Article

Exploring Internet Addiction in Italian Nurses during the COVID-19 Outbreak

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Abstract: (1) Background: Nomophobia is considered a digital and virtual contemporary society disorder and refers to discomfort, anxiety, nervousness, or distress caused by being out of contact with a cell phone or computer. The present study had a twofold objective: to evaluate the expert use of the Internet among Italian nurses by correlating it with socio-demographic characteristics, such as: sex, years of work experience, professional role, and level of nursing education; and to assess a possible increase in the levels of nomophobia among Italian nurses during COVID-19 compared to the pre-pandemic period. (2) Methods: An observational, cross-sectional, multicenter study was conducted from April to September 2020, such as during the First Wave of the COVID-19 outbreak. (3) Results: A total of 502 nurses were enrolled in the present study. Significantly differences were reported in the IAT (Internet Addiction Test) levels according to socio-demographic characteristics since males reported significantly higher IAT levels than females ($p < 0.001$). Nurses who worked more than 6 years reported significantly higher IAT levels ($p = 0.031$) than their younger colleagues. More nursing managers and coordinators reported significantly higher IAT levels than registered nurses ($p < 0.001$). This trend was repeated by considering the nursing educational level, as nurses who recorded more years of nursing educational level reported significantly higher IAT levels than the others ($p = 0.003$). Additionally, significant differences were reported according to all the socio-demographic characteristics considered and IAT subdimensions, namely: Salience, Excessive Use, Neglect Work, Anticipation, and Lack of Control. (4) Conclusions: The study revealed higher levels of Internet addiction in men than in women during the COVID-19 pandemic period, as well as a significant correlation between nomophobia, years of work experience, and the role of nursing coordinator/manager.

Keywords: COVID-19; Internet addiction; nurse

1. Introduction

Nomophobia is considered a digital and virtual contemporary society disorder and refers to discomfort, anxiety, nervousness, or distress caused by being out of contact with a cell phone or computer. In general, nomophobia is the pathological fear of remaining without contact with technology. Smartphones are used today by the majority of the world population. According to the Centers for Disease Control and Prevention, more than half

of Americans between the ages of 25 and 29 use cell phones rather than landlines [1], attributing smartphones for the great advantages of carrying convenience and simplicity of access to the Internet, so much so that there were an estimated 3.2 billion smartphone users in 2019, with a growth forecast of millions more by the end of 2021 [1]. More and more scholars agree that in recent years the number of cases of real forms of addiction to cell phones has increased. Smartphone addiction "is part of a continuum of addictive behaviors, from mild problematic smartphone use to more extreme addictive behaviors, in which the consequences must be addressed, prevented, and potentially treated before negative health effects debilitate the user of the smartphone" [2]. In Italy, this dependence appears to be, even today, quite in-depth in the health sector [3]. These devices, during working hours, are used not only for clinical practice, but also for extra-work activities, such as the use of social networks, games, and online research. This incorrect use increases the possibility of clinical errors that burden the already precarious health condition of patients [4]. A pilot study of 825 members of the Academy of Medical Surgical Nurses [5] found that "hospital nurses frequently use their personal cell phones or other personal communication devices for non-work-related activities. The main activity reported was sending personal emails and text messages to family and friends [6]. "Behavioral addictions", including smartphone addiction, are generally difficult to define because they are related not only to physical, but also to social and psychological factors [7]; the lack of standardized diagnostic criteria and the unclear distinctions of smartphone addiction, compared to other related addictions, make it difficult to make a conclusive statement on the status of "smartphone addiction", which could be considered "a poorly defined and heterogeneous construct". Studies have recently been conducted that correlate the COVID-19 pandemic with nomophobia. In particular, in a study conducted in China, it emerged that nomophobia can induce people who fear COVID-19 to use smartphones to seek help online [8], as well as finding a relationship between nomophobia and anger in university students during the pandemic [9]. Furthermore, during the COVID-19 pandemic, there has been a disproportionate use of social media by the nursing population to obtain information on COVID-19 in relation to the pandemic, and also to focus attention on the possible management problems caused by COVID-19 by showing the critical working conditions, and also supporting each other, and promoting one's profession [10]. However, few studies have focused on Internet overuse correlated to socio-demographic characteristics among nurses. Therefore, the present aimed to evaluate the prolonged use of the Internet among Italian nurses, correlating it with socio-demographic characteristics, such as sex, years of work experience, professional role, and level of nursing education during the COVID-19 pandemic period.

