

## REVIEW ARTICLE

## Psychological and occupational factors associated with nomophobia among healthcare professionals: A systematic review and meta-analysis

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## Abstract

Nomophobia is an emerging phenomenon with potential effects on mental health and professional performance. In the healthcare field, smartphone use is frequent for both personal and work-related reasons; however, the evidence regarding its prevalence and associated factors is heterogeneous, making it difficult to draw integrated conclusions. This study explores the prevalence of nomophobia and analyzes its relationship with sociodemographic, psychological, and occupational variables among healthcare professionals through a systematic review and meta-analysis. A systematic review and meta-analysis were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, with the protocol registered with PROSPERO (CRD420261329317). A search was conducted in Web of Science, Scopus, and ProQuest without time restrictions for quantitative observational studies involving healthcare professionals that assessed nomophobia using validated instruments. Data were extracted on sociodemographic characteristics, prevalence, severity, and psychological and occupational associations. A correlational meta-analysis was performed using a random-effects model. Eighteen published studies were included, with sample sizes ranging from 112 to 1,083 participants, mainly nursing professionals. The prevalence of nomophobia was high, generally at mild-to-moderate levels. It was consistently associated with younger age and less professional experience, and showed positive associations with stress, anxiety, fear of missing out, and neuroticism, and negative associations with mindfulness, self-efficacy, well-being, and clinical decision-making. Evidence regarding occupational variables was limited. The meta-analyses indicated a significant association with occupational stress, a negative association with decision-making, and a positive association with well-being. Nomophobia is common among healthcare professionals and is mainly associated with psychological variables relevant to well-being and clinical performance.

**Keywords:** Nomophobia; Health professionals; Nursing

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**Citation:** López-Salmerón MD, Olivencia-Carrión MA, Márquez-Hernández VV, Gutiérrez-Puertas L, Flujas-Contreras JM. Psychological and occupational factors associated with nomophobia among healthcare professionals: A systematic review and meta-analysis. *Health Psychol Res.*  
doi: 10.36922/HPR026110060

**Received:** March 14, 2026

**Revised:** June 11, 2026

**Accepted:** June 18, 2026

**Published online:** July 20, 2026

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## 1. Introduction

In recent decades, the progressive incorporation of technologies of relationship, information, and communication in the digital era has generated significant transformations in knowledge dissemination processes, promoting global interconnection and immediate access to information.<sup>1</sup> Among these technologies, smartphones have become essential tools for communication, social interaction, and access to a range of services, reshaping patterns of social interaction, learning, and everyday functioning.<sup>2,3</sup>

However, although these devices facilitate numerous daily activities, excessive use has been associated with negative consequences for mental health and psychosocial functioning.<sup>4-7</sup> It can also promote problematic use and technological dependence, with global prevalence estimates of 27% for smartphone addiction and up to 37% for problematic use.<sup>8,9</sup>

Within the context of digital transformation, a psychosocial phenomenon known as nomophobia (no-mobile-phone phobia) has emerged, defined as the irrational fear or dependence associated with being unable to access one's smartphone.<sup>10</sup> Individuals experiencing nomophobia report intense anxiety when they lose their device, when the battery runs out, or when they are unable to connect to the network, as well as fear of leaving home without their smartphone.<sup>11</sup> Evidence indicates a high prevalence of this phenomenon, particularly among young populations, with approximately 20% presenting mild levels and around 50% moderate levels.<sup>12</sup>

From a conceptual perspective, nomophobia is linked to models of technological dependence and disconnection anxiety, leading to reactions such as anxiety, anticipation, and repeated checking of the device.<sup>4,7,10,13</sup> Nomophobia has been associated with alterations in attentional control mechanisms, generating increased sensitivity to stimuli related to mobile devices and hindering the efficient management of daily demands.<sup>14</sup> It has also been explained through Bandura's social cognitive theory, which describes how the interaction between environment, behavior, and personal factors such as self-efficacy and self-regulation contributes to the level of nomophobia.<sup>15</sup>

Despite the existence of different models, this phenomenon can be understood from a multifactorial cognitive-emotional perspective, integrating variables related to emotional regulation, repetitive cognitive processes, and the need for social connection. From this perspective, nomophobia can be explained as the result of the interaction between fear of missing out (FoMO), rumination, and certain non-pathological compulsive

patterns. FoMO increases the need for constant connection and anxiety about potential mobile disconnection, while rumination amplifies emotional vulnerability and concern about losing access to the device.<sup>16,17</sup>

Within this model, non-pathological compulsions and mindfulness act as moderating variables that may enhance or attenuate the expression of nomophobia. Thus, nomophobia can be conceptualized as a multifaceted phenomenon in which cognitive, emotional, and motivational processes interact.<sup>18</sup>

Furthermore, nomophobia has been significantly associated with anxiety, stress, insomnia, and deterioration of psychological well-being, suggesting its relevance as an emerging public health problem.<sup>19-23</sup> Some authors, such as Mejía-Trejo<sup>17</sup> and Al-Mamun *et al.*<sup>5</sup>, have proposed the possible inclusion of nomophobia in the Diagnostic and Statistical Manual of Mental Disorders<sup>24,25</sup> due to its relevance and the problems it raises in contemporary society, which has increasingly stimulated scientific research interest.

In recent years, interest in nomophobia has also increased in the workplace context due to the growing use of mobile devices in professional environments.<sup>14,26</sup> Available evidence suggests associations with distraction, occupational stress, and alterations in well-being, although findings remain limited and heterogeneous, particularly regarding the factors influencing its development and its potential effects on professional performance.<sup>4,27</sup>

This issue becomes particularly relevant in healthcare settings, where characteristics of the clinical environment (such as high workload, constant time pressure, and high clinical responsibility) may be associated with greater exposure to problematic mobile device use and with differences in perceived clinical performance.<sup>6</sup> In this regard, the available evidence is limited; however, the only systematic review evaluating the prevalence of nomophobia among nurses reported a prevalence of 68.15%.<sup>4</sup> At the same time, the digital transformation of healthcare systems has promoted the widespread incorporation of smartphones as tools for clinical communication, access to information, and organizational management, potentially increasing exposure to technological dependency behaviors.<sup>28</sup>

Nevertheless, despite growing scientific interest and the increasing integration of mobile technologies into healthcare practice, the factors associated with nomophobia in healthcare professionals and their potential clinical implications have not been systematically synthesized in the literature, highlighting a research gap and justifying the need for a systematic synthesis of the available evidence.<sup>4</sup>

Therefore, the present study aims to explore the

relationships between nomophobia and other psychological or occupational variables in healthcare professionals through a systematic review and meta-analysis. Additionally, the study seeks to analyze the prevalence and sociodemographic characteristics of nomophobia among healthcare professionals, as well as its relationship and degree of correlation with psychological, environmental, and occupational variables. The specific objectives of this study are:

- (i) To evaluate the prevalence of nomophobia among healthcare professionals.
- (ii) To analyze the relationships between nomophobia and various psychological and occupational variables.
- (iii) To investigate the degree of correlation between nomophobia and psychological, environmental, and occupational variables.

## 2. Methods

### 2.1. Search procedures and eligibility criteria

This systematic review and meta-analysis was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines as described by Moher *et al.*<sup>29</sup> A protocol was developed to guide each phase of the systematic review and was registered in PROSPERO (ID: CRD420261329317).

