wan Ismail et al., 2020).

Similarly, in Saudi Arabia, the proportion of students using the internet was 98.2%. Of these, 4% were highly addicted, while 45.3% had potential internet addiction (Alshehri et al., 2015). This difference in prevalence is likely due in part to the different instruments and measurement methods used.

In the context of nursing training, internet deployment and access is essential (Islam et al., 2018). However, outside of educational and academic activities, excessive use of social networks, creating or maintaining online sexual relationships, excessive use of video games and internet gambling, increase the likelihood of developing addiction and internet misuse (Ching et al., 2017; Islam et al.,2018; Smita & Azhar.,2018).

Indeed, the estimates of problematic Internet use within this category vary. The results of a study conducted in Jordan (n: 163) showed that 67.5% of students suffered from Internet addiction (Hasan & Jaber, 2019).

Furthermore, in Iran, in a recent study conducted among nursing and obstetrics students at Zahedan University of Medical Sciences, the prevalence rate of AI was 11.3% (Najafi et al., 2018). Another study conducted among nursing students at Tehran University found that RN rates were 17.7% (Kiany et al., 2014).

When faced with the stress induced by nursing education, students are a particularly vulnerable group to Internet addiction. If no effective intervention strategies are implemented to address this problem, negative impacts on quality of care and patient safety can be observed among students in training. Therefore, this phenomenon and its associated factors merit further study.

In this context, numerous research studies reveal that Big Five personality traits are predictive factors of an individual's behaviors and are a nontrivial element in determining the risk of Internet addiction in different populations and cultures (Montag et al., 2010; Zhou et al., 2017).

A recent meta-analysis showed that all Big Five personality traits are categorized into five main dimensions, namely extraversion, neuroticism, conscientiousness, agreeableness, and openness, and that their significant relationship with Internet addiction is widely established. (Kayiş et al., 2016).

Some studies indicate that the dimensions of Openness, Conscientiousness, and Agreeableness are negatively correlated with excessive Internet use and thus represent protective factors (Luo and Ding, 2006 ; Zhou et al., 2017). For other studies, the dimensions of Extraversion and Neuroticism are positively correlated with IA, and are considered risk factors (Biolcati et al., 2018; Kayiş et al., 2016; Hardie and Tee, 2007; Tsai et al., 2009; Wolfradt and Doll, 2001, Hamburger et al., 2000) .

Indeed, results indicate that extroverts connect to the Internet more than introverts to optimize their social relationships and satisfaction (Zywica et al., 2008). Furthermore, individuals with higher levels of neuroticism place greater importance on socializing and communicating on websites compared to face-to-face interactions (Hwang, 2017), providing evidence that the Internet is an important psychological support for them (Hwang, 2017).

Although previous research has examined the relationship between personality traits and AI across multiple contexts and cultures, no study to date has examined such a relationship among nursing students in Morocco. Consistent with the vulnerability model of personality-psychopathology relationships, certain personality traits may predispose individuals to certain psychological disorders, including Internet addiction. Therefore, this exploratory descriptive study was designed to determine the prevalence of AI in Moroccan nursing students and to examine the relationships between Big Five personality traits and AI in this population.

MATERIAL AND METHODS

Design and population of the study

This is a descriptive, quantitative and correlational study conducted between the 1st of November 2022 and mid-January 2023 at the Higher Institute of Nursing

Professions and Health Techniques of Tetouan, (HINPHT-T) located in northern Morocco.

The study population consisted of: Multipurpose Nursing students (MNS), Family and Community Nursing students (FCHNS), and Mental Health Nursing students (MHNS). The participant selection procedure was performed using questionnaires published on the institute's website. Simple random sampling was conducted in each discipline, taking into account academic level. Participants were informed that their participation was voluntary and that they had the right to withdraw from the study at any time without consequences. In addition, contact information for the researchers was provided in case participants had any questions. A total of 472 questionnaires were distributed and 390 were returned. After excluding 02 invalid questionnaires, 388 students constituted the study population (effective response rate: 99.48%)

Data Collection Tool

To collect data for this study, three instruments were used:

1. *Socio-demographic questionnaire.* This questionnaire is designed to collect information about the participants, including age, gender, year of study, specialty, and main motivations for Internet use.