2. Materials and Methods

2.1. The Study

An observational, cross-sectional, multicenter study was conducted from April to September 2020, such as during the First Wave of the COVID-19 outbreak.

The study was conducted through the dissemination of an online questionnaire, thanks to the Google Drive platform. In order to publicize the questionnaire, all the Presidents of the Associations of the Italian Nursing Professions were contacted by e-mail and provided with a brief presentation of the study. After obtaining permission from each President, an email containing a brief presentation of the questionnaire and its relating active link was sent to about a thousand nurses who were on the mailing list.

2.2. Ethical Concerns

All Italian nurses, nursing managers, and coordinators, who voluntarily agreed to participate in the study, were included.

All the ethical characteristics of the study were stated in the first part of the questionnaire in agreement with the principles of the Italian data protection authority (DPA). Participation in the study, being free and voluntary, was considered as an expression of consent.

2.3. The Questionnaire

The questionnaire contained two essential sections. Specifically, in the first section socio-demographic characteristics were collected, including:

- Gender, as female and male;
- Years of work experience, as until 5 years and over 6 years;
- Nursing professional role, such as nurse and both nursing manager and coordinators;
- Nursing educational levels, as until 3 years and over 4 years of educational nursing training.

In the second part of the questionnaire, the "Internet Addiction Test" (IAT) was administered (Appendix A).

The IAT was created to assess the experienced Internet usage [11]. The questionnaire included a total of 20-items, which explored characteristics and attitudes linked to compulsive use of the Internet (Appendix A). For each item, a Likert-scale continuum was associated, which ranged from 0, as: "less extreme behavior" to 5, as: "most extreme behavior", respectively. Therefore, total score could range between zero and 100. Specifically, scores that varied from zero to 30 identified a normal level of Internet usage; scores of 31 to 49 recognized the presence of a mild level of Internet addiction; scores between 50 and 79 indicated the presence of a moderate level; and scores ranging from 80 to 100 described a severe dependence upon the Internet. Furthermore, by considering all the 20 items such as continuous variables, subdimensions of the Internet addiction could be identified thanks to the IAT, specifically:

- Salience, including item nos. 10, 12, 13, 15 and 19: high values identified that the respondent most likely felt worried about the Internet, by hiding the behavior from others, showing less interest in other activities and/or relationships, and also by preferring being solitary and being boring, empty, or joyless.
- Excessive Use, involving item nos. 1, 2, 14, 18 and 20: high scores both indicated that the respondent was absorbed with an excessive online attitude and compulsive usage and also became depressed, panicked, or angry if forced to go without the Internet for an extended length of time.
- Neglect Work, including item nos. 6, 8 and 9: high values indicated that the respondent recognized the Internet as a necessary appliance akin to the television, microwave, or telephone. Work performance and related productivity were compromised.
- Anticipation, involving item nos. 7 and 11: high values indicated that the respondent felt compelled to use the Internet when offline.
- Lack of Control, including item nos. 5, 16 and 17: high scores recognized that the respondent stayed online longer than intended.
- Neglect Social Life, concerning item nos. 3 and 4: high ratings indicated the respondent mostly prefer to use online relationships to cope with situational problems by reducing emotional tension and stress, and also by creating new only online relationships.

2.4. Validity and Reliability

Previous studies explored various subdimensions of online attitude and profiled characteristics that classified as "normal" online usage from compulsive [11,12]. The validity and reliability of the IAT questionnaire and its relating scoring were published in several journals, as well as the IAT, and were validated in several languages [11,12].

2.5. Data Analysis

Data were collected in an Excel datasheet and processed thanks to the Statistical Package for Social Science (SPSS) Software, version 20. All socio-demographic variables were considered as categorical ones and presented as frequencies and percentages. Chi square test (x2) was assessed between each socio-demographic characteristic according to the IAT levels. Then, for each subdimension of the IAT questionnaire, a T-test for the independent sample was assessed for each socio-demographic characteristic, respectively. All *p*-values < 0.05 were considered as statistically significant.