A systematic review and meta-analysis of published studies was conducted without time restrictions, including studies written in English and Spanish that examined nomophobia in relation to psychosocial and occupational variables among healthcare professionals.

The bibliographic search was performed independently on April 29, 2025 (updated on May 22, 2026) in the electronic databases Web of Science, ProQuest, and Scopus, combining search terms related to nomophobia, healthcare professionals, and psychological interventions (Table S1). The keywords used were nomophobia, health professionals, and nursing.

Title and abstract screening were conducted by three

researchers (MDLS, MAOC, and JMFC), while full-text evaluation was performed by two of them (MDLS and MAOC), with the participation of two additional reviewers (MDLS, MAOC, and JMFC) in cases of disagreement.

Three electronic databases (Web of Science, ProQuest, and Scopus) were searched. The search strategy was revised and adapted to the syntax requirements of each database using Boolean operators and parentheses to ensure appropriate grouping of concepts. The search combined terms related to nomophobia and healthcare professionals. No additional limits or filters were applied. Additionally, unpublished studies, grey literature, and preprints were considered when accessible through the selected databases. However, no records from these sources met the established inclusion criteria and, therefore, none were included in the final review. The complete search strings for each database, including Boolean operators and database-specific syntax, are provided in Table 1.

### 2.2. Article analysis

The evaluation of the articles was conducted according to previously established inclusion and exclusion criteria. To be included in the review, studies had to meet the following eligibility criteria:

- (i) Sample: Healthcare professionals working in hospital settings (nursing staff, physicians, nursing assistants, psychologists, occupational therapists, speech therapists, paramedics, etc.).
- (ii) Phenomenon of interest: Studies aimed at analyzing nomophobia, assessed through standardized instruments, in relation to other variables.
- (iii) Design: Studies with correlational, cross-sectional, longitudinal, or mediation/moderation designs were included.
- (iv) Evaluation: Nomophobia assessed using standardized quantitative instruments.
- (v) Research type: Quantitative research.

Studies that did not meet the previously established eligibility criteria were excluded. In particular, studies

**Table 1. Database-specific search strategies used in the systematic review**

| Database       | Search strategy                                                                                                                                         | Filters            |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Scopus         | (TITLE-ABS-KEY (("nomophobia" OR nomophob*)) AND TITLE-ABS-KEY ("health* professional*" OR nurse* OR physician* OR "healthcare worker*" OR clinician*)) | No filters applied |
| Web of Science | ("nomophobia" OR nomophob*) (Topic) and ("health* professional*" OR nurse* OR physician* OR "healthcare worker*" OR clinician*) (Topic)                 | No filters applied |
| ProQuest       | ("nomophobia" OR nomophob*) AND ("health* professional*" OR nurse* OR physician* OR "healthcare worker*" OR clinician*)                                 | No filters applied |

involving students from any health-related discipline were excluded; only healthcare professionals who had completed their studies and were actively practicing were included.

The search results were exported to the Rayyan platform, and duplicates were removed. Subsequently, three authors (MDLS, MAOC, and JMFC) independently screened the titles and abstracts. Eligible articles were then retrieved for full-text review by three authors (MDLS, MAOC, and JMFC). Any disagreements were resolved through discussion, with the involvement of two additional authors (VVMH and LGP) when necessary.

### 2.3. Data extraction

The following data were extracted from the selected studies: (i) authors and year of publication; (ii) research design; (iii) participant characteristics (total number of participants, mean age, gender, work experience, shift, and other variables assessed); (iv) main results; and (v) associated factors or predictors.

Data extraction from the included studies was carried out by two authors (MDLS and MAOC) and supervised by two additional researchers (VVMH & LGP). Any discrepancies identified during this process were resolved through consensus. When necessary, additional information was requested from the original authors of the studies. In addition, summary tables were prepared to present the collected information systematically and in an organized manner.

### 2.4. Quality assessment

The methodological quality of the selected studies was independently assessed by three researchers (JMFC, MAOC, and MDLS) using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies. Each researcher conducted a peer-quality review, and Cohen's kappa index was subsequently calculated. Any discrepancies in the assigned scores were addressed through discussion until consensus was reached.

### 2.5. Meta-analysis

For articles that included correlational analyses, a meta-analysis was conducted to quantitatively synthesize relationships between nomophobia and other variables using JASP (version 2.6.23.0). The correlation coefficients ( $r$ ) reported in the selected studies were extracted. Before conducting the meta-analysis, the direction of all effect sizes was harmonized so that positive and negative values consistently reflected the same direction of the outcome across studies. A random-effects model was used to account for expected heterogeneity among studies in design and evaluation instruments. Fisher's  $z$  statistic was calculated.

To assess heterogeneity, the  $I^2$  statistic and the Cochran's  $Q$  test were computed. A visual assessment of publication bias was conducted using funnel plots, and the Fail-Safe  $N$  statistic and the Begg and Egger tests were applied when the number of included studies allowed it.

## 3. Results

### 3.1. Identification of articles

The synthesis of the selection process is presented in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram (Figure 1). The initial search retrieved 1,039 records. After removing duplicates (183 records), 856 documents were screened by title and abstract in the first screening phase. At this stage, 820 studies were excluded, and 36 were selected for full-text assessment. Subsequently, 18 studies were excluded for the reasons detailed in Table S1. Finally, 18 studies were included in the systematic review, and 10 were included in the meta-analysis.

### 3.2. General characteristics of the studies

Table 2 describes the characteristics of the included studies. Overall, sample sizes ranged from 112 participants<sup>30</sup> to 1,083 participants.<sup>31</sup> Regarding participant profile, most studies included exclusively nursing professionals.<sup>31–42</sup> However, some studies incorporated broader healthcare samples, including healthcare professionals,<sup>43</sup> respiratory therapists,<sup>44</sup> assistant healthcare personnel,<sup>45</sup> nurses and midwives,<sup>30</sup> mixed healthcare worker samples including nurses and allied healthcare personnel,<sup>46</sup> and healthcare workers from public and private hospital settings.<sup>47</sup> Overall, the included studies showed variability in the professional composition of their samples.

Additionally, women predominated across most studies, although some studies reported a higher proportion of male participants. Considering only studies reporting mean age values, the overall mean age of participants was approximately 32 years. Regarding the variables studied, nomophobia was the main variable in all studies. As secondary variables, the following were explored: occupational stress<sup>45</sup>; mobile phone use habits, work-related distraction, and clinical errors<sup>33</sup>; perception of clinical decision-making<sup>34,41</sup>; FoMO and perceived workload<sup>42</sup>; sociodemographic and occupational factors together with logistic analysis for moderate-to-severe nomophobia<sup>44</sup>; mobile phone use patterns, caring behaviors, and sociodemographic variables<sup>36,37</sup>; mindfulness and self-efficacy<sup>35</sup>; anxiety, depression, social media addiction, social media use, job satisfaction, and psychological well-being<sup>43</sup>; personality traits<sup>38</sup>; leisure time management and resilience/psychological well-being<sup>32</sup>;

