

## Problematic Internet Use in University Students: associated factors and differences of gender

### *Uso problemático de internet en estudiantes universitarios: factores asociados y diferencias de género*

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#### Abstract

The aim of this paper is to make a descriptive analysis of Problematic Internet Use in college students, evaluating the possible association with health problems and addictive behaviors, as well as gender differences in user types. A total of 2,780 students participated in the study between 2011 and 2014, 29% of them being males (age  $20.8 \pm 5.1$  years) and 71% females (age  $20.3 \pm 4.4$  years). The prevalence of Problematic Internet Use (PIU) assessed by the Internet Addiction Test was 6.08%. Being under 21 years of age and studying for degrees in subjects other than the health sciences were associated factors with a higher frequency of this problem, no differences by gender or type of address were found. The results show a significant association with some health problems (migraines, back pain, excess weight or obesity, insufficient rest), psychological aspects (risk of eating disorders, risk of mental disorder, depression), family problems and discrimination; with no associations with substance use (alcohol, cannabis or tobacco) being found. Concerning the time of Internet use, weekly hours were significantly higher in women than in men, both the total time as for leisure. The analysis of the profile use in problematic users revealed that males are related to aspects of entertainment such as games or shopping online and females are related to aspects of socialization, such as chats and social networks.

*Keywords:* Problematic Internet Use, Epidemiology, Prevalence, University Students

#### Resumen

El objetivo del presente trabajo es realizar un análisis descriptivo del uso problemático de Internet en estudiantes universitarios, evaluando la posible asociación con problemas de salud y conductas adictivas, así como diferencias de género en los tipos utilización. Un total de 2780 alumnos participaron en el estudio entre los años 2011 – 2014, siendo un 29% varones (edad  $20.8 \pm 5.1$  años) y un 71% mujeres (edad de  $20.3 \pm 4.4$  años). La prevalencia de uso problemático de Internet evaluada mediante el Internet Addiction Test fue del 6.08%. Ser menor de 21 años y cursar titulaciones diferentes a ciencias de la salud fueron factores asociados a una mayor frecuencia de este problema, no existiendo diferencias en función del sexo o tipo de domicilio. Los resultados muestran una asociación significativa con algunos problemas de salud (migrañas, dolor lumbar, sobrepeso u obesidad, descanso insuficiente), aspectos psicológicos (riesgo de trastornos de la conducta alimentaria, riesgo de trastorno mental, depresión), problemas familiares y discriminación; no encontrándose asociaciones con consumo de sustancias adictivas (alcohol, tabaco o cannabis). Respecto al tiempo de uso de Internet, las horas de conexión semanales fueron significativamente mayores en las mujeres que en los hombres, tanto en el tiempo total como por motivos de ocio. El análisis del perfil de utilización en usuarios problemáticos reveló que los varones se relacionan más con aspectos de ocio como los juegos o las compras online y las mujeres con aspectos de socialización, como el chat o las redes sociales.

*Palabras clave:* Uso problemático de Internet, Epidemiología, prevalencia, Estudiantes universitarios.

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According to the latest data from the Internet World Stats, more than 2,405 million people worldwide, and 518 million people in Europe, are users of Internet. Spain is among the top 20 user countries in the world, occupying the seventh position in the European Union with more than 31 million users (Internet World Stats, 2014).

This tool, which came into being at the end of the 1960s in the United States in response to the need for a communications network between government agencies as part of a defense system, began to spread to academic and scientific areas during the 1980s and over the last 20 years we have witnessed its exponential growth (Glowniag, 1998). In our country, this growth has been observed especially over the last decade, from 27% of the population being users of Internet in 1993, to 64.5% in 2013, according to data reported by the Encuesta General de Medios (General Media Survey) (AIMC, 2013).

This explosive growth is closely related to the numerous advantages that the net provides, such as the immediacy of information and communication, socialization and its use as a medium of leisure and entertainment, especially among younger people; allowing for, in addition, anonymity to be maintained, virtual socialization or the construction of identities, which makes communication easier for shy or introverted people (Muñoz-Rivas, Navarro and Ortega, 2003).

But this medium, which has become a feature of our daily lives, is not free of problems. Its use requires time, and a lack of self-control can lead to an escape from real life and even to states of dependence or addiction (Diddia, Dorphinghaus, Maggi & Haro, 2009; Echeburúa & Corral, 2010; Gracia, Vigo, Fernández & Marco, 2002; Young, 1998).

