Internet Addiction and Emotional Intelligence in university nursing students: A cross-sectional study

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ABSTRACT

Background: The appearance of the Internet has allowed for improved communications and the technological development of society, but it has also led to problematic use, generating addictive behaviors in some university students. Emotional Intelligence helps to improve emotional skills, increase social skills, and act as a protective factor against technological addictions.
Objectives: to describe and analyze the relationship between Internet Addiction, Emotional Intelligence, and sociodemographic characteristics in Nursing students.
Methods: A multicenter cross-sectional study was conducted. Participants belonged to three different campuses of two Universities. 532 nursing students were included in the study. A self-administered questionnaire was used collecting sociodemographic variables and the TMMS-24 and IAT instruments were employed to measure Emotional Intelligence and Internet Addiction, respectively.
Results: 11.1% of the students presented Internet Addiction. Higher Internet Addiction scores were obtained by those who were younger, had a lower academic year, and were more involved in leisure activities. Adequate levels of Emotional Intelligence were found, women showed higher values of Attention and men of Repair. Students aged 24 or over reported higher Clarity and Repair values. There was an inverse relationship between Clarity and Repair with Internet Addiction values.
Conclusions: The ability to understand and regulate emotional states is related to lower Internet Addiction values. The group of Internet addicts revealed greater Attention and less Clarity. Internet Addiction values increased as the number of hours of Internet use increases. The development of programs which improve Emotional Intelligence could be essential to facilitate the emotional management of Internet Addiction.

1. Introduction

The proper use of the Internet can facilitate communication, access to information and knowledge, and can therefore be beneficial for the development of people; however, its multifunctional nature also causes negative behaviors and great difficulty in setting limits to its use. If overused, the Internet can stunt development, impair mental health and social functioning, and even cause addiction [1,2]. Despite these risks, adolescents and young adults, use social networks and the Internet on a daily basis to search for information and as

a way of socializing, establishing relationships, or consolidating them through the use of technology [3]. According to the WHO, adolescence lasts until the age of 19, the end of which coincides with the beginning of university studies. This university stage will cause changes in social relationships and in the way they behave, which they must know how to manage in order to develop behaviors that do not generate risks for their mental health [4].

Research on the problematic use of the Internet employs different terms to conceptualize the problem, so some authors define it as excessive Internet-mediated behaviors, Internet Addiction (IA), or compulsive use of the Internet [6,7,25]. Research shows the importance of including this problem in the Diagnostic and Statistical Manual of Mental Disorders [2,5]. This Manual, in its fifth edition [8], only includes Internet gaming disorder as a behavioral addiction, leaving out other types of emerging addictions linked to technological evolution and the globalization of our society.

Emotional Intelligence is considered a protective factor against the development of addictive behaviors as it is related to psychological variables such as self-esteem, resilience, self-control, and social skills [9]. The recognition of one's own emotions, as well as those of others, and being able to use these emotions to guide thinking and behavior, translate into important social results, this being related to the development of a set of skills which determine the concept of Emotional Intelligence (EI) [10], already defined as such by Salovey and Mayer in 1990.

In the last decades, Emotional Intelligence has gained importance in the educational field, as it favours the psychological well-being of students and allows them to better understand the environment surrounding them, providing them with the necessary skills, to be able to face everyday situations [11]. It is especially relevant to develop these emotional skills during the university stage since they will enable students to achieve a better academic performance, and adapt to the different contexts that they will later encounter in the world of work, since that way they will be prepared for the society of the future [12,13].

Following this line, several studies consider the importance of the development of EI in university students of health-related professions such as Nursing, since their activity is directed most of the time to interact with other people, facing situations loaded with emotional information. The ability to understand and manage their own emotions and develop communication skills is essential to provide quality patient care [14], successfully facing clinical practice and to be able to manage conflicts which are inevitable in health institutions [15].

2. Background

Individuals who have trouble establishing relationships in real life are at risk of using the internet uncontrollably due to their need for socialization or group membership [16]. Problematic internet use has been linked to lower mental health and poor sleep quality [17], reduced time spent with friends and family, increased levels of perceived loneliness [16], lower engagement in healthy behaviors [18] and dysfunctional social relationships [2].