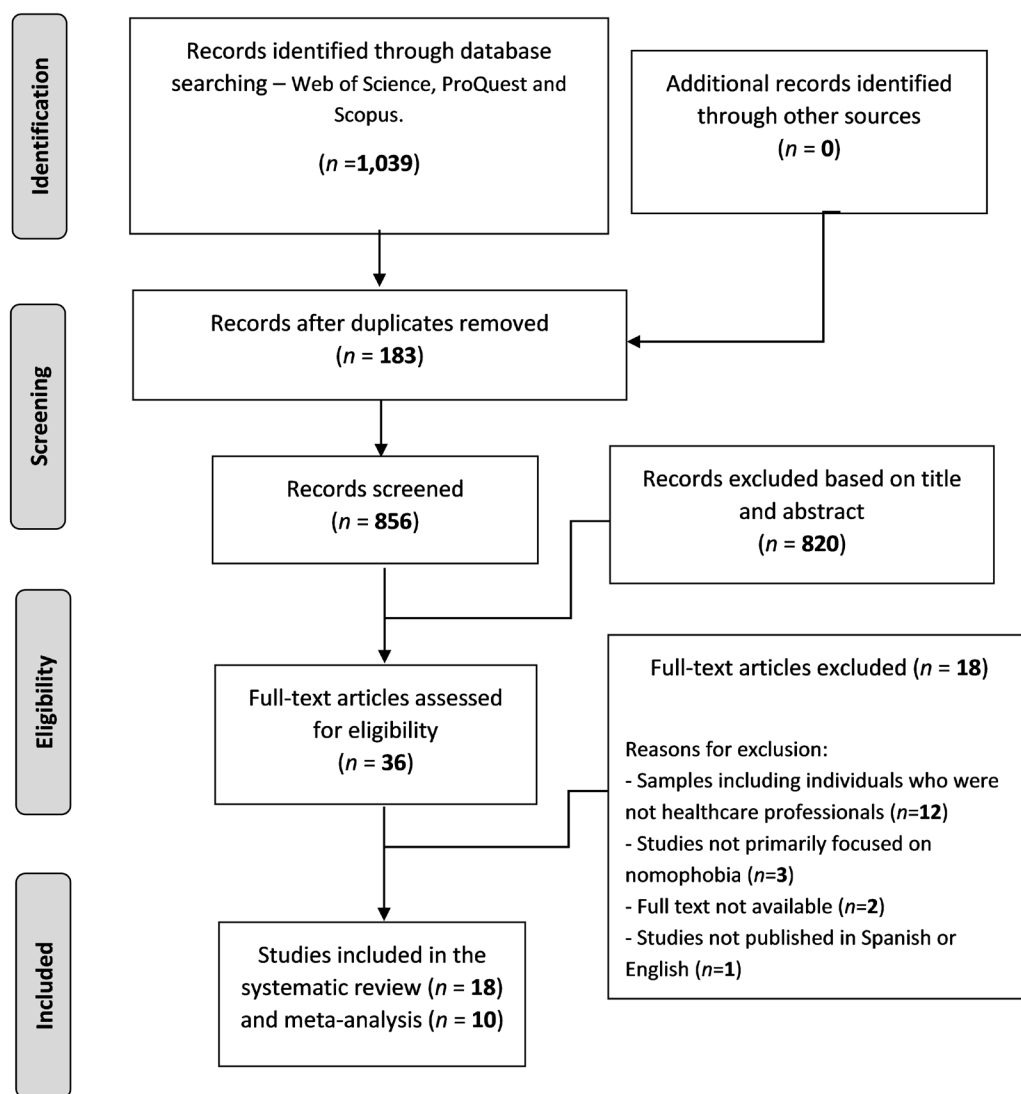


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram

smartphone addiction<sup>46</sup>; cyberloafing<sup>47</sup>; job satisfaction and care factor<sup>31</sup>; anxiety and physical activity<sup>40</sup>; and prevalence according to sociodemographic and occupational characteristics.<sup>30,39</sup> Overall, the reviewed studies examined nomophobia in relation to occupational, psychological, behavioral, and work-related outcomes. Regarding the assessment of nomophobia, it was mostly based on the Nomophobia Questionnaire (NMP-Q).<sup>48</sup>

### 3.3. Results on nomophobia

Regarding the severity of nomophobia, most studies used the conventional NMP-Q cut-off points (20 = absence;

21 – 59 = mild; 60 – 99 = moderate; 100 – 140 = severe), although there was heterogeneity in how results were reported. The cut-off points for classifying the severity of nomophobia have been mostly validated cross-culturally. The applicability of the nomophobia classification standards (NMP-Q) in diverse cultural contexts presents a complex picture. While these standards serve as a basis, significant modifications are required to adapt them to the specific cultural realities of each country.

Some studies reported prevalence according to severity categories,<sup>35,36,39,40,43,44</sup> whereas others primarily reported mean nomophobia scores.<sup>30,32–34,38,41,42,45</sup> In addition, some