On many occasions, what is attractive about the net could well be compared with the boosting properties of addictive substances, a reason for which some authors have described psychological symptoms or profiles derived from the excessive use of the net, similar to those that are produced in people who are addicted to substances (such as stress, anxiety or restlessness when no connection is available) (Lam-Figueroa et al., 2011; Young, 1998).

Terms such as "Internet Addiction", "Pathological Internet Use", "Compulsive Internet Use", "Net Addiction" or "Cyber Addiction" have been used widely in the scientific literature to refer to this problem (Douglas et al., 2008; Luengo, 2004; Young, 1998; Young, 2010). However, addiction to Internet, which comes within the framework of the addictions denominated as behavioral or psychological, is not registered as such in any diagnostic manual (American Psychiatric Association, 2003; World Health Organization, 1992), with only pathological online gaming having been considered as a disorder related to the use of Internet in the recent publication of the DSM-V (American Psychiatric Association, 2014; Carbonell, 2014).

In a descriptive study carried out among the adolescent population in eleven European countries, a direct association with Pathological Internet Use (PIU) was found, in those who presented symptoms of depression, anxiety and distress in maintaining personal relationships in real life, especially males (Kaess et al., 2014). As well as this, some authors have found an association with other health problems, such as sleep deprivation, eating disorders, migraines or back pains (Didia et al., 2009; Pezoa-Jares, Espinoza-Luna & Vasquez-Medina, 2012; Spada, 2014).

On another note, around 12% of adults who are addicted to Internet also have problems of dependence, or addiction to, alcohol and 5% to drugs in general, as the revision carried out by Sussman, Lisha and Griffiths (2011) shows. This aspect has been evidenced in the recent study by Secades-Villa et al. (2014), carried out among the European adolescent population, in which they found a statistically significant relationship between the number of hours of connection to Internet and the frequency of consumption of alcohol, tobacco, cannabis and other illegal drugs.

The highest PIU risk profile is that of a male, under the age of 21, with low self-esteem and who lives away from home, making him more vulnerable to the problems described above (Sánchez-Carbonell, Beranuy, Castellana, Chamarro & Oberst, 2008; Frangos, Frangos & Kiohos, 2010; Muñoz-Rivas et al., 2003).

Regarding the types of use, gender differences have been described in the scientific literature, with males being the ones who spend most hours per week on e-mail, playing online games and browsing in web pages (Muñoz-Rivas et al., 2003), while females are the ones who most use chats or social networks (Andreassen, Torsheim, Brunborg & Pallesen, 2012).

The analysis of the behaviors related to Internet use is of great interest, especially among the young population, given that adolescents and university students are the groups that are most susceptible to losing their self-control (Hicks & Heastie, 2008; Kandell, 1998; Ledo-Varela et al., 2011).

The university stage is a period of transition that in many cases implies becoming independent from the family nucleus, stress brought on by the new situation or the search for new friendships, all motives that can interfere in net use as well as lifestyle changes that may have future health repercussions. The prevalence of PIU in this population is between 6 and 40%, there being controversy owing to methodological differences between the studies published (Pezoa-Jares et al., 2012; Sussman et al., 2011).

For that reason, the University of León decided to set up the uniHcos project in 2011 with the aim of analyzing the influence of the university stage on different lifestyles, and now has the collaboration of another eight Spanish universities (Fernández-Villa et al., 2013).

This paper, which comes within the framework of the project, is a descriptive epidemiological study that has as a novelty a proposed wide-ranging analysis of possible fac-

tors or behaviors that may be associated with PIU, with three principal hypotheses being advanced: (a) that there is a stronger association in young people, under the age of 21, who live away from the family home and who have low self-esteem or states of depression or anxiety, with the masculine sex being the most vulnerable; (b) that there is also an association not only with health problems, both physical and psychological, but with the use of addictive substances such as alcohol, tobacco and other illegal drugs and; (c) that there are gender differences in Internet user profiles.

With the aim of checking these hypotheses, three principal objectives are established: (a) to evaluate the relationship between PIU and sociodemographic aspects; (b) to analyze the possible association with health problems, both physical and psychological, as well as with the consumption of addictive substances (alcohol, tobacco and cannabis) and, (c) to describe Internet user profiles in the search for gender differences.

## Method

### Design

Observational, descriptive, cross-sectional epidemiological study.