2. *Internet Addiction Test (IAT) (Young, 1998).* This is the most widely used measurement instrument to assess Internet addiction (Poli, 2017; Laconi, 2014). In this study, the Arabic version of the IAT (Hawi, 2013) was used to assess the degree of IA among nursing students on a 6-point Likert scale, with a total score ranging from 0 to 100. According to the manual, scores between 0 and 30 reflect a normal level of Internet use; scores between 31 and 49 indicate the presence of a mild level of IA; scores between 50 and 79 reflect the presence of a moderate level, and scores between 80 and 100 indicate severe IA (Young, 2011).The psychometric properties of the 20-item scale in the Arabic context, designed as a unidimensional instrument, were deemed appropriate (Nazir S. Hawi, 2013). In the present study, the Cronbach's alpha of the online version of the IAT was $\alpha=0.912$.

3. *The Big Five Inventory (BFI) (John & Srivastava, 1999).* This is a 44-item scale for measuring personality traits. It incorporates five aspects, namely extraversion, agreeableness, conscientiousness, neuroticism and openness. Each item is scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Arabic version of the BFI has shown good psychometric properties (Alansari, 2016). In the present study, the Cronbach's alpha coefficients for extraversion, agreeableness, conscientiousness, neuroticism, and openness were 0.789, 0.751, 0.783, 0.743, and 0.795 respectively.

Statistical analysis

Descriptive statistics were used, such as number (N), percentage (%), mean, and standard deviation (SD). Student's t test was used to compare the differences in AI between the different categorical groups. Pearson's correlation was

used to determine correlations between AI and personality traits. Linear regression analysis was performed to explore the effects of independent variable groups on the AI. Data were analyzed using SPSS-23.0 (Armonk, NY: IBM Corp).

Ethical approval

This study was conducted in accordance with the principles of the Declaration of Helsinki. Approval was granted by the Director of the Higher Institute of Nursing Professions and Health Techniques of Tetouan, Morocco. The consent was obtained from all participants included in the study.

RESULTS

Sociodemographic characteristics and prevalence of IA among participants

Nursing student data are categorized according to categorical variables. The mean age of the participants was 20.06±1.18 years. Of the 388 students, 276 (71.2%) were female and 112 (28.8%) were male. The overall prevalence of AI in nursing students was 68.3% (AI>30), including 54.2% mild AI (AI between 31 and 49); 12.9% moderate AI (AI between 50 and 79) and 1.2% severe AI (AI≥80). Significant differences in IA were observed by age group (P=0.001), gender (P=0.004), academic level (P=0.003), and reasons for using Internet (P=0.004) [Table 1].

Relationships between the variables

The results show that the age variable has a significant relationship with extraversion traits. The correlative analysis between the direct IAT and BFI scores showed a strong positive and significant correlation with the extraversion and neuroticism traits. However, the agreeableness, conscientiousness, and openness traits were negatively correlated with the AI [Table 2].

Table 1. Characteristics of study participants (N=388)

Variables	N	%	IAT (Mean ± SD)	*P*
Age				
18–20	284	73,2	31,66 ± 15,39	0,001
21–23	104	26,8	30,81 ± 14,28	
Gender				
Feminin	276	71,2 %	32,29 ± 16,44	0,004
Masculin	112	28,8 %	29,23 ± 13,30	
School year				
1st year	159	40,9 %	32,86 ± 16,25	
2nd year	126	32,5 %	31,92 ± 15,52	0,003
3rd year	103	26,6 %	31,78 ± 15,47	
The reasons to use the Internet				
Social networks	237	61,1 %	32,99 ± 16,31	
Research activities	115	29,6 %	27,03 ± 13,48	0,004
Video games	36	9,3 %	29,17 ± 14,24	

*Note: *p < 0.05; Abbreviation: Internet Addiction Test = IAT; Standard error = SE*

Table 2. The correlation matrix between the IAT and BFI factors scores (N=388)

Variables	Mean	SD	1	2	3	4	5	6	7
1. Age	20,06	1,18	1.00						
2. IAT	31,42	15,77	0.165	1.00					
3. Extraversion	23,09	4.78	0.589*	0.596*	1.00				
4. Agreeableness	31,81	5.35	−0.120	−0.525*	0.629*	1.00			
5. Conscientiousness	27,83	4,82	− 0.019	−0.584*	0.581*	0.648*	1.00		
6. Neuroticism	22,93	4.31	0.032	0.671*	−0.522*	−0.513*	−0.498*	1.00	
7. Openness	31,22	5,67	0.005	−0.599*	0.649*	0.588*	0.511*	−0.549*	0.633*