Table 2. Characteristics of the studies selected for the review

| Authors (year); country                                | Research design                                      | Participant characteristics (N; % sex; age; work experience; shift; other variables)                                                                                                 | Instruments and assessment                                         | Main results                                                                                                                                                                                                          | Associated factors/predictors                                                                                                                                                                       |
|--------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dinçer & Çelik (2025) <sup>30</sup> ; Turkey           | Cross-sectional study                                | N = 112 nurses and midwives; women: 98.2%; mean age: 34.50 ± 9.98 years; experience: 57.1% ≤ 10 years, 17.9% 11–20 years, 18.8% 21–30 years                                          | NMP-Q                                                              | Mean NMP-Q 68.45 ± 24.62 (moderate)                                                                                                                                                                                   | Higher nomophobia in younger professionals and those with less experience; higher in day + night shift workers than day shift only                                                                  |
| Öner <i>et al.</i> (2026) <sup>31</sup> ; Turkey       | Descriptive, cross-sectional and correlational study | N = 1,083 nurses; women: 62.6%; mean age 31.09 ± 5.68 years; experience mean: 7.70 ± 5.66 years; shift: 68.9% day-duty; internet use: 4.11 ± 2.16 years/day; social media use: 91.9% | FNS; CFS-CS/ CFS-CM; JSSN                                          | Mean FNS = 3.01 ± 0.87; Nomophobia negatively associated with job satisfaction and care factor; care factor mediated this relationship                                                                                | Higher nomophobia predicted lower job satisfaction and lower care factor; care factor partially mediated the association                                                                            |
| Bülbüloğlu <i>et al.</i> (2020) <sup>32</sup> ; Turkey | Cross-sectional study                                | N = 314 nurses; women: 65.3%; age not reported; shifts: 82.2% day + night; smartphone use: 38.5% 3–5 h/day                                                                           | NMP-Q; FTMS; BRS                                                   | Nomophobia 60.77 ± 15.09                                                                                                                                                                                              | Nomophobia associated with lower psychological well-being and a weak relationship with leisure time management                                                                                      |
| Lupo <i>et al.</i> (2022) <sup>33</sup> ; Italy        | Cross-sectional study                                | N = 539 nurses; women: 73.3%; mean age: 33.86 ± 13.11 years; experience: 35.1% 1–5 years, 11.0% 6–10 years, 9.3% 11–15 years, 8.7% 16–20 years, 13.6% 21–25 years, 8.9% 26–30 years  | NMP-Q; Nurses' Use of Personal Communication Devices Questionnaire | Mean NMP-Q: 50.34 ± 29.03 (mild); Work impact: 20.1% performance affected, 8.5% clinical errors due to distraction, 28.1% colleague errors, 16.5% loss of clinical information, 46.0% loss of colleagues' information | Fewer years of experience: weak negative correlation with nomophobia; perceived work performance affected by mobile phone: higher nomophobia; clinical errors due to distraction: higher nomophobia |
| Kapikiran <i>et al.</i> (2023) <sup>34</sup> ; Turkey  | Cross-sectional study                                | N = 186 nurses; women: 79.6%; mean age: 33.37 ± 7.15 years; experience: 11.00 ± 7.38 years; daily smartphone use: 5.33 ± 2.82 h                                                      | NMP-Q; CDMNS                                                       | Mean nomophobia: 66.64 ± 25.36 (moderate); CDMNS: 149.00 ± 26.33 (moderate)                                                                                                                                           | Higher nomophobia associated with lower perception of clinical decision-making; daily smartphone use weakly associated with higher nomophobia                                                       |
| Sharma <i>et al.</i> (2024) <sup>35</sup> ; India      | Cross-sectional study                                | N = 420 nurses; women: 32.6%; age not reported; experience: 9.3% ≤ 1 year, 48.3% 2–4 years, 32.6% 5–7 years, 9.8% ≥ 8 years                                                          | NMP-Q; MAAS; GSE                                                   | Prevalence: 34.5% mild, 53.3% moderate, 11.7% severe; Mean NMP-Q: 68.73 ± 24.85                                                                                                                                       | Nomophobia associated with sex, work area, years using smartphone and daily usage time                                                                                                              |
| Çam <i>et al.</i> (2025) <sup>36</sup> ; Turkey        | Cross-sectional and descriptive study                | N = 197 nurses; women: 80.2%; mean age: 27.14 ± 6.69 years; work experience: 7.00 ± 6.72 years; shifts: 29.9% day, 70.1% day + night; daily smartphone use: 6.05 ± 4.03 h            | NMP-Q; CBI-24                                                      | Mean NMP-Q: 80.37 ± 23.99 (moderate); CBI-24 = 5.53 ± 0.56; 62.9% moderate nomophobia, 17.8% severe                                                                                                                   | Nomophobia negatively correlated with caring behaviors; higher in younger nurses, nurses with fewer years of employment, shift workers, and inpatient/intensive care units                          |
| Zunira <i>et al.</i> (2025) <sup>37</sup> ; Pakistan   | Descriptive cross-sectional study                    | N=222 ICU nurses; women: 95.9%; Age: 31.0% (21–25y), 57.5% (26–30y), 7.1% (31–35y), 3.9% (36–41y); ICU experience ≥ 1 year                                                           | NMP-Q; CBI                                                         | Mean NMP-Q = 31.9 ± 4.12; 93.7% showed high nomophobia; 54.5% showed good caring behavior                                                                                                                             | Significant inverse association between nomophobia and caring behavior ( $r^2 = 0.49$ ; $p < 0.001$ ); higher nomophobia associated with poorer caring behaviors                                    |

(Cont'd...)

Table 2. (Continued)

| Authors (year); country                                   | Research design                     | Participant characteristics (N; % sex; age; work experience; shift; other variables)                                                                                                       | Instruments and assessment | Main results                                                                                     | Associated factors/predictors                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Uguz & Bacaksiz (2022) <sup>38</sup> ; Turkey             | Cross-sectional study               | N = 669 nurses; women: 82.8%; age not reported; experience: 26.3% ≤ 1 year, 36.2% 2–5 years, 37.5% ≥ 6 years; smartphone use: 24.4% 1–2 h, 28.7% 3–4 h, 46.9% ≥ 5 h/day                    | NMP-Q; BfPTI               | Mean NMP-Q: 2.89 ± 0.85 (scale 1–5)                                                              | Higher nomophobia in women, younger age, less experience, ≥5h smartphone use, ≥5h internet use, checking ≥ 6 times/h, carrying charger and self-identified addiction; correlations with neuroticism, extraversion and openness                                                                                             |
| Vitale (2022) <sup>39</sup> ; Italy                       | Cross-sectional study               | N = 156 nurses; women: 73.1%; age not reported; experience: 56.4% < 1 year, 43.6% > 1 year; shifts: 20.5% 1 shift, 12.8% 2 shifts, 66.7% 3 shifts                                          | NMP-Q                      | Prevalence: 49.4% mild, 41.7% moderate, 9.0% severe                                              | Higher nomophobia in women ≤ 25 years and <1 year experience; no differences according to shift                                                                                                                                                                                                                            |
| Vitale <i>et al.</i> (2023) <sup>40</sup> ; Italy         | Cross-sectional study               | N = 430 nurses; women: 85.8%; age not reported; experience: 54.9% < 10 years, 19.8% 11–20 years, 16.5% 21–30 years, 8.8% > 31 years; shifts: 28.8% 1 shift, 30.7% 2 shifts, 40.5% 3 shifts | NMP-Q; HADS                | Prevalence: mild 71.6%, moderate 13.5%, severe 0%                                                | Significant predictors: anxiety; low physical activity (inverse protective effect)                                                                                                                                                                                                                                         |
| Yang <i>et al.</i> (2024) <sup>41</sup> ; China           | Cross-sectional study               | N = 272 nurses; women: 86.8%; mean age: 31.53 ± 6.29 years; years of experience: not reported; mobile use at work for work purposes: 91.9%                                                 | NMP-Q; CDMNS               | Mean nomophobia: 54.01 ± 24.09; CDMNS: 144.94 ± 20.08                                            | Significant negative correlation between nomophobia and clinical decision-making ( $r = -0.365$ ; $p < 0.001$ ); nomophobia explains 13.3% of CDMNS variance; associated factors: female sex, younger age, university degree, junior professional title, higher daily use, longer smartphone ownership, temporary contract |
| Hosgör <i>et al.</i> (2021) <sup>42</sup> ; Turkey        | Cross-sectional study               | N = 178 nurses; women: 89.9%; mean age: 30.54 ± 7.30 years; experience: 8.48 ± 8.34 years                                                                                                  | NMP-Q; FoMOS; PWOS         | NMP-Q; FoMOS; PWOS                                                                               | Age and experience were negatively correlated with nomophobia and FoMO; multiple regression showed nomophobia predicts PWO                                                                                                                                                                                                 |
| Al <i>et al.</i> (2022) <sup>43</sup> ; Turkey            | Observational cross-sectional study | N = 591 healthcare professionals; women: 69.2%; mean age: 30.25 ± 7.04 years; mean work experience: 7.37 ± 5.35 years                                                                      | NMP-Q; MSQ; BSMAS; PHQ-9   | Mean NMP-Q = 72.70 ± 28.86; nomophobia prevalence: 97.5%; 34.5% mild, 45.5% moderate, 20% severe | Younger age, less work experience, higher social media use and lower job satisfaction associated with higher nomophobia; depression identified as an independent predictor of job dissatisfaction                                                                                                                          |
| Alasimi <i>et al.</i> (2025) <sup>44</sup> ; Saudi Arabia | Cross-sectional study               | N = 1,001 respiratory therapists; women: 33%; age not reported; experience: 36% < 1 year, 39% 1–5 years, 15% 6–10 years, 4% 11–15 years, 4% 16–20 years, 2% ≥ 20 years                     | NMP-Q                      | Prevalence: 51.8% mild, 42.0% moderate, 1.6% severe; mean NMP-Q: 56 ± 23.6                       | Female sex, ≥11 years experience, smoking and working in the private sector associated with higher probability of moderate–severe nomophobia                                                                                                                                                                               |

(Contd...)