### Participants

The target population were all first-year and first-enrollment university degree students, from any of the subjects offered at the universities collaborating in the uniHcos project (Fernández-Villa et al., 2013), from October 2011 until April 2014. Students were recruited by means of an invitation sent to their university email addresses, and took part totally voluntary without receiving any form of compensation for the survey that was carried out involving some 2,780 students (3.5%). Of them, 28.8% were males (with an average age of  $20.8 \pm 5.1$ ) and 71.2% were females (with an average age of  $20.3 \pm 4.4$ ), with all the participating universities being represented (2% from Alicante, 2% from Cantabria, 37% from Granada, 4% from Huelva, 8% from Jaén, 17% from León, 14% from Salamanca, 3% from Valladolid and 14% from Vigo). It was not necessary to delete any survey from the analysis, as it was obligatory to respond to all the items on the questionnaire for which reason there were no errors and no absent data.

### Tools

By means of a self-administered online questionnaire of 373 items, information was gathered concerning: sociodemographic questions (age, sex, degree course, type of accommodation, university attended) consumption of substances (alcohol, tobacco, cannabis), physical and psychological characteristics, as well as questions related to Internet use (the number of hours connected daily and weekly, and the type of use made). The tools used to this end were:

**The APGAR Test (Adaptability, Partnership, Growth, Affection, Resolve).** This is a brief, unidimensional questionnaire, consisting of five questions with a Likert scale (0-2 points) which is used to evaluate family functionality or dysfunctionality (Cronbach alpha coefficient of .84). A score above six points indicates good family functionality, while a score of six or below indicates moderate-to-grave family dysfunction (Bellón, Delgado, Del Castillo & Lardelli, 1996; Smilkstein, Ashworth & Montano, 1982).

**The SCOFF questionnaire (Sick, Control, One stone, Fat and Food).** This questionnaire consists of five dichotomous questions, for which each question is worth one point. A total of two or more points determines a greater probability of risky eating behavior, with a sensitivity level of .98 and a specificity level of .94 (García-Campayo et al., 2005; Morgan, Reid & Lacey, 1999).

**GHQ-12 Test (General Health Questionnaire).** This test consists of twelve items, six of a positive and six of a negative orientation. It shows good reliability in different studies carried out with Cronbach alpha coefficients of between .82 and .86 (Goldberg et al., 1997). It is evaluated according to a Likert scale with dichotomous scoring (0-0-1-1). A final result of three or more points corresponds to a greater risk of psychological problems (Rocha, Pérez, Rodríguez, Borrell & Obiols, 2011).

**AUDIT Test (Alcohol Use Disorders Identification Test).** A questionnaire comprising 10 items which are evaluated by means of a five-possibility Likert scale (0-4 points) with the exception of items numbers 9 and 10, whose scale is of three options (0-2-4 points). A score of eight or more points indicates problematic alcohol consumption, with a level of sensitivity of .90 and a specificity of .80 (Saunders, Aasland, Babor, de la Fuente & Grant, 1993).

**IAT Survey (Internet Addiction Test).** This was drawn up by Kimberly Young in 1998 in order to measure the extent to which Internet affected people's daily life, social life, productivity, sleep and feelings (Young 1998). In the different validations that have been published of this questionnaire, between one and six different dimensions have been found, with a Cronbach alpha correlation that is close to .90. It comprises 20 items that are evaluated by means of a five-point Likert scale (0 = Never; 1 = Almost never; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always). Given the controversy on the number of factors involved, for this study we have decided to analyze the PIU in accordance with a cut-off point of 40, considering as problematic users all those who scored 40 points or more (Jelenchick, Becker & Moreno, 2012).

### Procedure

This present study comes within the framework of the uniHcos Project, whose design is multi-centric and with a prospective cohort. All university students who fit the inclusion criteria are invited to take part via their university email address, all being monitored afterwards on a two-year basis.

In the descriptive study presented here, data from the first survey carried out on the students from the first three waves (from 2011 to 2014) have been used.

All those who wished to participate filled in an informed consent form online before completing the questionnaire. Once they accepted this, they were directed to the aforementioned questionnaire, run by the SphinxOnline® platform, which allows for participants' anonymity, in compliance with the Ley Orgánica de Protección de Datos de Carácter Personal (Organic Law on Protection of Personal Data, published in the Official State Bulletin in 1999). As well as this, the project has the approval of the Ethics Committees of all the collaborating universities regarding the use of the students' personal data.

### Statistical Analysis

The dichotomous categorization of Internet use was used as a dependent variable and the rest of the information collected (health problems, physical and psychological aspects, substance use and other aspects related to Internet use) as independent variables. In the descriptive analysis, the prevalences with their respective confidence intervals at 95% were calculated to categorical variables, while the numerical variables were analyzed by means of the calculation of means and standard deviations. The relationship between problematic Internet use and other variables was established by means of bi-variant and multi-variant logistical regression models, with the Odds Ratio and its respective confidence intervals being calculated at 95%, adjusting for gender, age and degree course. The STATA 13 statistics package was used for all the analyses (Stata Corp, 2013).