*Note: *p < 0.05; Abbreviation: Internet Addiction Test = IAT; Standard error = SE ;Big Five Inventory (BFI)*

Table 3. Results of linear regression analysis to predict variables influencing IA in nursing students (N=388)

Model	Unstandardized coefficients		Standardized coefficients β	t-value	Sig.
	B	SE			
Constante	11.923	4.476		6.927	0.001
Neuroticism	0.371	0.185	0.493	7.449	0.001
Extraversion	1.651	0.146	0.479	6.152	0.001
Agreeableness	− 0.284	0,057	− 0.461	− 6.593	0.001
Conscientiousness	− 0.221	0.132	− 0.395	− 5.771	0.003

*Note: *p < 0.05; Dependent variable: Internet Addiction; Abbreviation: Standard error = SE*

Predictors of Internet addiction

The results of the linear regression showed that after adjustment for covariates, four personality traits were significant predictors of IA. Indeed, neuroticism (β=0.493, P<.05) and extraversion (β=0.479, P<.05) were positive predictors of IA, however agreeableness (β=−0.461, P<.05) and conscientiousness (β=−0.395, P<.05) were negative predictors [Table 3].

DISCUSSIONS

The present study is the first in Morocco to investigate the association between personality traits and IA among nursing students, using the Arabic version of the IAT (Hawi, 2013) and the Arabic version of the BFI (Alansari, 2016).

Results revealed that the overall prevalence rate of AI among nursing students was 68.3%, including 54.2% with mild AI, 12.9% with moderate AI, and 1.2% with severe AI.

Similar results have been obtained in other studies of the same student population showing a moderate prevalence of IA, ranging from 9.2% in American students (Christakis et al., 2011), 9.7% in Colombian students (Puerta-Cortés & Carbonell, 2014), 10.8% in Iranian students (Ghamari et al.,2011), 11.7% in Chilean students (Berner al.,2014), and 16.3% in Italian students (Servidio al.,2014). However, in some studies this prevalence remains lower, ranging from 10.2% (Lam et al., 2009), 12% (Puerta-Cortés et al., 2013), or even 12.94% (Liu et al., 2009).

Nevertheless, AI interpretation thresholds and comparison of prevalences require some caution. Indeed, despite the availability of several AI tests, no instru-

ment today constitutes a reference model in terms of assessment and diagnosis (Poli, 2017; Laconi et al., 2014; Zhang et al.,2018).

Nursing students in Morocco are nowadays all equipped with a smartphone that allows them to easily access the Internet. Indeed, according to the findings of our study, a problematic use of the Internet is more prevalent among women than men and whose main motivations are social networks (61.1%), research activities (29.6%) and video games (9.3%). These findings are also supported by Durke et al. (2012) and Mottram and Fleming (2009) studies. Similarly, in Brazil, a recent study found that nearly one-third of healthcare students use the Internet for more than 14 hours per day, and 95% report using the Internet for online discussions and social network browsing (Loredo et al., 2018).

Lyvers et al.(2016) report that many young adults spend long hours on the Internet, which compromises the serenity of daily life, leading to altered moods and a noticeable decrease in time spent sleeping, studying, or doing various activities. Some users may experience anxiety or impatience due to slow connection or inability to find a desired partner, as well as irritability when they leave the screen or interrupt communication.

Regarding the relationship between AI and personality traits, the results obtained show that certain traits, particularly neuroticism, extraversion, agreeableness, and conscientiousness, contribute significantly to the prediction of AI in nursing students.

For its part, neuroticism recorded a positive correlation with AI and was the main predictor, which is consistent with the result of the meta-analysis by Kayiş et al. (2016). Indeed, people with high scores presenting for this factor suffer more symptoms of psychological distress, mood disorders and anxiety (John & Srivastava, 1999). They often display hostile behaviours towards their social environment and generally perceive people and events in a more negative light. Neuroticism has been shown to be a reliable predictor of poor social interactions (Munno et al., 2016). Along these lines, individuals with high levels of neuroticism are often likely to feel a lack of social acceptance, receive insufficient support, and have more negative experiences with their social community than less neurotic individuals (Lincoln, 2008). In addition, neuroticism also indicates undesirable behaviors including isolation, withdrawal, and avoidance (Mark & Ganzach, 2014). Therefore, for these individuals, using the Internet is a way to "relieve" themselves of everyday social difficulties or unpleasant emotions (Zhou et al., 2017).