Table 2. (Continued)

| Authors (year); country                             | Research design                     | Participant characteristics (N; % sex; age; work experience; shift; other variables)                                                                                                                                                                     | Instruments and assessment | Main results                                                                                         | Associated factors/predictors                                                                                                                                          |
|-----------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aslan & Ünal (2022) <sup>45</sup> ; Turkey          | Descriptive study                   | N = 519 assistant healthcare personnel; women: 79.2%; mean age: 35.46±8.15 years; experience: 37.2% <10 years, 33.3% 10–19 years, 29.5% ≥20 years                                                                                                        | NMP-Q; WSS                 | Mean NMP-Q 72.20 ± 29.98;<br>Mean work stress 24.98 ± 6.75                                           | Relationship between nomophobia and work stress in healthcare staff; higher levels in younger, single workers and those in critical units                              |
| Hamayatullah et al. (2025) <sup>46</sup> ; Pakistan | Descriptive cross-sectional study   | N = 171 healthcare workers; men: 63.2%; mean age: 33.7 ± 4.3 years <30 years: 19.9%; professions: nurses 40.9%, OT technicians 17.5%, cardiac perfusionists 11.7%, anesthesia technicians 8.8%                                                           | NMP-Q; SAS-SV              | Severe nomophobia prevalence 79.5%; severe smartphone addiction 43.9%                                | Significant positive association between nomophobia and smartphone addiction ( <i>p</i> < 0.001); greater digital addiction associated with higher nomophobia          |
| Sönmez & Cankul (2025) <sup>47</sup> ; Turkey       | Descriptive and correlational study | N = 489 healthcare workers; women: 45.6%, men: 54.4%; age: 18–24y (9.6%), 25–34y (43.4%), 35–44y (31.3%), 45–49y (13.3%), ≥50y (2.5%); experience: 41.5% 0–5y, 20.0% 6–10y, 20.7% 11–15y, 8.2% 16–20y, 6.7% 21–25y, 2.9% ≥ 26y; public/private hospitals | NMP-Q; Cyberloafing Scale  | Strong positive correlation between nomophobia and cyberloafing ( <i>r</i> = 0.684; <i>p</i> < 0.01) | Higher nomophobia and cyberloafing in single workers, higher income groups, and professionals with 16–20 years of experience; no significant differences by age or sex |

Abbreviations: BFPTI: Big Five Personality Traits Inventory; BRS: Brief Resilience Scale; BSMAS: Bergen Social Media Addiction Scale; CBI-24: Caring Behaviors Inventory-24; CDMNS: Clinical Decision-Making in Nursing Scale; CFS-CS/CFS-CM: Care Factor Scale – Caring for Self/Caring for Manager; FoMO: Fear of Missing Out; FoMOS: Fear of Missing Out Scale; FNS: First Nomophobia Scale; FTMS: Free Time Management Scale; GSE: General Self-Efficacy Scale; HADS: Hospital Anxiety and Depression Scale; JSSN: Job Satisfaction Scale for Nurses; MAAS: Mindful Attention Awareness Scale; MSQ: Minnesota Satisfaction Questionnaire; NMP-Q: Nomophobia Questionnaire; PHQ-9: Patient Health Questionnaire-9; PWOS: Perceived Work Overload Scale; SAS-SV: Smartphone Addiction Scale–Short Version; WSS: Work Stress Scale.

studies examined nomophobia in relation to occupational, psychological, or behavioral variables without explicitly classifying severity,<sup>37,46,47</sup> while Öner *et al.*<sup>31</sup> used an alternative scale (Firat Nomophobia Scale), which limits direct comparability across studies.

Overall, mild and moderate levels of nomophobia predominated. Mild nomophobia ranged from 34.5%<sup>43</sup> to 71.6%,<sup>40</sup> while moderate nomophobia varied between 13.5%<sup>40</sup> and 62.9%.<sup>36</sup> Among the studies that reported the severe category, prevalence ranged from 1.6%<sup>44</sup> to 20.0%,<sup>43</sup> although Hamayatullah *et al.*<sup>46</sup> reported a considerably higher proportion (79.5%).

### 3.4. Associated factors and predictors of nomophobia

#### 3.4.1. Sociodemographic factors

Female sex was associated with higher levels of nomophobia in several studies.<sup>35,38,39,41,44</sup> Similarly, younger age was frequently associated with higher levels of nomophobia.<sup>30,36,38,39,41–43,45</sup> Regarding marital status, some studies reported higher levels of nomophobia among single individuals,<sup>45,47</sup> whereas other studies did not identify marital status as a significant associated factor or did not consider analyzing this variable because, when controlling for age, youth better explains addictive behavior than being single by itself.<sup>31,41,43</sup> Furthermore, these inconsistent results are rooted in cultural differences and the varying importance attributed to marriage and family across the countries studied. In the Turkish context, it has been suggested that married individuals may experience higher levels of psychological well-being and social support, thus reducing their need for constant companionship via smartphones.<sup>32,45,47</sup>

Regarding educational level, the findings were heterogeneous. Some studies suggested that higher educational attainment or certain educational characteristics were associated with higher levels of nomophobia.<sup>35,41</sup>

#### 3.4.2. Work-related stress

Overall, several studies reported an inverse association between professional experience and nomophobia, with higher levels observed among younger professionals or those with fewer years of work experience.<sup>30,33,36,38,39,42,43</sup>

Regarding the work area, some studies identified higher levels of nomophobia in contexts characterized by greater care demands, such as inpatient and intensive care units,<sup>36,45</sup> whereas Sharma *et al.*<sup>35</sup> also reported associations according to work area. With respect to work shifts, findings were heterogeneous. Dinçer and Çelik<sup>30</sup> found

higher levels of nomophobia among professionals working day and night shifts compared with those working only day shifts, and Çam *et al.*<sup>36</sup> identified shift work as a factor associated with higher nomophobia. In contrast, Vitale<sup>39</sup> did not observe differences according to shift type.