## Results

### General Aspects

The prevalence of PIU in the sample was of 6.04%, there being no statistically significant differences by age or type of residence. Regarding the age and the subjects studied, Table 1 shows how the under-21s and those studying subjects other than health sciences present Odds Ratios (OR) close to 1.5 both in the raw and in the adjusted analyses.

### Association with Health Problems and Psychosocial Aspects

In Table 2 we can observe that there is a greater problem of PIU in persons who present back pains in the lumbar region and migraines, while no association was found with cervical pain.

The evaluation of physical constitution by means of the body mass index shows an association of PIU with persons who are overweight or obese, with this problem being almost 2.5 times more frequent in persons with an index of body mass higher than 30Kg/m<sup>2</sup> (p= .009).

On another note, aspects such as a perceived poor state of health, the risk of eating disorders as analyzed by means of the SCOFF survey, or depression, were also associated positively with PIU in both analyses, with a prevalence of PIU among those surveyed who were at risk of mental health problems that was almost four times higher, evaluated by means of the GHQ-12 (aOR = 3.58; p= .000), standing out.

Our results show as well that social and family relationships are also relevant in the problems related to Internet use, given that the students who show family dysfunction, be it moderate or serious (positive AGPAR), or some form of

Table 1  
Sociodemographic Characteristics of Problematic Users.

	Problematic Internet Use										
	N	n	%	cOR <sup>1</sup>	95%CI	B	p	aOR <sup>2</sup>	95%CI	B	p
Gender											
Female	1979	118	6.0	1				1			
Male	801	50	6.3	1.05	.75 - 1.48	.049	.779	1.03	.74 - 1.47	.039	.823
Age											
≥ 21	2001	37	4.5	1				1			
< 21	816	168	6.7	1.50	1.03 - 2.19	.409	.032	1.52	1.05 - 2.22	.421	.028
Degree course											
Health Sciences	726	33	4.6	1				1			
Other degree courses	2054	135	6.6	1.48	.99 - 2.18	.390	.050	1.49	1.01 - 2.21	.399	.046
Accommodation type											
Family Home	1190	79	6.6	1				1			
Student Residence Hall	300	16	5.3	.79	.45 - 1.37	-.236	.402	.72	.41 - 1.25	-.330	.246
Other	1384	168	6.0	.84	.61 - 1.17	-.169	.312	.87	.62 - 1.21	-.131	.402

Note. <sup>1</sup>cOR= crude Odds Ratio; <sup>2</sup>aOR= adjusted Odds Ratio by Gender, Age and Degree course.

discrimination, double or even triple the prevalence of PIU respectively.

The role of good sleep is also highlighted, given that those persons who refer insufficient rest double the fre-

quency of problems derived from Internet use ( $p = .000$ ), with statistically significant differences regarding the daily number of hours of sleep (normal users:  $7.6 \pm 1.2$  h/day; problematic users:  $7.3 \pm 1.5$  h/day ;  $p = .003$ ).

Table 2  
Relation of Problematic Internet Use to health problems and psychological aspects.

