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Nomophobia and the influence of time to REST among nursing students. A descriptive, correlational and predictive research

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ABSTRACT

The inclusion of the smartphone in society has brought many advantages, but also disadvantages, such as nomophobia, considered as a digital disease generated by the excessive use of the smartphone. The general objective of the research is to know and analyse the prevalence of nomophobia among nursing students and knowing the influence of time to rest. The research design is descriptive, correlational, transversal and predictive with a quantitative research methodology. The sample consist of nursing students from the University of Granada (N = 880) in Spain. A descriptive analysis has been carried out, as well as a bivariate correlation of Pearson, the student T test and a multiple linear regression. The results show an average level of nomophobia among nursing students. Although the students can recognize that the use of the smartphone can reduce their rest period, mainly focused on the hours they spend sleeping, there is no significant relationship between the two facts, confirming also that the levels of nomophobia are significantly more related in those who claim not to have problems in their rest due to the use of the mobile phone. A large percentage of them claim to rest less time due to excessive use of their smartphone.

1. Introduction

The impact of information and communication technologies (ICT) has favoured the emergence of new habits in people's daily lives (King et al., 2014; Rodríguez-García et al., 2020). Although its inclusion has improved and streamlined daily actions and has brought positive aspects for human beings (Kneidinger-Müller, 2019), it has also led to problems derived from addiction (Ahmed et al., 2019) and even the appearance of psychological pathologies such as nomophobia (Adawi et al., 2019).(see Fig. 1)

The term nomophobia (no-mobile-phobia) refers to psychological disorders derived from fear and anxiety (González-Cabrera et al., 2017) and caused by the impossibility of using a mobile phone at a given moment to communicate or access information (Ahmed et al., 2019) and the dependence generated by the device (Gutiérrez-Puertas et al., 2019). It is therefore catalogued as a type of phobia (Mertkan et al., 2018) and addiction (Basu et al., 2018) that arose after the appearance of the smartphone in society (Farooqui et al., 2017). Research shows that women (Işcan et al., 2020) and people between 12 and 24 years old (Betoncu and Ozdamli, 2019; Gutiérrez-Puertas et al., 2019) are the population sector with the highest risk of prevalence.

Nomophobia is currently considered a digital disease (Betoncu and Ozdamli, 2019) due to the excessive use of mobile phones in personal and professional life (Aguilera-Manrique et al., 2018). Several research studies have shown the presence of nomophobia among different members of the population, especially adolescents (Argumosa et al., 2017) and university students (Gutiérrez-Puertas et al., 2019; Işcan et al., 2020; Thapa et al., 2020). Sharma et al. (2015) even found that 83% of the students in their research had experienced a panic attack when they were unable to make immediate use of their smartphone.

Dependence on mobile phones causes problems in various areas of daily life, such as nutrition, rest time, social relationships, as well as other psychological disturbances (Argumosa et al., 2017; Moreno-Guerrero et al., 2020a, 2020b; Rodríguez-García et al., 2020).

In the case of nursing professionals, both students and working professionals present moderate nomophobia (Ayar et al., 2019;

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Bülbüloğlu et al., 2019; Celikkalp et al., 2020; Gutiérrez-Puertas et al., 2019). Research by McBride et al. (2015) found that 75% of nurses reported using their mobile phone during work to deal with personal concerns. According to research by Alsos et al. (2012) and Gill et al. (2012), this can lead to distractions in the performance of their healthcare tasks, poorer patient care and a greater attention deficit in their work.

A quasi-experimental study (control group and experimental group) conducted by Gutiérrez-Puertas et al. (2020) finds that problematic mobile phone use and nomophobia negatively affect the academic performance and learning of nursing students. Ayar et al. (2018) found a direct correlation between nomophobia levels and the variables of problematic Internet use, social appearance anxiety and social media use between nursing students.

Research conducted by Bülbüloğlu et al. (2019) finds that nomophobia prevents patients from communicating effectively with health professionals, leads to misunderstandings and reduces the amount of work per unit time and the quality of work. In addition, problematic mobile phone use and/or nomophobia may have an influence on decision-making in nursing students (Márquez-Hernández et al., 2020). In addition, other researchers report that mobile phone addiction and nomophobia increase distractions in nursing students' clinical practice (Aguilera-Manrique et al., 2019; Cho and Lee, 2016).

It seems that nomophobia is becoming one of the emerging diseases of the 21st century around the world (Rodríguez-García et al., 2020). Discovering the prevalence of nomophobia among nursing students is very important, as the misuse of smartphones in their lifes may cause some problems, affecting the quality of care and putting patient safety at risk (Gutiérrez-Puertas et al., 2019). Given that we are facing a problem that seems to increase with the evolution of the digital society and due to the scarcity of studies in this field, we present a research that aims to know and analyse the prevalence of nomophobia in students in the Degree in Nursing and identify the relationship between the level of nomophobia and time spent resting, as well as determine the influence on the time spent using the smartphone and the prevalence of nomophobia.

2. Materials and methods

This study has been carried out following a descriptive, correlational, transversal and predictive design, framed in a quantitative research methodology, taking into account the guidelines set out by the authors Hernandez et al. (2016).