It seems that IA is lower in people with high EI as they may be able to control their own and other people's emotions [7]. In this line, several authors report that the excessive and maladaptive use of the Internet seems more typical of lonely individuals, with low self-esteem, emotional instability, and cognitive impulsivity which could be the result of their low emotional abilities [5,19,20]. It is found that individuals with higher EI may be able to control their dependence on the Internet, while those with low levels are more likely to show signs of addiction to it [7,21].

University students who do not belong to the branch of knowledge of health sciences are those with the highest prevalence of problematic Internet use [22]. The reverse direction of the relationship should be considered, since Nursing students who show excessive use of the Internet seem to be more neurotic, less extroverted, and more socially anxious [23]. However, other positions suggest that Nursing students' competencies which allow them to have an adequate social interaction and the ability to manage interpersonal conflicts are positively connected to the relationships and social support they find in cyberspace [24].

The prevalence of AI in the Spanish university population seems to be higher than the general average of European countries. The studies found indicate that this prevalence has increased in recent years, from 6% in 2015 [22] and 6.08% in 2016 to 11% in 2020 [25].

2.1. Justification and objectives

Increasing knowledge about this relationship may allow us to focus on strategies which promote an increase in EI in university students, considering this a protective factor against the risk of behavioral addictions [16]. Although implementation programs to improve EI in students have increased [11], the number of studies is still scarce.

This study proposes to analyze the relationship between IA and EI in Nursing university students, to describe the levels of EI that these students present, and determine if there are differences between sociodemographic characteristics and th presence of IA levels in them.

3. Methods

3.1. Design

A cross-sectional correlationalmulticenter study was conducted between December 2021 and June 2022.

3.2. Participants

The study population consisted of undergraduate nursing students enrolled during the 2021/2022 academic year at two Spanish public universities, belonging to three campuses in different nearby locations (N = 840). The sample size was calculated using the Questionpro programme, with a 95% CI and a margin of error of 5 over our study population, resulting in 265 participants. Accidental non-probability convenience sampling was used by distributing the questionnaires via email and university platforms after the researchers presented the study to students in classrooms. Students from any of the four years of the Bachelor's Degree in Nursing at the University were included, excluding those students who did not have personal devices with internet access and who did not complete the questionnaire in its entirety. The sample size obtained was n = 532 students who correctly answered the questionnaire.

3.3. Measures

A self-administered questionnaire was prepared and included mandatory informed consent followed by a section of sociodemographic variables: age, sex, the place where they are studying, the highest education year in which they are enrolled, who they live with, and time spent on the Internet in terms of leisure hours.

The EI and IA variables were operationalized with the following instruments: Trait Meta-Mood Scale (TMMS-24) [26] validated in Spanish [27], and the Internet Addiction Test (IAT) scale [28], validated in Spanish [3], respectively. TMMS-24 is a self-report measure aimed at the population over 16 years of age, with 24 items on a Likert-type scale from 1 to 5 (not at all-totally agree). This scale is made up of 3 dimensions with 8 items for each one: Attention: the ability to attend to feelings adequately (1–8), Emotional clarity: the ability to understand properly one's emotional states (9–16) and Emotional repair: the ability to regulate appropriately one's emotional states (17–24). The internal consistency obtained in each dimension of the original study in Spanish [27] using Cronbach's alpha was: Attention $\alpha = 0.90$, Emotional clarity $\alpha = 0.90$ and Emotional repair $\alpha = 0.86$.

Table 1
Descriptive statistics of the sample and its association with the variables IA and EI.