Regarding occupational outcomes, smartphone use and nomophobia were associated with poorer perceived work performance and a higher frequency of clinical errors and information loss.<sup>33</sup> Additionally, higher levels of nomophobia were associated with lower job satisfaction,<sup>31,43</sup> higher work stress,<sup>45</sup> lower caring behaviors,<sup>31,36,37</sup> greater cyberloafing,<sup>47</sup> and lower perception of clinical decision-making.<sup>34,41</sup>

#### 3.4.3. Psychological factors

The psychological factors analyzed in relation to nomophobia included occupational stress;<sup>45</sup> FoMO and perceived workload<sup>42</sup>; anxiety<sup>40</sup>; depressive symptoms, social media use, social media addiction, and job satisfaction<sup>43</sup>; mindfulness and self-efficacy<sup>35</sup>; clinical decision-making<sup>34,41</sup>; personality traits including neuroticism, extraversion, and openness to experience<sup>38</sup>; psychological well-being and resilience<sup>32</sup>; smartphone addiction<sup>46</sup>; caring behaviors<sup>36,37</sup>; care factor and job satisfaction<sup>31</sup>; and cyberloafing behavior.<sup>47</sup>

Higher levels of nomophobia were positively associated with greater occupational stress,<sup>45</sup> higher FoMO and perceived workload,<sup>42</sup> greater anxiety,<sup>40</sup> higher depressive symptoms and greater social media use/addiction,<sup>43</sup> and higher smartphone addiction.<sup>46</sup> Nomophobia was also positively associated with cyberloafing behavior.<sup>47</sup>

Conversely, nomophobia showed negative associations with psychological well-being and resilience,<sup>32</sup> mindfulness and self-efficacy,<sup>35</sup> job satisfaction,<sup>31,43</sup> caring behaviors and care factor,<sup>31,36,37</sup> and perception of clinical decision-making.<sup>34,41</sup> Regarding personality dimensions, higher nomophobia was associated with higher neuroticism and openness to experience, and lower extraversion.<sup>38</sup> However, heterogeneity in the variables assessed and measurement approaches limited direct comparison across studies.

### 3.5. Quality assessment of the studies

In a first phase, a Cohen's kappa score ( $\kappa$ ) of 0.898 was obtained, indicating a very high level of agreement. Table 3 details the assessment of the methodological quality of the studies included in the systematic review and meta-analysis. The aspects that obtained a higher level of methodological quality were the research question, study population, groups recruited from the same population and uniform eligibility criteria, and exposure and outcome measures and assessment. However, greater

methodological weakness was observed in the temporal assessment of exposure, specifically in whether the exposure of interest was measured prior to the outcome (100%) and whether the exposure was assessed more than once over time (100%).

### 3.6. Meta-analysis

Table 4 details the results of the meta-analysis of the relationship between nomophobia and occupational stress and well-being in healthcare professionals. A total of  $k = 4$  studies were quantitatively synthesized to assess the relationship between nomophobia and psychological distress indicators (anxiety, depression, and neuroticism) (Figure S1). The pooled correlation coefficient based on the random-effects model indicates a statistically significant, positive, and stable association. Heterogeneity statistics showed absolute consistency across the primary data, with an  $I^2$  value of 0.00% ( $Q[3] = 2.572$ ,  $p = 0.462$ ). Regarding publication bias, neither the Begg and Mazumdar rank correlation ( $p = 0.279$ ) nor Egger's regression test ( $p = 0.289$ ) indicated significant funnel plot asymmetry.

However, given the small number of studies ( $k < 10$ ), these tests must be interpreted cautiously due to limited statistical power, and publication bias cannot be definitively ruled out (Figure S2).

A separate meta-analysis was conducted on six studies evaluating occupational outcomes (including occupational stress, job satisfaction, and professional caring behaviors). The estimated average correlation coefficient was 0.13 (95% confidence interval:  $-0.135$  to  $0.40$ ;  $z = 0.968$ ,  $p = 0.333$ ) (Figure S3). Crucially, the analysis revealed extreme statistical heterogeneity ( $Q[5] = 145.113$ ,  $p < 0.001$ ;  $I^2 = 97.47\%$ ). Residual and influential case diagnostics (Studentized residuals and Cook's distances) explicitly identified Zunira *et al.*<sup>37</sup> as a severe statistical outlier and highly influential study within the model. While most of the literature (83%) aligns in the positive spectrum—confirming that nomophobia correlates with compromised work outcomes (ranging from 0.16 to 0.36)—the outlier study by Zunira *et al.*<sup>37</sup> reported a highly divergent negative effect (Fisher's  $z = -0.54$ ), mathematically driving the overall pooled effect toward non-significance. Publication

**Table 3. Methodological quality assessment of the included studies using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies**

| Authors (Year)                                  | 1 | 2 | 3  | 4 | 5 | 6 | 7  | 8  | 9 | 10 | 11 | 12 | 13 | 14 |
|-------------------------------------------------|---|---|----|---|---|---|----|----|---|----|----|----|----|----|
| Dinçer & Çelik (2025) <sup>30</sup>             | + | + | +  | + | - | - | NA | +  | + | -  | +  | NA | NA | -  |
| Öner <i>et al.</i> (2026) <sup>31</sup>         | + | + | +  | + | + | - | NA | +  | + | -  | +  | -  | NA | +  |
| Bülbüloğlu <i>et al.</i> (2020) <sup>32</sup>   | + | + | +  | + | - | - | NA | +  | + | -  | +  | -  | NA | +  |
| Lupo <i>et al.</i> (2022) <sup>33</sup>         | + | + | NR | + | - | - | NA | +  | + | -  | +  | +  | NA | -  |
| Kapikiran <i>et al.</i> (2023) <sup>34</sup>    | + | + | +  | + | + | - | NA | +  | + | -  | +  | NA | NA | +  |
| Sharma <i>et al.</i> (2024) <sup>35</sup>       | + | + | +  | + | - | - | NA | +  | + | -  | +  | NA | NA | -  |
| Çam <i>et al.</i> (2025) <sup>36</sup>          | + | + | NR | + | + | - | NA | +  | + | -  | +  | -  | NA | +  |
| Zunira <i>et al.</i> (2025) <sup>37</sup>       | + | + | -  | + | + | - | NA | +  | + | -  | +  | -  | NA | +  |
| Uguz & Bacaksiz (2022) <sup>38</sup>            | + | + | +  | + | - | - | NA | +  | + | -  | +  | NA | NA | +  |
| Vitale (2022) <sup>39</sup>                     | + | + | NR | + | - | - | NA | +  | - | -  | -  | -  | NA | +  |
| Vitale <i>et al.</i> (2023) <sup>40</sup>       | + | + | NR | + | + | - | NA | +  | + | -  | +  | NA | NA | +  |
| Yang <i>et al.</i> (2024) <sup>41</sup>         | + | + | -  | + | - | - | NA | +  | + | -  | +  | NA | NA | -  |
| Hoşgör <i>et al.</i> (2021) <sup>42</sup>       | + | + | NR | + | - | - | NA | +  | + | -  | +  | NA | NA | +  |
| Al <i>et al.</i> (2022) <sup>43</sup>           | + | + | +  | + | + | - | NA | +  | - | -  | -  | NA | NA | +  |
| Alasimi <i>et al.</i> (2025) <sup>44</sup>      | + | + | NR | + | + | - | NA | +  | + | -  | +  | NA | NA | +  |
| Aslan & Ünal (2022) <sup>45</sup>               | + | + | +  | + | - | - | NA | NA | + | -  | -  | NA | NA | NA |
| Hamayatullah <i>et al.</i> (2025) <sup>46</sup> | + | + | NR | + | + | - | NA | +  | + | -  | +  | NA | NA | -  |
| Sönmez & Cankul (2025) <sup>47</sup>            | + | + | NR | + | - | - | NA | +  | + | -  | +  | -  | NA | -  |

Note: + = Yes; - = No; NR = Not reported; NA = Not applicable.

bias tests showed no significant asymmetry (Begg's  $p = 0.469$ ; Egger's  $p = 0.388$ ), though their power remains severely limited (Figure S4).