2.1. Sample details

The study population is made up of nursing students from the University of Granada (N = 880), specifically on the campuses of the

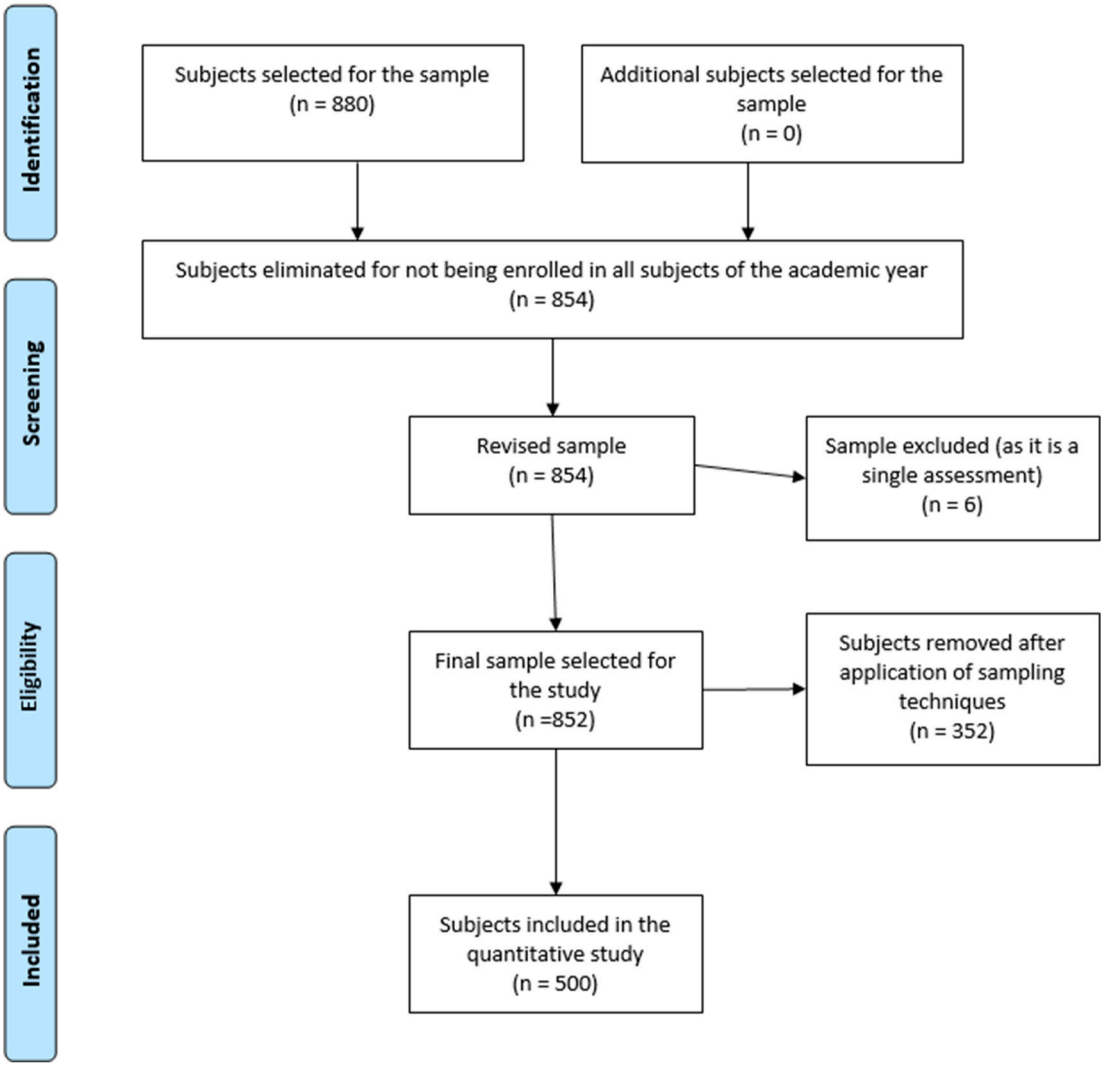

Fig. 1. Sample selection procedure.

Autonomous Cities of Ceuta (n = 376) and Melilla (n = 504). For the development of the research, a sample size of n = 596 has been estimated, for a margin of error of 3%, an estimated percentage of the sample of 50% and a confidence level of 99%. For the selection criteria of the sample we have taken into account that all students were enrolled full time, not in individual subjects. In addition, we have not included students who do not attend classes because of their single assessment. Nor have we included students who have not formalised their enrolment by paying.

Due to the fact that the study was carried out in both cities, stratified random sampling with proportional affixation was also applied, selecting a total of 214 students from the Ceuta campus and 286 from Melilla at random.

2.2. Instrument

The instrument from which this study is based has its origins in that built by Yildirim and Correia (2015) and it is validated in the Spanish context by González-Cabrera et al. (2017) and Gutierrez-Puertas et al. (2016). It is composed of 27 items distributed as follows: a) Socio-technological dimension (7 items); Dimension I. Not being able to communicate (6 items); Dimension II. Losing connectedness (5 items); Dimension III. Not being able to access information (4 items); Dimension IV. Giving up convenience (5 items).

The questionnaire mainly uses a Likert scale from 1 to 7, being 1 "totally agree" and 7 "totally disagree". The total scores are calculated by adding the values of each item, giving a range of scores between 20 and 140 points. The lowest scores correspond to a greater severity of nomophobia. Dichotomous yes/no questions are also used. To avoid having lost values, all the fields that conformed the questionnaire were established as obligatory.