	Problematic Internet Use											
	N	n	%	cOR <sup>1</sup>	95%CI	B	p	aOR <sup>2</sup>	95%CI	B	p	
Cervical pain												
No	2493	150	6.0	1				1				
Yes	287	18	6.3	1.04	.63 - 1.73	.044	.864	1.09	.66 - 1.82	.090	.727	
Back pain												
No	2427	138	5.7	1				1				
Yes	353	30	8.5	1.54	1.02 - 2.33	.432	.040	1.60	1.06 - 2.43	.472	.026	
Migraines												
No	2284	129	5.7	1				1				
Yes	496	39	7.9	1.43	.98 - 2.07	.355	.062	1.48	1.01 - 2.17	.394	.042	
BMI <sup>3</sup>												
Normal weight	2005	112	5.6	1				1				
Underweight	267	16	6.0	1.08	.63 - 1.85	.746	.787	1.05	.61 - 1.82	.055	.854	
Overweight / Obesity	508	40	7.9	1.44	.99 - 2.10	.368	.054	1.53	1.04 - 2.24	.425	.029	
Perceived health												
Good/Very good	2206	115	5.2	1				1				
Regular or Worse	574	53	9.2	1.85	1.32 - 2.60	.615	.000	1.90	1.35 - 2.68	.643	.000	
Socff												
No risk	2239	116	5.2	1				1				
At risk	541	52	9.6	1.95	1.38 - 2.74	.666	.000	1.94	1.37 - 2.74	.660	.000	
Ghq_12												
No risk	1266	34	2.7	1				1				
At risk	1514	134	8.9	3.52	2.40 - 5.17	1.258	.000	3.58	2.44 - 5.27	1.276	.000	
Depression												
No	2432	131	5.4	1				1				
Yes	348	37	10.6	2.09	1.42 - 3.07	.737	.000	2.22	1.50 - 3.28	.799	.000	
Apgar												
Normal functioning	2067	103	5.0	1				1				
Dysfunctional	713	65	9.1	1.91	1.38 - 2.64	.649	.000	1.87	1.35 - 2.59	.627	.000	
Discrimination												
No	2354	115	4.9	1				1				
Yes	426	53	12.4	2.77	1.96 - 3.90	1.018	.000	2.78	1.97 - 3.93	1.023	.000	
Sleep												
Yes	1584	66	4.2	1				1				
No	1196	102	8.5	2.14	1.56 - 2.95	.763	.000	2.17	1.58 - 3.00	.777	.000	

Note. <sup>1</sup>cOR= crude Odds Ratio; <sup>2</sup>aOR= adjusted Odds Ratio by Gender, Age and Degree course; BMI = Body Mass Index in Kg/m<sup>2</sup> considering Underweight as  $\leq 18,5$  Kg/m<sup>2</sup> and Overweight/Obesity as  $\geq 25$  Kg/m<sup>2</sup>, the other remaining values being evaluated as Normal weight.

### Association with the Consumption of Legal and Illegal Drugs

Concerning the consumption of addictive substances (alcohol, tobacco and cannabis), no statistically significant association has been found, either in the raw or the adjusted analyses, as shown in Table 3. However, if we evaluate the risk of problems related to the consumption of alcohol by means of the AUDIT test, we find that there is a two-fold prevalence of PIU among the students with a positive AUDIT result.

### Types of Internet Use and Gender Differences

In the global analysis of the different types of use made of Internet, we found that the use of chats or social networks behaves as a risk factor for PIU, while the use of email was associated with a lesser prevalence of this problem, and no significant association being shown with the remaining uses (Table 4).

If we analyze the profile of persons with PIU criteria, we observe statistically significant gender differences, as

is shown in Table 5. The females who use chats and social networks show this problem with greater frequency, while among the males, the greater prevalence of PIU is seen in those who play online games or purchase online. The frequency of problems derived from Internet related to online shopping among males needs to be analyzed with caution given the small sample size.

Regarding the time spent using Internet, we have found a weekly mean of  $32.2 \pm 24.3$ h connection time among normal users, and one of  $52.7 \pm 31.7$ h among problematic users, with the time spent on leisure activities being especially relevant. Our results reveal that females spend more time connected to the net (Figure 1), with significant differences being observed both in the overall time connected and that spent connected for leisure activities among those users who did not show problematic use and those who did, with there being no such difference in the time used for activities related to studying or working.

Table 3

Relation of Problematic Internet Use to consumption of addictive substances in the last month.