#### 4. Discussion

The main objective of this research was to explore the relationships between nomophobia and other psychological or occupational variables in healthcare professionals through a systematic review and meta-analysis. The results obtained in the present research suggest that nomophobia is associated with sociodemographic, psychological, and occupational factors and may be related to differences in emotional well-being, professional functioning, and interpersonal relationships in healthcare settings. In this context, problematic smartphone use may coexist with changes in both interpersonal and professional relationships within the healthcare environment. Likewise, several studies outside this systematic review have also demonstrated the relationship between nomophobia and psychological factors,<sup>12,19–22,49</sup> as well as occupational factors.<sup>14,26,27,50,51</sup>

Regarding the first specific objective, namely, to assess the prevalence of nomophobia among healthcare professionals, the findings indicate that this is not a marginal phenomenon but rather a highly prevalent condition within this professional group. Several studies reported very high prevalence rates.<sup>35,37,43,44,46</sup> Likewise, other studies described predominantly mild and moderate levels of nomophobia among nursing professionals.<sup>30,32,34,38,39,41,42</sup> This interpretation is consistent with the conclusions of Banjade *et al.*<sup>52</sup>, who described a high prevalence of nomophobia among healthcare professionals and considered it a relevant issue in the current healthcare context.

In relation to the second specific objective, the reviewed studies show that several sociodemographic characteristics are associated with nomophobia in healthcare populations. Consistently, younger age, female sex, and lower work experience constitute the main associated

factors.<sup>30,33,35,38,39,41,44,45</sup> These findings are consistent with recent external evidence confirming a higher prevalence among young professionals and women, as well as among nursing students,<sup>52–54</sup> suggesting greater technological dependence in younger generations.<sup>5,8,55,56</sup>

External studies have documented that the greater vulnerability observed among women may be explained by biopsychosocial factors, such as higher levels of anxiety and a greater value placed on social connectivity.<sup>2,20,56</sup> However, some studies have reported opposite findings, highlighting the influence of cultural and gender-related factors.<sup>57</sup>

Other sociodemographic factors show less consistency. Being single has been associated with higher levels of nomophobia,<sup>30,32,34,38,42,43,45</sup> possibly due to smartphone use as the main means of social interaction. This interpretation is also supported by external evidence suggesting that a greater need for connectivity and digital social interaction may promote greater smartphone dependence.<sup>5,20</sup>

Regarding educational level, the results are heterogeneous: some studies report greater nomophobia among healthcare professionals with higher educational attainment,<sup>32,45</sup> whereas others found no significant association<sup>34,40</sup> or even described greater nomophobia among individuals with lower educational levels<sup>41</sup>. Similar findings have been reported in studies not included in the present systematic review, where these discrepancies suggest that professional demands related to connectivity and digital communication may influence smartphone dependence; however, recent evidence shows substantial heterogeneity in the sociodemographic factors associated with nomophobia.<sup>58</sup>

The final objective focused on investigating the degree of correlation between nomophobia and psychological, environmental, and occupational variables. The meta-analysis results reported a significant association with psychological distress. Regarding the psychological factors associated with nomophobia among healthcare professionals, we found positive associations with

**Table 4. Summary of mean estimates and heterogeneity levels by variables**

| Variable (k)                        | Outcome | SE     | z     | 95% CI |       | P      | Q         |
|-------------------------------------|---------|--------|-------|--------|-------|--------|-----------|
| Psychological distress (4)          | 0.249   | 0.0218 | 11.4  | 0.206  | 0.292 | 0%     | 2.572     |
| Work and occupational variables (6) | 0.132   | 0.137  | 0.968 | −0.135 | 0.4   | 97.47% | 145.113** |

Note: \*\* $p < 0.001$ .

Abbreviations: k: Number of independent studies; CI: Confidence interval; P: Heterogeneity; SE: Standard error.

occupational stress, perceived workload, and FoMO. In the included studies, higher levels of nomophobia were associated with higher perceived workload,<sup>42,45</sup> highlighting its link with the organizational context. External literature also supports this relationship.<sup>59,60</sup>

Additionally, recent evidence suggests that nomophobia may be associated with other forms of problematic digital behavior in healthcare professionals. Sönmez and Cankul<sup>47</sup> reported a strong positive correlation between nomophobia and cyberloafing, indicating that higher levels of smartphone dependence may coexist with increased engagement in non-work-related online activities during working hours. Likewise, Hamayatullah *et al.*<sup>46</sup> identified a significant positive association between nomophobia and smartphone addiction, supporting the idea that nomophobia may occur within broader patterns of problematic smartphone use. Moreover, the published literature outside the included studies also reports similar findings. Yıldız *et al.*<sup>26</sup> found that, among employees, nomophobia explained 34.2% of the variance in cyberloafing, further supporting the positive association between nomophobia and other problematic digital behaviors.

Likewise, nomophobia has been associated with lower levels of mindfulness and self-efficacy,<sup>35</sup> as well as with higher levels of anxiety and lower physical activity.<sup>40</sup> Although the studies included in this review did not directly analyze the relationship between nomophobia and processes such as sustained attention or task presence, recent external evidence may help to interpret these findings. For example, Irfan *et al.*<sup>51</sup> suggest that problematic smartphone use may be associated with reduced attention and concentration capacity during task performance, which may help contextualize some of the associations observed in the present review.

Evidence derived from the studies included in this review also suggests that nomophobia is associated with lower psychological well-being<sup>32</sup> and with certain personality traits.<sup>38</sup> Complementarily, external studies not included in the present review have expanded this interpretation by showing that nomophobia may be related to mental health problems, reduced general well-being, and difficulties in emotional functioning.<sup>20,53,61</sup> Similarly, external evidence has described significant differences in personality profiles, indicating that individuals with higher levels of nomophobia tend to present higher neuroticism and lower extraversion, traits associated with greater emotional instability and a greater tendency toward anxiety.<sup>62</sup> In relation to depression and anxiety, both the studies of the systematic review<sup>60,62</sup> and the meta-analysis indicated that higher levels of nomophobia are associated

with worse psychological well-being. We found several studies that support this relationship in other populations such as university students or young adults.<sup>54,63,64</sup>

The meta-analysis reveals a clear dual dynamic regarding the impact of nomophobia on healthcare professionals. On one hand, nomophobia is consistently and significantly associated with higher psychological distress, showing perfect homogeneity across studies in relation to anxiety, depression, and neuroticism. On the other hand, its impact on work-related outcomes is highly complex and polarized. While the vast majority of the evidence confirms that nomophobia compromises clinical practice by increasing occupational stress and reducing job satisfaction and care quality, a rigorous statistical analysis isolated a single highly influential outlier<sup>37</sup> that reported the opposite effect. This divergence suggests that while the psychological toll of nomophobia is universal, its operational impact on clinical performance may fluctuate depending on specific institutional policies, device usage regulations, and individual coping strategies within the hospital environment.

Overall, these findings highlight the multidimensional nature of nomophobia, integrating emotional, cognitive, behavioral, and contextual factors in its development and impact on clinical practice. This interpretation is also consistent with external evidence not included in the present systematic review, such as that reported by Banjade *et al.*<sup>52</sup>, who described nomophobia as a complex and multifactorial phenomenon within the healthcare context.