Bearing in mind the validation and reliability process carried out by Gutiérrez-Puertas et al. (2016), the Kaiser-Meyer-Olkin statistician gave a result of 0.90, Bartlett's test was significant (x2190 = 1420.8259, P < .01). The second analysis of the main components, following the varimax rotation process, showed a variance of 22.38% in Dimension I, a variance of 16.82% in Dimension II, a variance of 11.87% in Dimension III and a variance of 11.59% in Dimension IV. These results indicated the importance of the factors for the questionnaire. In the reliability tests, Cronbach's total value at α was 0.928, indicating that the questionnaire had good internal consistency. The instrument can therefore be considered valid and reliable.

2.3. Study variables

The variables presented below are those used in this study. They have been coded for better interpretation in the results section. Given the structure of the study presented, the dependent variables are: "the incidence of mobile phone use in rest time, centered on sleeping hours" (REST) and "time spent daily on the mobile phone" (UMV). While the independent ones are "I would worry about not being able to communicate at the moment with my family and/or friends" (NMF_1); "I would worry about my family and/or friends not being able to contact me" (NMF_2); "I would get nervous about not being able to receive text messages or calls" (NMF_3); "I would be nervous about not being able to keep in touch with my family and/or friends" (NMF_4); "I would be nervous about not being able to tell if someone has tried to contact me" (NMF_5); "I would be nervous about having constantly stopped being in touch with my family and/or friends" (NMF_6); "I would be nervous about being disconnected from my virtual identity" (NMF_7); "I would feel bad about not being able to keep up with what's going on in the media and social networks" (NMF_8); "I would feel uncomfortable about not being able to consult notifications about my virtual connections and networks" (NMF_9); "I would be overwhelmed about not being able to check for new e-mail messages" (NMF_10); "I would feel weird because I wouldn't know what to do" (NMF_11); "I would feel bad if I couldn't access information anytime through my smartphone" (NMF_12); "I would be upset if I couldn't access information through my smartphone whenever I wanted" (NMF_13); "I would be nervous if I couldn't access news (p. e.g. events, weather prediction, etc.) through my smartphone" (NMF_14); "I would get upset if I couldn't use my smartphone and/or its applications whenever I wanted" (NMF_15); "I would be scared if my smartphone ran out of battery" (NMF_16); "I would be heartsick if I were about to run out of credit or reach my monthly spending limit" (NMF_17); "If I ran out of data or couldn't connect to a Wi-Fi network, I would be constantly checking to see if I had recovered the signal or found a network" (NMF_18); "If I couldn't use my smartphone, I'd be afraid of getting stuck somewhere" (NMF_19); "If I couldn't check my smartphone for a while, I'd feel like doing it" (NMF_20).

2.4. Procedure

To proceed with the research, contact was made with the centres of the University of Granada where teaching is given in the Nursing Degree, both in the cities of Ceuta and Melilla to present the research, requesting voluntary participation and agreeing to communicate the results at the end of the study. Once the approval of the centres was obtained, the questionnaires were carried out, which were supplied to the students by the researchers and research collaborators, guaranteeing anonymity to achieve the greatest sincerity in the answers, as well as trying to resolve all possible doubts that arose during their completion. A single-blind procedure has been followed, through which the subjects do not know the objectives of the study to reduce expectations, reactivity and social desirability. Likewise, the administration has been simultaneous to all participants in the same class in school hours trying to assure the homogeneity and equality of conditions. The estimated time period did not exceed 10 min, thus avoiding the fatigue of the participating students.

2.5. Data analysis

Statistical analyses were performed using IBM SPSS version 25. In the first place, the assumptions of linearity, independence, normality, homocedasticity, waste analysis and not collinearity were applied, trying to guarantee the validity of the selected statistical model (De la Fuente et al., 2018). All of them were strictly fulfilled, except the assumptions of homocedasticity and normality of the general linear model in certain variables. However, in the visual verification of the fit of the points to the axis of normality and the indices of asymmetry and kurtosis reflect that most variables do not exceed the value |1| and even the dimensions that exceed it do not assume a severe asymmetry |2| or severe kurtosis |3|. The probabilities of type I error rates, with the achieved data, under the conditions of non-normality and equality of variances reveal robustness, so it is decided to make use of parametric tests, as reported by the authors Montilla and Kromrey (2010).

First, a descriptive analysis was carried out to determine the distribution of the variables defined in the instruments used, using mean (M), standard error of measurement (STM), standard deviation (SD), asymmetry and kurtosis. We continued to make bivariate correlations of Pearson, which allows us to check whether the linear association between the various variables of the nomophobia questionnaire are statistically significant, as well as their strength and direction. The descriptive statistics of comparison of means were then applied, specifically the student T test, which allows us to analyse whether there are statistically significant differences in the variables of the nomophobia questionnaire in relation to the incidence of smartphone use in rest time (hours of sleep). Finally, the multiple linear regression, using the stepwise method (successive steps), provided information on the dependence between the variables, that is, it allows us to know in which measures the nomophobia variables can be explained by the time dedicated to the use of the mobile phone on a daily basis (Giner et al., 2019).

3. Results

The socio-demographic profile of the sample defines that we find ourselves faced with 513 women (86.07%) and 83 men (13.93%), with ages ranging from 18 (17.8%), 19 (54%), 20 (12.4%) to more than 20 years old (15.8%). This section shows the results obtained in the various statistical tests carried out. Table 1 shows that the values of asymmetry and kurtosis are within a normal distribution This is established bearing in mind the statement by Jöreskog (2001), which indicates that the kurtosis of the samples, when between −1.96 and + 1.96, are considered to be within a normal distribution. In addition, the mean is placed in mean-high values in most of the variables. The results presented in this table also show that the levels of nomophobia in nursing students are intermediate, given that the assessments carried out are high. The averages are between 3 and 4. In this case, it can be seen that there may be isolated cases where nomophobia can be a difficulty in their daily lives.