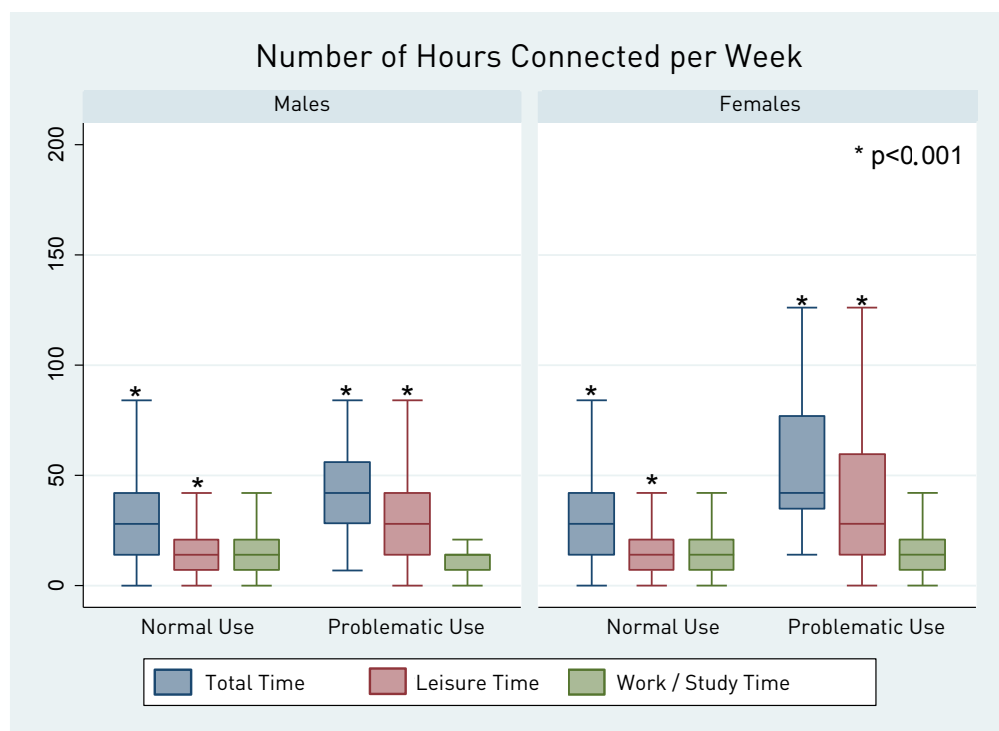
	N	n	%	cOR <sup>1</sup>	95%CI	Problematic Internet Use					
						B	p	aOR <sup>2</sup>	95%CI	B	p
Cannabis											
No	1638	101	6.2	1				1			
Yes	1142	67	5.9	.95	.69 - 1.30	-.053	.745	.98	.71 - 1.35	-.020	.902
Tobacco											
No	2121	126	5.9	1				1			
Yes	659	42	6.3	1.08	.75 - 1.55	.785	.689	1.12	.78 - 1.62	.117	.530
Alcohol											
No	576	36	6.3	1				1			
Yes	132	132	6.0	.96	.65 - 1.39	-.045	.815	.96	.66 - 1.41	-.037	.851
Binge Drinking <sup>3</sup>											
No	1395	77	5.5	1				1			
Yes	1385	91	6.6	1.20	.88 - 1.65	.185	.246	1.21	.88 - 1.65	.189	.237
Audit											
Negative	2279	115	5.1	1				1			
Positive	501	53	10.6	2.23	1.58 - 3.13	.800	.000	2.20	1.56 - 3.11	.789	.000

Note. <sup>1</sup> cOR=crude Odds Ratio; <sup>2</sup> aOR= adjusted Odds Ratio by Gender, Age and Degree course; <sup>3</sup> Binge Drinking = drinking five or more drinks for men and four or more drinks for women in a single occasion (approximately in two hours).

Table 4  
Types of use made of Internet among problematic users.

	Problematic Internet Use										
	N	n	%	cOR <sup>1</sup>	95%CI	B	p	aOR <sup>2</sup>	95%CI	B	p
Chats											
No	1375	64	4.7	1				1			
Yes	1286	95	7.4	1.63	1.18 - 2.26	.491	.003	1.60	1.14 - 2.23	.469	.006
Email											
No	1908	126	6.6	1				1			
Yes	753	33	4.4	.65	.44 - .96	-.434	.031	.67	.45 - .99	-.401	.047
Games											
No	2454	141	5.8	1				1			
Yes	207	18	8.7	1.56	.94 - 2.61	.446	.088	1.50	.89 - 2.54	.407	.130
Social Networks											
No	885	37	4.2	1				1			
Yes	1776	122	6.9	1.69	1.16 - 2.46	.525	.006	1.70	1.16 - 2.49	.532	.006
Shopping											
No	2578	151	5.9	1				1			
Yes	83	8	9.6	1.71	.81 - 3.62	.539	.157	1.81	.85 - 3.83	.591	.123
Press											
No	2250	142	6.3	1				1			
Yes	411	17	4.1	.64	.38 - 1.07	-.445	.090	.64	.38 - 1.08	-.444	.097
Series											
No	1517	87	5.7	1				1			
Yes	1144	72	6.3	1.10	.80 - 1.52	.099	.547	1.08	.78 - 1.50	.080	.628

Note. <sup>1</sup> cOR= crude Odds Ratio; <sup>2</sup> aOR= adjusted Odds Ratio by Gender, Age and Degree course.



Note. In the graphic representation, the line in the middle of the boxes corresponds to the percentile 50 or the median, its height is established by the interquartile range and the external lines explain the deviation of the data by 1.5 times the interquartile range.

Figure 1. Total hours connected to Internet per week for leisure, work or studies.