On the other hand, among the occupational factors analyzed, professional experience, work shifts, and performance-related variables were significant. Most of the studies included in this review showed a negative correlation between work experience and nomophobia, such that fewer years of experience were associated with higher levels, probably due to their relationship with younger age among healthcare staff.<sup>30,32,38–41,43,45</sup> Complementarily, external evidence not included in this review has suggested that less experienced professionals may use smartphones as a support resource in response to job insecurity or as a mechanism to adapt to the clinical environment.<sup>58</sup>

However, the only included study that reported opposite findings<sup>44</sup> identified a higher risk among professionals with more than 11 years of experience, a result that may be interpreted, according to external evidence, as being linked to greater demands for connectivity and professional availability.

In addition, the work area acts as a moderator of nomophobia, with higher levels observed in high-

pressure units such as emergency departments, intensive care units, and COVID-19 wards, compared with more predictable environments such as the operating room.<sup>30,34,38,39,42,43,45</sup> Recent evidence relates smartphone use to stress management in healthcare environments, showing improvements in occupational well-being through mobile interventions and a high prevalence of nomophobia in high-pressure clinical contexts.<sup>65</sup> Likewise, an association between smartphone dependence, stress, and professional performance have been described; however, whether these relationships reflect mechanisms related to emotional regulation remains unclear.<sup>54</sup>

Evidence derived from this systematic review also suggests that nomophobia may extend beyond emotional and organizational consequences, influencing professional dimensions related to patient care. In this regard, the studies by Çam *et al.*<sup>36</sup> and Zunira *et al.*<sup>37</sup> showed that higher levels of nomophobia were associated with lower caring behaviors among nurses, particularly among younger professionals, shift workers, and staff working in inpatient and intensive care units. Although the included studies did not explore the specific mechanisms that might explain this relationship, recently published external evidence reinforces this interpretation. Specifically, Córdoba<sup>66</sup> observed that higher levels of nomophobia were associated with greater distraction during clinical practice, suggesting that smartphone dependence may be associated with difficulties in sustained attention and professional performance, which may be related to lower scores in dimensions associated with patient care.

Regarding work shifts, findings on their association with nomophobia are inconsistent. Italian studies did not find a significant relationship,<sup>39-40</sup> whereas research conducted among Turkish nurses and midwives identified differences according to work shift.<sup>30</sup> This variability is also observed in other studies conducted in healthcare populations, which show different associations between nomophobia and occupational variables depending on the study context.

In this regard, Zunira *et al.*<sup>37</sup> identified a significant relationship between higher levels of nomophobia and poorer caring behaviors among intensive care unit nurses, reflecting that the impact of nomophobia on professional variables may differ across healthcare settings and populations. This variability is consistent with international evidence, as systematic reviews have described marked heterogeneity in findings on nomophobia across different populations and sociocultural contexts, partly attributed to methodological and organizational differences.<sup>67</sup>

Overall, these findings suggest that factors such as organizational context and work culture may moderate

the relationship between work shifts and nomophobia. Regarding performance and clinical safety, the included studies suggest nomophobia may be associated with differences across several dimensions of professional performance. Lupo *et al.*<sup>33</sup> observed that professionals who perceived a negative impact of smartphone use on their performance or acknowledged clinical errors resulting from distraction presented higher levels of nomophobia, suggesting potential implications for clinical safety. This interpretation is also supported by external evidence, which has described a relationship between nomophobia, smartphone-related distraction, and possible repercussions on performance in clinical settings.<sup>66,68</sup>

Findings regarding job satisfaction were heterogeneous: while Al *et al.*<sup>43</sup> did not find an association between nomophobia and job satisfaction, Öner *et al.*<sup>31</sup> identified that higher levels of nomophobia predicted lower job satisfaction among nurses, with care factor acting as a partial mediator of this relationship. Likewise, Yang *et al.*<sup>41</sup> found that higher levels of nomophobia were associated with poorer perception of clinical judgment and professional performance. In this line, external evidence has also suggested that higher levels of nomophobia may coexist with lower job satisfaction and poorer psychological well-being among healthcare professionals,<sup>69</sup> reinforcing the possibility that this phenomenon may be associated with aspects of the work environment and perceived quality of care.

Finally, the results of this review should be interpreted considering several limitations of the available evidence. First, methodological inconsistencies were identified across the included studies, including differences in study design, sample characteristics, and assessment instruments. In addition, substantial heterogeneity was observed, limiting direct comparison between studies and reducing the ability to draw broadly generalizable conclusions.

Likewise, cultural and contextual variability across healthcare settings may influence both the expression of nomophobia and the interpretation of its associations with psychological and occupational variables, limiting the transferability of findings to other populations and contexts. Another important limitation is that most included studies employed cross-sectional designs, which precludes establishing causal relationships and allows only the identification of associations between variables.

Furthermore, the relatively limited number of studies specifically addressing nomophobia in healthcare professionals reduces the strength of the accumulated evidence and highlights the need for further research. Future studies should prioritize longitudinal and prospective designs, as well as more homogeneous

methodological approaches, to better understand the temporal direction and potential mechanisms underlying the observed associations.

Considering the available evidence, nomophobia may be associated with psychological, occupational, and professional dimensions in healthcare professionals; however, these findings should be interpreted cautiously until more robust evidence becomes available.

## 5. Conclusion

Overall, the findings of this review suggest that nomophobia appears to be a frequent phenomenon in the available samples of healthcare professionals, particularly among nursing staff, and may be associated with relevant psychological and occupational dimensions, including psychological well-being, occupational functioning, perceived clinical performance, and other work-related factors.

Based on these findings, healthcare institutions may consider promoting strategies aimed at encouraging balanced and appropriate smartphone use, as well as increasing awareness regarding patterns of digital exposure.

In addition, initiatives focused on supporting psychological well-being and promoting healthy digital habits among healthcare professionals—particularly among nursing staff and professionals working in high-pressure clinical environments—may be beneficial.

Rather than limiting smartphone use itself, such approaches may contribute to promoting a healthier integration of mobile technologies into clinical practice while supporting both professional functioning and individual well-being.

However, these findings should be interpreted with caution due to the predominance of observational and cross-sectional studies, methodological heterogeneity, and the concentration of evidence in specific healthcare populations and geographic contexts. Consequently, further longitudinal and intervention studies are needed to confirm these associations, explore potential causal relationships, and strengthen the available evidence regarding the relevance of nomophobia in healthcare settings.

## Acknowledgments

None.

## Funding

This study was funded by the Instituto de Salud Carlos III (ISCIII) through the project “PI23/01213” and co-financed

by the European Union (PI23/01213).

## Conflict of interest

The authors declare they have no competing interests.

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## Ethics approval and consent to participate

Not applicable.

## Consent for publication

Not applicable.

## Availability of data

Not applicable.

## Further disclosure

During the preparation and revision of this manuscript, ChatGPT (OpenAI) was used exclusively as a supportive tool for language editing, translation, grammar correction, improvement of readability, and refinement of responses to reviewers. The tool was not used for study design, literature searching, screening and selection of studies, data extraction, quality assessment, statistical analysis, interpretation of results, or generation of scientific conclusions. All scientific content, methodological decisions, interpretation of findings, and final editorial decisions remained under the full responsibility of the authors. All AI-assisted outputs were critically reviewed, verified, and revised by the authors prior to submission to ensure accuracy, originality, and compliance with the journal's publication standards.

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