Table 2 shows the correlation matrix between the independent variables established in the study. Most of the variables correlate very significantly, except "I would feel weird because I wouldn't know what to do" with "I would get nervous because I couldn't receive text messages or calls"; "if I was left without a data signal or could not connect to a Wi-Fi network, I would be constantly checking if I have recovered the signal or I could find a network" with "I would get nervous not being able to receive text messages or calls"; "I would get upset if I could not use my smartphone and/or its applications when I wanted" with "I would worry about not being able to communicate at the moment with my family and/or friends". Furthermore, taking into account the magnitude of the correlations, there is a medium and low relationship between the various variables, most of which are of positive value. The strongest connection is between "I would be overwhelmed by not being able to check if I have new email messages" and "I would feel uncomfortable not being able to consult notifications about my virtual connections and networks", as well as "I would be nervous if I could not access news (e.g. events, weather forecasts, etc.) through my smartphone" and "I would be upset if I could not consult information through my smartphone when I wanted". In other words, these results indicate that the various variables influence each other, so there is a direct connection between them. This means that the actions applied to each one of them can have a positive or negative influence.

The relationship between the independent variables with the variable "it affects your hours of sleep", shows statistically significant differences in "I would get nervous for not being able to know if someone has tried to contact me", "I would worry about having stopped being constantly in contact with my family and/or friends", "it would annoy

Table 1
Descriptive statistics.

Variables	M	STM	SD	ASYMMETRY	KURTOSIS
NMF_1	3.23	0.79	1.922	.404	-.975
NMF_2	3.18	.080	1.941	.100	-.963
NMF_3	4.24	.083	2.021	-.130	−1.187
NMF_4	3.46	.080	1.963	.375	−1.039
NMF_5	3.95	.081	1.971	.056	−1.133
NMF_6	3.83	.080	1.943	.145	−1.082
NMF_7	4.78	.082	1.994	-.488	-.950
NMF_8	4.57	.084	2.044	-.339	−1.166
NMF_9	4.59	.081	1.980	−328	−1.087
NMF_10	5.05	.080	1.960	-.672	-.779
NMF_11	4.48	.084	2.045	-.262	−1.152
NMF_12	4.11	.079	1.919	-.019	−1.100
NMF_13	3.69	.079	1.926	.228	−1.060
NMF_14	4.44	.084	2.059	-.208	−1.273
NMF_15	3.83	.080	1.960	.165	−1.128
NMF_16	4.70	.087	2.113	-.441	−1.153
NMF_17	5.04	.086	2.098	-.686	-.896
NMF_18	4.04	.087	2.118	-.005	−1.331
NMF_19	3.81	.088	2.142	.203	−1.326
NMF_20	4.09	.083	2.016	-.018	−1.200

Table 2
Variable correlations.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	–																			
2	-.141[a]	–																		
3	-.144[a]	-.706[a]	–																	
4	-.211[a]	.512[a]	.387[a]	–																
5	-.159[a]	.729[a]	.691[a]	.579[a]	–															
6	-.174[a]	.508[a]	.404[a]	.654[a]	.588[a]	–														
7	-.120[a]	.622[a]	.500[a]	.603[a]	.662[a]	.644[a]	–													
8	-.137[a]	.258[a]	.163[a]	.555[a]	.267[a]	.507[a]	.458[a]	–												
9	-.124[a]	.262[a]	.194[a]	.484[a]	.264[a]	.433[a]	.379[a]	.660[a]	–											
10	-.174[a]	.308[a]	.219[a]	.578[a]	.334[a]	.508[a]	.430[a]	.723[a]	.787[a]	–										
11	-.051	.135[a]	.048	.385[a]	.145[a]	.364[a]	.338[a]	.546[a]	.533[a]	.535[a]	–									
12	-.224[a]	.268[a]	.159[a]	.495[a]	.309[a]	.479[a]	.409[a]	.554[a]	.571[a]	.578[a]	.456[a]	–								
13	-.153[a]	.368[a]	.244[a]	.498[a]	.373[a]	.491[a]	.456[a]	.542[a]	.605[a]	.638[a]	.441[a]	.613[a]	–							
14	-.155[a]	.387[a]	.292[a]	.453[a]	.385[a]	.453[a]	.443[a]	.451[a]	.531[a]	.538[a]	.309[a]	.516[a]	.749[a]	–						
15	-.072	.214[a]	.122[a]	.398[a]	.242[a]	.394[a]	.375[a]	.464[a]	.567[a]	.531[a]	.561[a]	.476[a]	.551[a]	.541[a]	–					
16	-.171[a]	.436[a]	.305[a]	.506[a]	.441[a]	.487[a]	.440[a]	.482[a]	.543[a]	.594[a]	.344[a]	.561[a]	.644[a]	.650[a]	.514[a]	–				
17	-.175[a]	.193[a]	.085[b]	.469[a]	.211[a]	.374[a]	.353[a]	.559[a]	.468[a]	.541[a]	.439[a]	.495[a]	.453[a]	.384[a]	.525[a]	.432[a]	–			
18	-.159[a]	.156[a]	.039	.429[a]	.176[a]	.339[a]	.330[a]	.558[a]	.465[a]	.530[a]	.443[a]	.501[a]	.434[a]	.324[a]	.457[a]	.385[a]	.669[a]	–		
19	-.258[a]	.363[a]	.261[a]	.486[a]	.344[a]	.449[a]	.416[a]	.519[a]	.457[a]	.543[a]	.324[a]	.480[a]	.486[a]	.429[a]	.355[a]	.554[a]	.558[a]	.544[a]	–	
20	-.133[a]	.411[a]	.391[a]	.372[a]	.403[a]	.402[a]	.431[a]	.324[a]	.278[a]	.314[a]	.229[a]	.319[a]	.345[a]	.360[a]	.286[a]	.336[a]	.360[a]	.276[a]	.443[a]	–