Table 5  
Gender differences by types of Internet use among Problematic Users

		Males										
		N	n	%	cOR <sup>1</sup>	95%CI	B	p	aOR <sup>2</sup>	95%CI	B	p
Chats	No	463	33	7.1	1				1			
	Yes	327	16	4.9	.67	.36 - 1.24	-.400	.202	.67	.36 - 1.25	-.401	.208
Email	No	574	39	6.8	1				1			
	Yes	216	10	4.6	.67	.33 - 1.36	-.407	.264	.66	.32 - 1.35	-.414	.258
Games	No	670	36	5.4	1				1			
	Yes	120	13	10.8	2.14	1.10 - 4.17	.761	.025	2.11	1.08 - 4.14	.747	.029
Social Networks	No	312	16	5.1	1				1			
	Yes	478	33	6.9	1.37	.74 - 2.54	.316	.314	1.40	.75 - 2.59	.334	.289
Shopping	No	775	46	5.9	1				1			
	Yes	15	3	20.0	3.96	1.08 - 14.53	1.377	.038	3.98	1.08 - 14.62	1.381	.038
Press	No	583	40	6.9	1				1			
	Yes	207	9	4.4	.62	.29 - 1.29	-.483	.202	.61	.29 - 1.29	-.492	.195
Series	No	438	25	5.7	1				1			
	Yes	352	24	6.8	1.21	.68 - 2.16	.190	.521	1.20	.67 - 2.14	.184	.532
		Females										
		N	n	%	cOR <sup>1</sup>	95%CI	B	p	aOR <sup>2</sup>	95%CI	B	p
Chats	No	912	31	3.4	1				1			
	Yes	959	79	8.2	2.55	1.67 - 3.90	.937	.000	2.42	1.57 - 3.72	.882	.000
Email	No	1334	87	6.5	1				1			
	Yes	537	23	4.3	.64	.40 - 1.03	-.444	.065	.67	.42 - 1.08	-.393	.104
Games	No	1784	10	5.9	1				1			
	Yes	87	5	5.8	.98	.39 - 2.46	-.025	.957	.98	.39 - 2.48	-.018	.970
Social networks	No	573	21	3.7	1				1			
	Yes	1298	89	6.9	1.93	1.19 - 3.14	.660	.008	1.90	1.16 - 3.09	.640	.010
Shopping	No	1803	105	5.8	1				1			
	Yes	68	5	7.4	1.28	.51 - 3.26	.250	.600	1.36	.53 - 3.47	.307	.520
Press	No	1667	102	6.1	1				1			
	Yes	204	8	3.9	.63	.30 - 1.31	-.468	.212	.66	.32 - 1.39	-.410	.276
Series	No	1079	62	5.8	1				1			
	Yes	792	48	6.1	1.06	.72 - 1.56	.057	.775	1.03	.70 - 1.53	.033	.866

Note. <sup>1</sup> cOR= crude Odds Ratio; <sup>2</sup> aOR= adjusted Odds Ratio by Gender, Age and Degree course.

## Discussion

The use of Internet has grown in recent years (AIMC, 2013; Internet World Stats, 2014), with several authors relating this tool to possible states of dependency or addiction (Brenner, 1997; Echeburúa and Corral, 2010; Young, 1998). The scanty knowledge of the health problems that may be derived from the overuse of this medium, as well as the disparity of tools and diagnostic criteria, justify the need for studies such as this one in which not only the situation of the university population in relation to Internet use, given their vulnerability, has been studied (Echeburúa & Corral, 2010; Muñoz-Rivas et al., 2003), but also some of the possi-

ble health problems related to its use, and some of the gender differences that exist, have been identified.

Our results reflect that six out of every hundred university students have occasional or frequent problems with Internet use, which may have repercussions on their daily or social life. This is in line with data provided by other authors both for the adolescent population and for university students. In the SEYLE study that was carried out in eleven European countries a prevalence of problematic Internet use was found in 4.4% of adolescents (Durkee et al., 2012). In general European population the figures vary between 1% and 9%. (Kaltiala-Heino, Lintonen and Rimpela, 2004; Siomos,



Dafouli, Braimiotis, Mouzas and Angelopoulos, 2008). If we refer to the university population, the figures vary between 6% and 40%, making it difficult to establish a comparison given the geographical and, fundamentally, methodological differences found (Pezoa-Jares et al., 2012; Sussman et al., 2011).