Sociodemographic variables		IAT		TMM-24					
				Attention		Emotional Clarity		Emotional Repair	
Sex	n (%)	Me	p	Me	p	Me	p	Me	p
Males	79 (14.8%)	25	0.652	27	0.033	24	0.942	26	0.048
Females	453 (85.2%)	24		28		23		24	
Cohen d		0.046		−0.335		−0.018		0.184	
Age (years)									
18	103 (19.4%)	28	0.000	29	0.784	23	0.024	24	0.047
19	111 (20.9%)	27		29		23		23	
20	117 (22%)	21		28		23		23	
21	95 (17.9%)	24		28		24		25	
22	26 (4.9%)	20		28		24		24	
23	16 (3%)	26.5		27		23		26	
24 or more	64 (12%)	19		28		26		27	
Eta Square		0.077		0.006		0.027		0.026	
Ac. year									
1st	168 (31.6%)	27	0.000	28	0.339	23	0.294	24	0.938
2nd	178 (33.5%)	23.5		29		24		24	
3rd	129 (24.2%)	21		27		23		24	
4th	57 (10.7%)	24		28		22		25	
Eta Square		0.029		0.006		0.009		0.001	
Campus									
1	256 (48.1%)	25	0.000	28	0.809	23	0.271	25	0.846
2	135 (25.4%) (25,54%)	21		27		24		24	
3	141 (26.5%)	24		29		24		24	
Eta Square		0.039		0.000		0.004		0.001	
Internet hours									
< 1 h	42 (7.9%)	21	0.000	26	0.215	22	0.784	24	0.521
1–2 h	102 (19.2%)	21		28		24		25	
2–4 h	222 (41.7%)	23		28		23		24	
4–8 h	152 (28.6%)	29		29		24		24	
More than 8 h	14 (2.6%)	32.5		31		22		26	
Eta Square		0.070		0.009		0.001		0.010	
Lives with									
Alone	68 (12.8%)	24	0.286	28	0.626	25	0.056	25	0.319
Parents	213 (40%)	24		28		23		24	
Couple	28 (5.3%)	20.5		28		26		27	
Others	223 (41.9%)	24		29		23		24	
Eta Square		0.006		0.004		0.016		0.010	

Note: IAT: Internet Addiction Test. TMMS-24: Trait Meta-Mood Scale-24. Me: Median. p: U-Mann-Whitney test/Kruskal-Wallis H test. Effect Size: Cohen d/Eta Square.

IAT is made up of 20 items rated on a Likert scale from 0 to 5 (Never - Always). The reliability and psychometric properties obtained in the original study show that it represents a useful tool for the analysis of problems derived from Internet misuse, establishing two groups of users according to the score obtained: Users without problems: <40 and users with IA: ≥ 40. The internal consistency obtained through Cronbach's alpha in the original study in Spanish [3] was: $\alpha = 0.9$ [3].

3.4. Data collection

The questionnaires were provided online from December 2021 to April 2022, through a form made on the Google Forms platform. Previously, the study was presented in the classrooms, informing the students of its anonymous, voluntary, and unpaid nature. The time used was 15 min.

3.5. Data analysis

The IBM statistical program, SPSS (Statistical computer program package for the Social Sciences), version 28.0 was employed.

To measure the psychometric properties of the measurement instruments, Cronbach's alpha was used.

The univariate analysis was carried out by taking into account measures of centrality and dispersion in the quantitative variables and using frequencies and percentages in the qualitative ones.

Non-parametric tests were performed after checking that the quantitative variables did not fit a normal distribution using the Kolmogorov-Smirnov test with Lilliefors significance correction. The Mann Whitney U test and the Kruskal Wallis H test were used. Cohen's d coefficient and eta squared were calculated to indicate the effect size of the comparisons, following Cohen's criteria for establishing cut-off points [29]. Spearman's Rho was used to determine the relationship between the quantitative variables EI and IA. Simple logistic regression models were used between the dichotomised scale IAT as the dependent variable and the variable dimensions EI. A value of $p < 0.05$ was used to determine significance.

3.5.1. Ethical considerations

This study has the favorable report of the Ethics Committee of the University of León (ULE-048-2021) and the informed and voluntary consent of the participants and respect for their freedom, according to the principles of the Nuremberg Code and the Declaration from Helsinki.

The purpose of the investigation, its risks, effects, and consequences have been informed, and confidentiality, privacy, and anonymity have been guaranteed at all times.