Note: N = 596.
[a] Correlation is significant at level 0.01 (bilateral).
[b] Correlation is significant at level 0.05 (bilateral).

me if I couldn't access information through my smartphone when I wanted to", "it would annoy me if I couldn't use my smartphone and/or its applications when I wanted to", "if I couldn't use my smartphone, I'd be afraid of getting stuck somewhere" and "if I couldn't access my smartphone for a while, I'd feel like doing so" in favour of not being affected by mobile phone use during sleeping hours. In the rest of the variables there is no significant relation. The results obtained indicate that there is a direct relationship between various variables that can generate nomophobia and lack of sleep. This means that the higher the level of nomophobia, the greater the sleep problems in the subjects who suffer from it (Table 3).

The multiple linear regression model aims to understand the effect of independent variables on the time spent on mobile phone use. To do this, following the process of successive steps, four models were obtained, the fourth offering the greatest explanatory capacity. Bearing in mind the values of R2, in 9.2% of the variance in the hours dedicated to mobile phone use, it can be explained by the variables included in model 4, i.e.- "if I ran out of data signal or could not connect to a Wi-Fi network, I would be constantly checking if I have recovered the signal or find a network", "I would feel strange because I do not know what to do", "I would be overwhelmed by not being able to check if I have new e-mails", "I would get nervous about not being able to receive text messages or calls". However, in the corrected R2, i.e. taking into account the number of variables and the subjects involved, the study showed that 8.6% of the variance can be predicted by the variables indicated above (Table 4).

Following the values marked in Table 5, the level of significance is less than 0.05 in the four variables of the predictive model. Given these results, it is assumed that the four variables favour the explanation of the variance of the dependent variable, although their B values mark that the ones with the greatest influence, in descending order, are "if I run out of data signal or can't connect to a Wi-Fi network, I would be constantly checking if I have recovered the signal or managed to find a network", "I would feel strange because I wouldn't know what to do", "I would be overwhelmed by not being able to check if I have new e-mails" and "I would get nervous not being able to receive text messages or calls". These results indicate that the higher the level of use of mobile devices, the greater the influence on the variables indicated and consequently, the greater the negative effect on the subjects' sleep. Therefore, there is an influence on the amount of time spent using a mobile phone on the sleep problems, focused on the indicated variables.

Table 3
Differentiated results according to sleep loss of nursing students.

	REST TIME	N	M	SD	t	p
NMF_1	Yes	354	3.20	1.874	-.570	.102
	No	242	3.29	1.994		
NMF_2	Yes	354	3.21	1.944	.423	.985
	No	242	3.14	1.940		
NMF_3	Yes	354	4.11	.1978	−1.851	.286
	No	242	4.42	2.072		
NMF_4	Yes	354	3.34	1.912	−1.888	.180
	No	242	3.64	2.024		
NMF_5	Yes	354	3.81	1.895	−2.224	.021
	No	242	4.17	2.061		
NMF_6	Yes	354	3.69	1.827	−2.179	.014
	No	242	4.04	2.089		
NMF_7	Yes	354	4.68	1.964	−1.541	.720
	No	242	4.93	2.032		
NMF_8	Yes	354	4.42	1.976	−2.201	.073
	No	242	4.79	2.125		
NMF_9	Yes	354	4.43	1.912	−2.421	.085
	No	242	4.83	2.057		
NMF_10	Yes	354	4.84	1.976	−3.183	.141
	No	242	5.36	1.899		
NMF_11	Yes	354	4.29	2.005	−2.767	.401
	No	242	4.76	2.075		
NMF_12	Yes	354	3.88	1.857	−3.485	.097
	No	242	4.43	1.964		
NMF_13	Yes	354	3.48	1.818	−3.183	.017
	No	242	3.99	2.040		
NMF_14	Yes	354	4.28	2.027	−2.343	.311
	No	242	4.68	2.086		
NMF_15	Yes	354	3.63	1.824	−3.035	.000
	No	242	4.12	2.113		
NMF_16	Yes	354	4.41	2.088	−4.131	.411
	No	242	5.13	2.080		
NMF_17	Yes	354	4.81	2.093	−3.191	.281
	No	242	5.37	2.068		
NMF_18	Yes	354	3.75	2.028	−4.080	.051
	No	242	4.46	2.179		
NMF_19	Yes	354	3.53	2.011	−3.930	.000
	No	242	4.22	2.260		
NMF_20	Yes	354	3.80	1.913	−4.372	.010
	No	242	4.52	2.088		

Table 4
Stepwise multiple regression model.