3. Results

All invited nurses answered the questionnaire. A total of 502 healthcare workers were recruited in the present study. Of these, 453 were nurses and 49 were nursing coordinators or managers. Among participants, 324 were females and 178 were males. Significantly differences were reported in the IAT levels according to socio-demographic characteristics (Table 1) since males (9.60%) reported significantly higher IAT moderate levels than females (2.6%) ($p < 0.001$). Additionally, nurses who worked more than 6 years reported significantly higher IAT moderate levels (9.20%) ($p = 0.031$) than their younger colleagues. More nursing managers and coordinators reported significantly higher IAT levels than registered nurses ($p < 0.001$), too. This trend was repeated by considering the nursing educational level, as nurses who recorded more years of nursing educational level reported significantly higher IAT moderate levels (10.00%) than the others (2.20%) ($p = 0.003$).

Table 1. Sampling characteristics according to IAT levels ($n = 502$).

Socio-Demographic Characteristics/ IAT Levels	Normal	Mild	Moderate	Severe	*p*-Value
Gender					
Female	288(57.40%)	22(4.40%)	13(2.6%)	1(0.20%)	<0.001 *
Male	93(18.50%)	36(7.20%)	48(9.60%)	1(0.20%)	
Years of work Experience					
>5 years	170(33.90%)	23(4.60%)	15(3.00%)	1(0.20%)	0.031 *
< 6 years	211(42.00%)	35(7.00%)	46(9.20%)	1(0.20%)	
Job role					
Nurse	356(70.90%)	50(10.00%)	46(9.20%)	1(0.20%)	<0.001 *
Coordinator/ Manager	25(5.00%)	8(1.60%)	15(1.300%)	1(0.20%)	
Nursing educational level					
>3 years	356(70.90%)	51(10.20%)	50(10.00%)	1(0.20%)	0.003 *
<4 years	25(5.00%)	7(1.40%)	11(2.20%)	1(0.20%)	

* $p < 0.05$ is statistically significant.

Considering IAT subdimensions according to socio-demographic characteristics (Table 2), significant differences were reported according to all the socio-demographic characteristics considered and IAT subdimensions, namely: Salience, Excessive Use, Neglect Work, Anticipation, and Lack of Control, respectively. Males recorded higher levels in the salience dimension (8.09 ± 5.16), excessive use (8.08 ± 5.15), neglect work (4.61 ± 3.71), anticipation (3.54 ± 2.35), and lack of control (3.18 ± 2.38) than females. Nursing coordinators and managers also reported higher levels in all the IAT subdimensions than nurses. By considering work experience, data were not significantly different, while, regarding the educational levels of participants, the IAT scores were greater in higher educational levels than in others, respectively.

Table 2. Exploring IAT subdimensions according to socio-demographic characteristics.

Socio-Demographic Characteristics/ IAT Subdimensions	Salience μ ± s.d.	Excessive Use μ ± s.d.	Neglect Work μ ± s.d.	Anticipation μ ± s.d.	Lack of Control μ ± s.d.
Gender					
Female	5.00 ± 3.75	5.00 ± 3.74	2.09 ± 2.46	1.90 ± 1.77	1.37 ± 1.55
Male	8.09 ± 5.16	8.08 ± 5.15	4.61 ± 3.71	3.54 ± 2.35	3.18 ± 2.38
p-value	>0.001 *	>0.001 *	>0.001 *	>0.001 *	>0.001 *
Years of work Experience					
>5 years	6.02 ± 3.86	6.02 ± 3.85	2.81 ± 2.69	2.34 ± 1.82	1.77 ± 1.84
<6 years	6.15 ± 4.98	6.14 ± 4.97	3.11 ± 2.35	2.58 ± 5.15	2.19 ± 2.22
p-value	>0.001 *	>0.001 *	>0.001 *	>0.001 *	>0.001 *

Table 2. *Cont.*

Socio-Demographic Characteristics/ IAT Subdimensions	Salience μ ± s.d.	Excessive Use μ ± s.d.	Neglect Work μ ± s.d.	Anticipation μ ± s.d.	Lack of Control μ ± s.d.
Job role					
Nurse	5.83 ± 4.34	5.82 ± 4.32	2.78 ± 2.99	2.33 ± 2.05	1.88 ± 1.96
Coordinator/ Manager	8.63 ± 5.59	8.63 ± 5.58	4.88 ± 4.33	3.88 ± 2.52	3.26 ± 2.62
p-value	>0.001 *	>0.001 *	>0.001 *	0.006 *	>0.001 *
Nursing educational level					
>3 years	5.87 ± 4.37	5.85 ± 4.35	2.84 ± 3.05	2.36 ± 2.09	1.90 ± 1.99
<4 years	8.45 ± 5.62	8.44 ± 5.60	4.54 ± 4.18	3.77 ± 2.27	3.16 ± 2.55
p-value	0.012 *	0.012 *	>0.001 *	0.039 *	0.007 *

* $p < 0.05$ is statistically significant.