4. Results

4.1. Sociodemographic data

The sociodemographic characteristics and their relationship with the EI and IA variables are shown in Table 1. A sample of 532 Nursing students was obtained, with a higher participation of female (85.2%) and of 20-year-old students (22%) being the minimum age 18 and the maximum 24 or more with a mode of 20 years.

4.1.1. EI values

The EI levels found in the students were as follows for each dimension (median): Attention = 28, Emotional Repair = 24, and Emotional Clarity = 23. Significant differences were found in the Attention and Emotional repair dimensions of EI in the sex variable ($Z = -2.135$ and $Z = -1.975$), finding higher values of Attention in female and higher values of Emotional repair in male. No differences were found in the Emotional clarity dimension regarding sex ($Z = -0.072$). The results of the Kruskal-Wallis H test to establish the difference between the age groups in the EI dimensions were significant for Emotional clarity, finding that students aged 24 or over present higher values than the rest. They were also significant for Emotional repair, with students aged 24 or over revealing higher levels than those aged 18 ($p = 0.018$), 19 ($p = 0.001$), 20 ($p = 0.004$), and 21 years ($p = 0.012$). No difference was found in the age groups regarding Attention. The differences between the EI dimensions and the others of the sociodemographic variables were not significant (Table 1).

4.1.2. IA values

Differences in IA scores were found according to age. The students were classified according to their age at the time of the study, from 18 years at the beginning of their studies to 24 years or older, including in this group those students who had taken longer than usual to complete their studies or those who had studied. Students aged 18 and 19 had higher score than those aged 20 ($p = 0.000$ and $p = 0.003$) and higher than those aged 24 or more years ($p = 0.000$ and $p = 0.001$). In the case of 18-year-old students, the levels were also higher than those of 21 and 22 ($p = 0.011$ and $p = 0.002$).

Students who spent between 4 and 8 h using the Internet for leisure presented significant differences in comparison with the rest of the groups, except for the use of more than 8 h, with higher IA values; there were also higher values among those who use the Internet for more than 8 h compared to those who use it for less than an hour and between 1 and 2 h.

The students of campus 2 showed a lower score in IA compared to those of campus 3 ($p = 0.001$) and 1 ($p = 0.000$), with no significant difference between the latter two.

Regarding the values of IA and the academic year, they were higher in first-year students compared to second-year students (p = 0.008) and compared to third-year students (p = 0.000), with no difference between the others.

4.2. Association of IA with EI

The descriptive statistics of the total sample of the IA and EI variables are shown in Table 2. In addition, Spearman's Rho coefficient displayed a very weak negative correlation between Emotional clarity and Emotional repair with the IA values (Table 2).

The prevalence of students presenting IA exceeding the established cut-off point was 11.1%. In addition, these students scored higher in Attention (p = 0.010) and lower in Emotional clarity (p = 0.031) than the rest (Fig. 1, Table 3). The results of the binary logistic regression analysis are shown in Table 4. For each item of Attention, the score of Internet addiction increased by 0.089 times, and for each item of Emotional clarity, the score of Internet addiction decreased by 0.080 times.

5. Discussion

When describing and analyzing the relationship between IA and EI, as well as the sociodemographic characteristics in Nursing students, IA values were found, which showed normal use in the average of students, coinciding with a study that found low levels of problematic use of the internet among university students [16]. It should be noted that this study used a different scale with three dimensions (negative consequences of the Internet, social benefit/social comfort and excessive use) to assess problematic Internet use [16]. The purpose of Internet use was also not analyzed in the present study, and it would be interesting to do so in future studies, as authors report that the use of social networks and chat rooms acts as a risk factor for the development of IA [22].

Several authors found a lower rate of IA in those university students of health sciences [22,25], and in some cases, lower scores were obtained in mobile phone dependence in Nursing students compared to other undergraduate students [24].