				Change Statistics				
Model	R	R^2	R2C	ETE	CR^2	CF	SCF	DW
1	.258a	.066	.065	.921	.066	42.230	.000	1.665
2	.282b	.079	.076	.916	.013	8.367	.004	
3	.293c	.086	.081	.913	.007	4.233	.040	
4	.303d	.092	.086	.911	.006	3.924	.048	

ETE: Typical estimation error; CR^2: Change in R^2, CF: Change in F; DW: Durbin Watson.

4. Discussion

The impact of digital technologies, such as smartphones, has made people's lives easier, enriching their ways of accessing the net, creating content, communicating, collaborating and cooperating with other people and training, among other aspects. However, an excessive use of these devices is generating problems of addiction and phobia before the impossibility of access to the device, its content or the possibilities it provides us. Nomophobia is the fear of leaving the house without a mobile and being out of mobile phone contact and affects different areas of a person's life, especially in terms of social, work and academic relationships due to a dependence on the use of smartphones (Gutiérrez-Puertas et al., 2019). Research shows that nomophobia is associated with problems of self-esteem, loneliness, sadness (Ozdemir et al., 2018), depression, anxiety, anger, aggressiveness (Darvishi et al., 2019), inattention (Aguilera-Manrique et al., 2018), distance from the physical world (Santos et al., 2017), sleep disorders (Gentina et al., 2018), emotional destabilization (Argumosa et al., 2017) and poor academic and work performance (Cho and Lee, 2016; Dasgupta et al., 2017), among others.

The present study aimed to analyse the level of nomophobia among nursing students at the University of Granada (Ceuta and Melilla Campus), as well as the influence of rest time and daily time spent using mobile phones on the greater or lesser presence of nomophobia. The analyses carried out determine that we have a sample with a moderate level of nomophobia. This result corroborates the findings of other researchers that nursing students have intermediate levels of this phobia (Aguilera-Manrique et al., 2018; Ayar et al., 2018; Celikkalp et al., 2020; Cho and Lee, 2015, 2016; Gutiérrez-Puertas et al., 2016; Kaur et al., 2015; Márquez-Hernández, 2020). Research has shown that a large proportion of nursing professionals admit to using their mobile phones for personal matters (McBride et al., 2015), which can lead to problems of distraction in their work, as well as poorer attention to the user (Alsos et al., 2012).

It is worth highlighting, as the research by Kaur and Charma (2015) showed, that nursing students present a higher level of nomophobia in situations that impede instant and bidirectional communication with family or friends, as well as the fact of not being able to consult immediately if they have new notifications (Gutierrez-Puertas et al., 2019). These variables, therefore, would be the factors that trigger the appearance of this phobia among the population studied. As found by

Table 5
Multiple linear regression model coefficients.

	B	Stand. error	Beta	t	Sig.	Tolerance	FIV
4(Constant)	2.476	.117		21.096	.000		
NMF_18	-.081	.021	-.179	−3.777	.000	.684	1.461
NMF_11	-.065	.023	-.139	−2.794	.005	.620	1.613
NMF_10	.052	.022	.107	2.374	.018	.754	1.326
NMF_3	-.045	.023	-.096	−1.981	.048	.654	1.529

Darvishi et al. (2019) this relationship is shown between the fact of getting nervous for not observing the news and the displeasure for not consulting certain information whenever you want, observing an association between the fact of getting nervous and being displeased, which can generate conflictive situations in their environment.

In relation to the effect on rest time, a large part of the sample claims to have a worse sleep due to their mobile phone use (Moreno-Guerrero et al., 2020b). However, this does not seem to affect the presence of nomophobia. In contrast to the findings of Gentina et al. (2018), there is no significant relationship between nomophobia and time to rest, confirming, moreover, that the levels of nomophobia are significantly more related in those who claim not to have problems in their rest time due to mobile phone use. All this, as other researchers have found, can cause distractions during the development of their clinical practice (Aguilera-Manrique et al., 2018; Bülbüloğlu et al., 2019; Cho and Lee, 2016) and, therefore, worsen their learning, as well as their academic performance (Mendoza et al., 2018).

Regarding to daily time spent using the mobile phone, it can be predicted that the time that nursing students dedicate to the use of the mobile phone directly influences the fact of not being able to connect to a Wi-Fi signal, not knowing what to do when one does not have a mobile phone, being overwhelmed by not knowing if one has received new messages and the fact of being nervous about not receiving messages or calls. All this shows, in line with the results of Kaur and Sharma (2015), that the longer the smartphone is used, the higher the level of nomophobia in these items will tend to be, with no greater influence on the rest of the aspects that may generate this disorder.

4.1. Limitations of the study

When considering the results of this study, a set of limitations should be taken into account. Firstly, it should be borne in mind that we are dealing with a study that analyses the perceptions of subjects, so we must consider the degree of subjectivity of this type of non-experimental research (Hernandez et al., 2016). In this regard, Polit and Beck (2008) found that students might hide their true responses. Secondly, the lack of literature on the subject, as already mentioned by Gutiérrez-Puertas et al. (2019) makes it difficult to have a meaningful discussion. However, it would be advisable to continue researching along these lines, including different variables and covering more populations, since we are faced with a problem of great social impact (Rodríguez-García et al., 2020). The educational and family spheres must promote a critical and healthy use of current technology, thus avoiding the appearance of problems such as the one studied in this paper.