In this study, the extraversion trait showed a positive relationship with IA. This relationship was confirmed in the study by Kircaburun and Griffiths (2018). Indeed, extroverted individuals tend to seek out sources of stimulation and the Internet represents a preferred means to do so (Bai et al., 2013). Extraversion refers to a person's active, jovial, communicative, and sociable behavior. Thus, individuals with high levels of extraversion are likely to be more actively involved in interacting with others and more easily form relationships with them (Balhara et al., 2019). In this regard, the Internet provides another means of communication for these individuals, allowing them to easily find their friends and contacts online (Kayiş et al., 2016).

Regarding agreeableness, the results of this study reveal a negative correlation with AI, which is consistent with previous research findings (Servidio et al., 2014; Wang et al.,2015; Zhou et al.,2017). Indeed, agreeable individuals often avoid any emotions that could lead to conflictual situations (Balhara et al., 2015), but those who are disagreeable are more likely to exhibit conflictual behaviors toward those around them. The lack of social skills and adequate contact explains why disagreeable people tend to spend more time on their Internet activities. They tend to shun social interactions in the real world and turn to virtual networks to satisfy certain social demands and roles, putting them at greater risk of becoming addicted to the Internet than their counterparts (Balhara et al., 2015).

According to the absolute value of the normalized β, conscientiousness is also negatively correlated and participates in AI change. Indeed, our results corroborate those of Müller et al. (2016). Indeed, low conscientiousness is a potential predictor of problematic internet use. Yet, this construct has also been shown to predict beneficial well-being behaviors, in that higher scores reveal that being mindful acts as a protective factor against problematic internet use (Kayis et al., 2016). In contrast, lower scores have negative effects (Kuss et al., 2014). Furthermore, students who score high on this construct often place a high priority on academic and educational goals, possess better planning and self-control skills, and fully understand the consequences of internet misuse (Zhou et al., 2017). Therefore, the results of our study suggest that more aware, organized, and structured students have lower levels of internet use than less aware students (Elbilgahy et al., 2021).

Given that IA is a major issue for nursing students (Liet al., 2016) and its effects on well-being and productivity (Babacan, 2016). The results of the research we obtained can be explained by the microgenetic theory of symptom, which makes it possible to link addiction to the Self system, with particular attention to the emotional, cognitive and cultural Self (Brown 2015, Pąchalska 2019, 2022). Future research is needed to determine the effects of tailored cognitive behavioral therapy to strengthen personality traits with this population.

Limitations

This study has three limitations to overcome in future research. The first concerns the reliability of the version adapted to the Arab context of the BFI by Alansari (2016). Although the overall consistency of the resulting questionnaire is acceptable (0.794), its reliability of the dimensions is not satisfactory. Therefore, caution is recommended in the use of this instrument and a validation of this instrument in the Moroccan context is needed. The second limitation concerns the participants; although it is a large sample, it will not be sufficiently representative and generalization of the results should be done with caution, as the study does not include all nursing students due to its conduct in a single nursing school in Morocco. Indeed, additional studies should be conducted in other countries with different cultures and nursing education systems. Finally, the third limitation concerns the online questionnaire methodology used in this study. Indeed, all data were ob-

tained through self-reported online questionnaires, which could introduce a response bias. As studies based on self-administered questionnaires are likely to generate responses that are perceived as socially acceptable by the respondents. Thus, future studies could be based on personal interviews or observational checklists would be desirable.

Finally, despite the limitations of this exploratory study, it is essential to conduct an analysis of AI among nursing students in order to prevent, intervene, and optimize its use in the Moroccan context where it is rapidly expanding.

CONCLUSION

The present research demonstrated that the rate of AI among Moroccan nursing students is a phenomenon of concern, requiring specific intervention by all decision makers in this domain. The significant contribution of personality traits to the prediction of AI in students was also demonstrated. While neuroticism and extraversion are risk factors for AI, agreeableness and conscientiousness are protective factors. Therefore, personality traits and AI should be considered when designing individualized intervention strategies to prevent and reduce AI in nursing students.

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