Although there are authors who report a higher prevalence of IA in male than female [7,16,22], in the present study, a difference between sex and Internet use was not found, coinciding this with different studies [10,17,19,23]. It should be noted that the sample of women was larger than that of men, which may have influenced the final result. We found some studies pointing to greater use of the Internet by women related to their shyness and the fact of receiving greater perceived social support online [6], and in the case of a study with a sample of students from Mexico and Spain, it was found that in the first case, the prevalence of problematic Internet use was higher in men, while Spanish university students presented higher rates in women [25].

Age could be influential when it comes to falling into maladaptive use of the Internet. Students aged 18 or 19 present higher values than those aged 24 or over, and those aged 18 even higher than those aged 20 and 21, coinciding this with the most problematic use of the Internet by those under 21 years of age [22]. A longitudinal study found similar outcomes, with a decrease in the prevalence of IA as age increased, a fact which can be explained by the maturation process of adolescents leading to less risky behaviors [2].

Higher levels of IA were found in first-year students compared to second-and third-year students. This is in line with some studies where first-year students spend more time on the Internet than fourth-year students [30]. No differences were observed concerning the fourth-year students, although it should be borne in mind that it was the year with the smallest sample size.

Significant differences in IA levels were found in the three campuses although the magnitude of the effect size is small and there are no studies to make a comparison in this sense. This difference should be investigated in the future.

While it seems more logical to think that students who live in an organized family environment may have more control over the use of technology, this study, like others [22], reported no differences between the students use of the internet and who they live with. Nevertheless, a study with two different populations, obtained higher rates of IA when living with their parents in its sample of Spanish students, while this was not the case in the sample obtained from students in Mexico, with this situation reversed [25].

Similar to other studies [18,25], differences were encountered with the number of hours spent using the Internet for leisure, so that as these increase, AI values increase in the studied sample. Along these lines, problematic use is observed in those individuals who spend an average of 52.7 h per week dedicated to leisure [22], and yet other studies do not report differences between the addiction of Nursing students to smartphones and the number of hours they use them [31], although the explanation could be related to the different applications that can be given to this device, such as the time dedicated to making or receiving calls and not just surfing the internet.

Regarding EI levels, adequate values were reported for Attention and Emotional repair, which implies that students are capable of

Table 2
Descriptive statistics and Spearman correlations of the variables IA and EI.

			IAT	TMMS-24		
				Attention	Emotional clarity	Emotional repair
TMMS-24. Correlations	Attention	Rho	0.082	1		
	Emotional clarity	Rho	−0.169**	0.345**	1	
	Emotional repair	Rho	−0.095*	0.280**	0.478**	1
Descriptive statistics	Total	M±SD	25.3 ± 11	27.8 ± 6.1	23.7 ± 6.4	24.6 ± 6.3
	α		0.87	0.88	0.91	0.88

Note. Rho: Sperman correlations. IAT: Internet Addiction Test. TMMS-24: Trait Meta-Mood Scale-24. M±SD: Mean ± Standard Deviation. α: Cronbach's alpha. *p < 0.05 **p < 0.01.
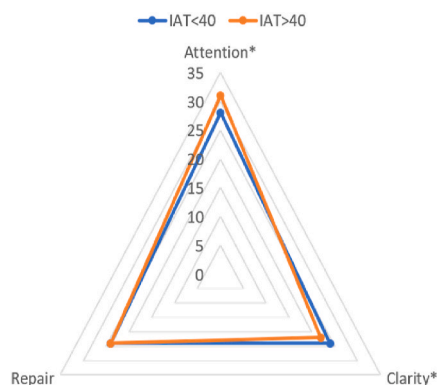
Fig. 1. Differences between the prevalence of IA with the dimensions of EI.

Table 3
Differences between the prevalence of IA with the dimensions of EI.

	N (%)	Attention			Emotional Clarity			Emotional Repair		
		Me	p*	d	Me	p*	d	Me	p	d
IAT<40	473 (88.9%)	28	0.010	−0.375	24	0.031	0.307	24	0.836	0.016
IAT≥40	59 (11.1%)	31			22			24		

Note. Me: Median. p*<0.05-U-Mann-Whitney test. d: Effect Size Cohen d.