4. Discussion

There is currently no single definition of smartphone addiction, sometimes it is preferable to use the term "problematic smartphone use", which describes the recurrent inability to control addictive behavior, which results in functional impairment or discomfort [13]; in general, smartphone addiction can be defined as the continuous action of using a smartphone, deprived of the ability to control its use, despite the awareness of its harmful effects [14]. Evidence suggested that the number of users currently using smartphones in the world is around 6 billion, which means that 81% of the world population owns a smartphone. Of South Korea's smartphone users, 45.8% feel anxious when not holding their mobile phone, 27.1% spend most of their time with their heads bowed over the device, and 22.6% have repeatedly attempted to reduce its use, always ending up in failure; moreover, 21% of them report difficulties at school and at work due to the distractions caused by notifications and messages from their smartphone [15]. According to an analysis conducted in 2018, the number of mobile users in Italy is 49.9 million, being 83% of the Italian population. In fact, Italy has been confirmed as a country full of mobile phones; it is in third place for the number of mobile phone users, immediately after South Korea and Hong Kong [16]. The abuse of smartphones can also affect social relationships, ruining their quality, especially in the workplace, resulting in the abandonment of one's duties and the deterioration of relationships between colleagues, also causing unemployment and high staff turnover [17]. Few studies have analyzed the extent to which health professionals (nurses and nursing coordinators/managers) develop Internet addiction and levels of nomophobia. Excessive use of digital devices can lead to addiction, and this has prompted researchers to conduct further investigations into nomophobia. Five hundred and two health professionals participated in our study, particularly nurses and nursing coordinators/managers. The results of the study show that the average score is higher for nursing coordinators than for nurses, male gender prevails, a figure that, compared with other studies conducted on a population of nurses and nursing students, highlights differences [18,19]. Other studies report conflicting data with respect to gender differences, with nomophobia more present in the female gender [19,20]. The results of a further study indicate a correlation between smartphone use and nomophobia, with a higher incidence in women than in men [17], while in another Italian study it was found that male participants (61.5%) believed that smartphones would improve coordination among care team members and also reported a reduction in the level of work-related stress through use smartphone [20]. Subjects with mild nomophobia, of an almost negligible level, are numerically more present among nurses than coordinators, a worrying result and potentially having a negative impact on care performance. The moderate level must be a wake-up call, since the immediately higher level is the severe level, a state in which connection anxiety can cause even physical disturbances to a certain extent. The presence of moderately nomophobic professionals can be correlated with an increased risk of distraction errors: this phenomenon, together with inexperience, is a