5. Conclusions

This research allows us to analyse the perception of nursing students in relation to the use of mobile phones. The data analysed in this study lead us to conclude that nursing students present moderate levels of nomophobia. These levels are higher when instant communication and the checking of new notifications are not possible. Furthermore, although a considerable group of the sample claims to have a worse rest due to excessive use of their mobile phones, there is no relationship between this fact and a higher prevalence of nomophobia. However, there seems to be a positive correlation between the amount of time spent on the smartphone per day and a higher level of nomophobia. Taking these results into consideration, it is necessary to develop preventive training actions that promote a correct and healthy use of Information and Communication Technologies. Finally, further research is needed on nomophobia and the consequences this may have on the professional development of nurses.

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Declaration of competing interest

None declared.

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References

Adawi, M., Zerbetto, R., Simona, T., Bisharat, B., Mahamid, M., Amital, H., Del Puente, G., Bragazzi, N.L., 2019. Psychometric properties of the Brief Symptom Inventory in nomophobic subjects: insights from preliminary confirmatory factor, exploratory factor and clustering analyses in a sample of healthy Italian volunteers. Psychol. Res. Behav. Manag. 12, 145–154.

Aguilera-Manrique, G., Márquez-Hernández, V.V., Alcaraz-Córdoba, T., Granados-Gámez, G., Gutiérrez-Puertas, V., Gutiérrez-Puertas, L., 2018. The relationship