Table 4
Logistic regression analysis between IA and EI.

	Internet Addiction			
	R^2	O.R	95%IC	p
Attention	0.014	0.089	1.041–1.1147	0.001
Emotional Clarity	0.034	−0.080	0.879–0.969	0.000

Note: R^2, Cox and Snell's, O.R: Odds Ratio.

properly attending to feelings and regulating emotional states; however, although just below the limit of what is considered normal, they showed lower levels of Emotional clarity, indicating that they should improve their understanding of their emotional states. We observed similar results in some studies, but with also adequate results in Emotional clarity, unlike the present study [32]. It is important to analyze that we are in the context of a pandemic that may have left the students with some difficulty in understanding their feelings. In fact, low scores in Emotional clarity, in the case of fourth and third year students, may reflect complications in coping with changes due to taking classes online and having to give up a period of clinical practice and contact with patients.

In terms of sex, women presented more Attention to feelings compared to men; this was not the case in the ability to regulate their emotional state, which was greater in the latter, coinciding with [32]. In other research studies [10,13] no differences were found in terms of gender and EI levels, and the existing variability in the measurement instruments used must be assessed.

It seems that age could gradually increase EI, since students aged 24 or over are capable of understanding and regulating their emotional states, with a higher score than the those with younger ages. According to Budler et al. [33], this could be because emotional skills can be improved as students' training increases, although this does not coincide with studies that found that high school students had higher EI values than university students [10] or that the increase in EI levels was better after implementing programs in primary school students compared to the rest [11].

A moderate and inverse relationship is found between AI and IE [7], as proposed in this study, although it is true that the articles that analyzed it used different measurement instruments and came from different countries, making it difficult to interpret the results conclusively. In addition, it was observed that individuals with higher levels of social anxiety and difficulty establishing relationships with others suffered more problematic use of the Internet than others [16]. Similarly, some authors report that low self-esteem which can be translated into a low control of emotions could predict maladaptive use of the Internet [19], and also, those students with some type of mental disorder including depression, presented 4 times more problematic use of the Internet [22], coinciding with what has been stated in other studies [2,17].

There is an inverse relationship between EI scores and problematic internet use, showing that poor emotion management in stressful circumstances may be related to poor impulse control and greater symptomatology of technological addictions [10]. Despite the evidence previously described, the findings of this study inform us of a weak relationship between the dimensions of EI and IA in Nursing students. This relationship is negative in the case of Emotional repair and Emotional clarity, since as students are better at

regulating emotional states and understanding their emotions, they present lower IA values, albeit very weakly. It is striking how those students with IA prevalently show higher levels of Attention, which makes them capable of attending to their feelings, and yet present low levels of Emotional clarity, with less ability to regulate them.

5.1. Study limitations

The cross-sectional design of the study does not allow a causal relationship to be established. In view of the non-random nature of the sample, there may be variables which have not been taken into account or could not be controlled and which may have influenced the final results.

The voluntary and self-administered nature of the questionnaire could have introduced a desirability bias on the part of the students.

Research with Spanish Nursing students shows a higher prevalence of women and may not be representative of Nursing university students in other countries.

The present study was conducted during the COVID-19 pandemic, and the results found may have been influenced by the possibility that students increased their use of the Internet during the pandemic.

6. Conclusions

Undergraduate nursing students from the two Spanish public universities studied presented a prevalence of 11.1% of Internet addiction. These students show adequate levels of emotional intelligence. In addition, as age increases, IA levels decrease; on the contrary, these levels are higher as the number of hours spent using the internet dedicated to leisure increases. It seems that higher levels of Clarity and Repair could protect students from the risk of higher IA.

The development of programs that increase emotional competencies in Nursing students could be essential to achieve success in clinical practice, providing protection against maladaptive behaviors such as technological addictions.

Credit authors statement

Fernández-Martínez: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Roles/Writing - original draft. Sutil-Rodríguez: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Visualization, Roles/Writing - original draft. Liébana-Presa: Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Supervision, Validation, Visualization, Roles/Writing - original draft, Writing - review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2023.e19482.

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