condition of greater vulnerability with implications for clinical practice. An increase in the use of smartphones by the latter has been observed, even for activities totally unrelated to clinical practice [21]. Other studies show that about 75% of nurses admit to frequently using a smartphone during working hours [21]. The study revealed a significant correlation between nomophobia and years of work experience (Spearman's Rho = −0.097; p = 0.027); in fact, a worker with more years of work experience tends to think that thanks to his knowledge, and routine actions, he has everything under control, leading him to greater distraction; unlike another study in which it emerged that nurses with lower levels of experience were more likely to use their devices during healthcare activities, with a high chance of errors and distractions [6]. Overall, the level of nomophobia, expressed as the average of the scores recorded in both groups, corresponds to that reported by previously conducted studies [19,22,23]. Moderate levels of nomophobia and related consequences emerge from a study conducted among a population of Italian nurses (mean = 50.34; SD = 29.0) before the pandemic period. According to ISAT statistics, between 2019 and 2021, there was a strong increase in the use of the Internet by Italians (83.5% of users, with a positive difference of 4.2 percentage points), where the use of smartphones rose to 83.3% (with a record growth compared to 2019: + 7.6%), with an increase to 76.6% also for users of social networks (+ 6.7%) [24]. The study found that 44.0% (n = 222) never used healthcare apps for patient medical care, and 16.6% (n = 87) admitted that using these devices adversely affected their working performance (average 80.5; SD 40.1). Some studies report that it can lead to strong perceptions of anxiety and stress [25] and can also lead to suicidal ideas [26]. A study conducted on a population of engineering students in Northern Taiwan showed that Smartphone Addiction has several aspects similar to disorders related to drug use [27]. Due to the current social isolation imposed to prevent the spread of the virus, the increasing number of users connected to the Internet, and the increase in time spent online, it is important to consider the problem of hyper-connectivity from the point of view of an imbalance [28]. Added to this is the increased infectious risk: the fact that the "hand–phone syndrome", another way of referring to nomophobia, can contribute to the transmission of pathogens due to microbial contamination of touch screens, has been reported in various research [29]. The hands of healthcare workers already represent the main vehicle for the transfer of pathogens; in particular, the transient microorganisms with which the healthcare worker comes into direct contact, not only with patients, but also with contaminated surfaces, such as that of a smartphone, are often associated with healthcare-related infections (HAIs). A study showed that most nurses believe that the use of personal communication devices in hospital units can raise important safety problems [30], aspects that have not been explored in the literature. One of the most common mistakes, but also the riskiest one for the patient himself, as well as on the expenditure of economic resources and on a reduction in trust in the health system by the population, is precisely that of the administration of therapy, which is included as one of the various causes of distraction [31–33]. During the COVID-19 pandemic, the prevalence of anxiety, sleep disturbances, and low self-efficacy was found among Italian nurses [34,35]. The pandemic has also highlighted psycho-physical consequences with regard to Internet addiction. Our study highlights significant differences based on all socio-demographic characteristics considered and IAT sub-dimensions, such as Salience, Excessive Use, Neglect Work, Anticipation, and Lack of Control, respectively; aspects that should be further investigated through prospective multicenter studies during the period of long-COVID.

Limits

The study has several limitations: the low sample size makes it possible to reach statistical significance only for some comparisons; the target population is represented solely by nurses and nursing coordinators/managers; and the study does not envisage a comparison with other health professionals, such as, for example, hospital doctors or pharmacists. Studies that have investigated the correlation between nomophobia and Help

Professionals during the period of the COVID-19 pandemic are scarce; therefore; it has not always been possible to make comparisons.

5. Conclusions

The objective of the study aimed to investigate Internet addiction in Italian nurses during COVID-19 according to socio-demographic characteristics, such as: gender, years of work experience, professional role, and nursing instruction level. The study revealed higher levels of Internet addiction in men than in women in the pandemic period. Furthermore, nurses who worked for more than 6 years reported significantly higher IAT levels. Nursing managers and coordinators also reported significantly higher IAT levels than registered nurses. The data showed moderate levels of addiction to smartphones during work, which could only be predictive of the errors and consequences that such an addiction could bring, with possible damage to the patient due to nurse distraction, and above all, consequences on the delicate role that the nursing coordinator/manager plays by linking organizational needs, clinical-care needs, and company objectives, given the scarce presence of studies in the literature on this professional category.

Appendix A. Internet Addiction Test (IAT)

This questionnaire consists of 20 statements. After reading each statement carefully, based upon the 5-point Likert scale, please select the response (0, 1, 2, 3, 4 or 5) which best describes you. If two choices seem to apply equally well, circle the choice that best represents how you are most of the time during the past month. Be sure to read all the statements carefully before making your choice. The statements refer to offline situations or actions unless otherwise specified. 0 = Not Applicable 1 = Rarely 2 = Occasionally 3 = Frequently 4 = Often 5 = Always

1. How often do you find that you stay online longer than you intended?
2. How often do you neglect household chores to spend more time online?
3. How often do you prefer the excitement of the Internet to intimacy with your partner?
4. How often do you form new relationships with fellow online users?
5. How often do others in your life complain to you about the amount of time you spend online?
6. How often do your grades or schoolwork suffer because of the amount of time you spend online?
7. How often do you check your email before something else that you need to do?
8. How often does your job performance or productivity suffer because of the Internet?
9. How often do you become defensive or secretive when anyone asks you what you do online?
10. How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?
11. How often do you find yourself anticipating when you will go online again?

12. How often do you fear that life without the Internet would be boring, empty, and joyless?
13. How often do you snap, yell, or act annoyed if someone bothers you while you are online?
14. How often do you lose sleep due to being online?
15. How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?
16. How often do you find yourself saying "just a few more minutes" when online?
17. How often do you try to cut down the amount of time you spend online and fail?
18. How often do you try to hide how long you've been online?
19. How often do you choose to spend more time online over going out with others?
20. How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back online?

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