Remarkable risk factors that are associated to a PIU are: male gender, under the age of 21 years, living outside the family home, having low self-esteem and a dependence on other addictive behaviors such as drug consumption (Sánchez-Carbonell et al., 2008; Frangos et al., 2010; Muñoz-Rivas et al., 2003; Secades-Villa, 2014). Despite the fact that our results concur in that it is the under-21 age group that show the highest PIU rates, as well as those who are studying for degrees in subjects other than the health sciences, we have not found any statistically significant differences regarding gender.

In relation to possible health problems associated with PIU, Didia et al. (2009) established links with back pains, migraines, sleeping disorders, irregular eating habits and family problems. These findings are in line with the results of this study, where there is a slightly higher prevalence of PIU in persons with migraines and pains in the lumbar region, but no significant association being found with cervical pains. Our data also reveal a positive association with eating disorders and with excess weight and obesity.

On the other hand, it is important to highlight the role of the family and of society in PIU, given that those students who expressed that they had suffered some form of discrimination, or had a positive result in the APGAR test, presented greater prevalences.

Some authors also describe symptoms of depression, sadness or loneliness as risk factors for behavioral addictions, among which is Internet addiction (Alavi et al., 2012; Kaess et al., 2014). In this sense, our data reveal that students at risk of mental disorders evaluated by means of the GHQ-12 survey present four times more PIU (aOR= 3.58 IC95%: 2.44 – 5.27), which highlights at the same time that those who say they have suffered at some time a depressive disorder double the frequency of this problem (aOR=2.22 IC95%: 1.50 – 3.28).

On another note, previous studies have established a connection between the consumption of addictive substances and PIU (Pezoa-Jares et al., 2012; Secades-Villa, 2014; Sussman et al., 2011), which is in line with our data on the relationship between PIU and the problematic use of alcohol as measured by the AUDIT test. However, no association was observed between PIU and the consumption of these substances (tobacco, alcohol, illegal drugs) which may be explained by the use of a classification criterion that does not distinguish whether it is a case of occasional use or of problematic use, which means that the group of problematic users is included within the much larger group of non-problematic users, thus generating a regression towards

a null association. Our results, therefore, point to the idea that there is an association between PIU and other problematic behaviors, even if it is not possible to establish a directionality in the relationship given the cross-sectional nature of the study.

Regarding the disturbance of sleeping patterns, it is important to highlight not so much the difference regarding the number of hours of sleep per day (normal users: 7.6±1.2 h/day; problematic users: 7.3±1.5 h/day; p= .003), but rather their quality, given that those persons who say they do not get sufficient rest are doubly at risk of suffering from PIU (aOR=2.17 95%CI: 1.58 – 3.00), compared to those with sufficient amounts of sleep.

As for the time spent using Internet, some studies establish differences between problematic users with a weekly average of 28 hours of connection and those who do not show any problems, whose average is of 12 hours (Yang & Tung, 2007). Our study reflects times that are relatively higher, with an average of 32 hours a week of connection for users without problems and of 53 hours a week for problematic users, with the time spent on leisure activities (19 and 32 hours respectively) being highlighted and it being females who use the net for the most hours a week.

Regarding other possible gender differences, we found that the males use the Internet principally for activities related to leisure, such as online games, or for making purchases, while the females are more associated with activities related to socialization, such as chats and social networks, which is in line with what has been published in the scientific literature (Andreassen et al., 2012; Muñoz-Rivas et al., 2003). What most stands out is that it is females who spend most time connected to Internet, whether for reasons of leisure, work or study, which differs from the findings of other studies, in which being male behaves as a risk factor (Tsai et al., 2009; Leung & Lee, 2012).

This study contributes relevant information concerning the use made of Internet by the university population, given the scarce number of publications on this matter. However, the data must be analyzed with caution, given that our study does have its limitations. The voluntary nature of the study and the tendency of students to downplay those behaviors that society disapproves of in their responses, possibly skew both the selection and the differential classification. On another note, the methodological differences regarding the diagnostic tools or criteria used (IAT, GHQ-12, APGAR, SCOFF) may make it difficult to compare this with other studies and, at the same time, the descriptive design of this paper impedes us from establishing causal relationships.

For that reason, it is proposed, as a future line of research, not only to analyze the momentary situation of Internet with descriptive studies, but also to monitor it over time, as was proposed in the design of the cohort for the uniHcos project, with the aim of determining causal associations with health problems, drug consumption, behavioral

changes related to Internet use and even changes in academic or professional performance that may be associated with the amount of connection time.

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## Conflict of Interests

The authors of this article declare that they have no conflict of interests.

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