between nomophobia and the distraction associated with smartphone use among nursing students in their clinical practicum. PloS One 13 (8), 1–14.
Ahmed, S., Pokherl, N., Roy, S., Samuel, A.J., 2019. Impact of nomophobia: a nondrug addiction among students of physiotherapy course using an online cross-sectional survey. Indian J. Psychiatr. 61 (1), 77–80.
Alsos, O.A., Das, A., Svanæs, D., 2012. Mobile health IT: the effect of user interface and form factor on doctor–patient communication. Int. J. Med. Inf. 81 (1), 12–28.
Argumosa, L., Boada-Grau, J., Vigil-Colet, A., 2017. Exploratory investigation of theoretical predictors of nomophobia using the Mobile Phone Involvement Questionnaire (MPIQ). J. Adolesc. 56, 127–135.
Ayar, D., Ozalp, G., Ozdemir, E.Z., Bektas, M., 2018. The effect of problematic Internet use, social appearance anxiety and social media use on nursing students' nomophobia levels. Comput. Inform. Nurs. 36 (12), 589–595.
Basu, S., Garg, S., Singh, M.M., Kohli, C., 2018. Addiction-like behavior associated with mobile phone usage among medical students in Delhi. Indian J. Psychol. Med. 40 (5), 446–451.
Betoncu, O., Ozdamli, F., 2019. The disease of 21st century: digital disease. TEM J. 8 (2), 598–603.
Bülbüloğlu, S., Özdemir, A., Kapıkıran, G., Sarıtaş, S., 2020. The effect of nomophobic behavior of nurses working at surgical clinics on time management and psychological well-being. J. Subst. Use 25 (3), 318–323.
Celikkalp, U., Bilgic, S., Temel, M., Varol, G., 2020. The smartphone addiction levels and the association with communication skills in nursing and medical school students. J. Nurs. Res. 28 (3), e93.
Cho, S., Lee, E., 2015. Development of a brief instrument to measure smartphone addition among nursing students. Comput. Inform. Nurs. 33 (5), 216–224.
Cho, S., Lee, E., 2016. Distraction by smartphone use during clinical practice and opinions about smartphone restriction policies: a cross-sectional descriptive study of nursing students. Nurse Educ. Today 40, 128–133.
Darvishi, M., Noori, M., Nazer, M.R., Sheikholeslami, S., Karimi, E., 2019. Investigating different dimensions of nomophobia among medical students: a cross-sectional study. O.A. Mac. J. Med. Sci. 7 (4), 573–578.
Dasgupta, P., Bhattacherjee, S., Dasgupta, S., Roy, J.K., Mukherjee, A., Biswas, A., 2017. Nomophobic behaviors among smartphone using medical and engineering students in two colleges of West Bengal. Indian J. Publ. Health 61 (3), 199–204.
De la Fuente, D., Hernández, M., Pra, I., 2018. Vídeo educativo y rendimiento académico en la enseñanza superior a distancia. RIED 21 (1), 323–341.
Farooqui, I.A., Pore, P., Gothankar, J., 2017. Nomophobia: an emerging issue in medical institutions? J. Ment. Health 27 (5), 438–441.
Gentina, E., Tang, T.L.P., Dancoine, P.F., 2018. Does Gen Z's emotional intelligence promote iCheating (cheating with iPhone) yet curb iCheating through reduced nomophobia? Comp. Educ. 126, 231–247.
Gill, P.S., Kamath, A., Gill, T.S., 2012. Distraction: an assessment of smartphone usage in health care work settings. Risk Manag. Healthc. Pol. 5, 105.
Giner, I., Navas, L., Holgado, F.P., Soriano, J.A., 2019. Actividad física extraescolar, autoconcepto físico, orientaciones de meta y rendimiento académico. Rev. Psic. Dep. 28 (2), 107–116.
González-Cabrera, J., León-Mejía, A., Pérez-Sancho, C., Calvete, E., 2017. Adaptation of the nomophobia questionnaire (NMP-Q) to Spanish in a sample of adolescents. Actas Esp. Psiquiatr. 45 (4), 137–144.
Gutiérrez-Puertas, L., Márquez-Hernández, V.V., Gutiérrez-Puertas, V., Granados-Gámez, G., Aguilera-Manrique, G., 2020. The effect of cell phones on attention and learning in nursing students. Comp. Inform. Nurs. 38 (8), 408–414.
Gutiérrez-Puertas, L., Márquez-Hernández, V.V., Aguilera-Manrique, G., 2016. Adaptation and validation of the Spanish version of the nomophobia questionnaire in nursing studies. Comp. Inform. Nurs. 34 (10), 470–475.
Gutiérrez-Puertas, L., Márquez-Hernández, V.V., Sao-Romao-Preto, L., Granados-Gámez, G., Gutiérrez-Puertas, V., Aguilera-Manrique, G., 2019. Comparative study of nomophobia among Spanish and Portuguese nursing students. Nurs. In Pract. 34, 79–84.
Hernández, R., Fernández, C., Baptista, P., 2016. Metodología de la Investigación, sixth ed. MC Graw Hill Education.
Işcan, G., Yildirim Baş, F., Özcan, Y., Özdoğanci, C., 2020. Relationship between "nomophobia" and material addiction "cigarette" and factors affecting them. Int. J. Clin. Pract., e13816
Jöreskog, K.G., 2001. Analysis of Ordinal Variables 2: Cross-Sectional Data. Text of the Workshop "Structural Equation Modelling with LISREL 8.51". Friedrich-Schiller-Universität Jena.
Kaur, A., Sharma, P., 2015. A descriptive study to assess the risk of developing nomophobia among students of selected nursing colleges. Int. J. Psychiatr. Nurs. 1 (2), 1–6.
King, A.L.S., Martins, A., Valezça, A.M., Cardoso, A., Sancassiani, F., Machado, S., Egidio, A., 2014. «Nomophobia»: impact of cell phone use interfering with symptoms and emotions of individuals with panic disorder compared with a control group. Clin. Pract. Epidemiol. Ment. Health 10, 28–35.
Kneidinger-Mueller, B., 2019. When the smartphone goes offline: a factorial survey of smartphone users' experiences of mobile unavailability. Comput. Hum. Behav. 98, 1–10.
Márquez-Hernández, V.V., Gutiérrez-Puertas, L., Granados-Gámez, G., Gutiérrez-Puertas, V., Aguilera-Manrique, G., 2020. Problematic mobile phone use, nomophobia and decision-making in nursing students mobile and decision-making in nursing students. Nurse Educ. Pract. 49, 102910.
McBride, D.L., LeVasseur, S.A., Li, D., 2015. Non-work-related use of personal mobile phones by hospital registered nurses. JMIR 3 (1), e3.
Mendoza, J.S., Pody, B.C., Lee, S., Kim, M., McDonough, I.M., 2018. The effect of cellphones on attention and learning: the influences of time, distraction and nomophobia. Comput. Hum. Behav. 86, 52–56.
Mertkan, D., Burcin, N., Sezen-Gultekin, G., Gemikonakli, O., 2018. Relationship between nomophobia and fear of missing out among Turkish university students. Cypr. J. Ed. Sci. 13 (4), 549–561.
Montilla, J.M., Kromrey, J., 2010. Robustez de las pruebas T en comparación de medias, ante violación de supuestos de normalidad y homocedasticidad. Cienc. e Ingen. 31 (2), 101–108.
Moreno-Guerrero, A.J., Aznar-Díaz, I., Cáceres-Reche, P., Rodríguez-García, A.M., 2020a. Do age, gender and poor diet influence the higher prevalence of nomophobia among young people? Int. J. Environ. Res. Publ. Health 17 (10), 3697.
Moreno-Guerrero, A.J., López-Belmonte, J., Romero-Rodríguez, J.M., Rodríguez-García, A.M., 2020b. Nomophobia: impact of cell phone use and time to rest among teacher students. Heliyon 6 (5), e04084.
Ozdemir, B., Cakir, O., Hussain, I., 2018. Prevalence of Nomophobia among university students: a comparative study of Pakistani and Turkish undergraduate students. Eurasia J. Math. Sci. Technol. Educ. 14 (4), 1519–1532.
Polit, D.F., Beck, C.T., 2008. Nursing Research: Generating and Assessing Evidence for Nursing Practice, second ed. Lippincott Williams & Wilkins.
Rodríguez-García, A.M., Moreno-Guerrero, A.J., López Belmonte, J., 2020. Nomophobia: an individual's growing fear of being without a smartphone—a systematic literature review. Int. J. Environ. Res. Publ. Health 17 (2), 580.
Santos, T., Da Silva, L.K., Abbas, W., De Souza, L.A., De Sá, L.V., 2017. Cade meu celular? Uma análise da nomofobia no ambiente organizacional. Res. Agric. Eng. 57 (6), 634–635.
Sharma, N., Sharma, P., Sharma, N., Wavare, R.R., 2015. Rising concern of nomophobia amongst Indian medical students. Int. J. Res. Med. Sci. 3 (3), 705–707.
Thapa, K., Lama, S., Pokharei, R., Sigdel, R., Rimal, S.P., 2020. Mobile phone dependence among undergraduate students of a medical college of eastern Nepal: a descriptive cross-sectional study. J. Natl. Med. Assoc. 58 (224), 234.
Yildirim, C., Correia, A.P., 2015. Exploring the dimensions of nomophobia: development and validation of a self-reported questionnaire. Comput. Hum. Behav. 49, 130–137.