

# Impact of the COVID-19 pandemic on the mental health of Nursing students

## A systematic review and meta-analysis

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### Abstract

**Background:** There is an increased prevalence of mental health problems in various population groups as a result of the COVID-19 pandemic and its consequences, especially regarding anxiety, stress, depression, fear, and sleep disturbances, require to be investigated longitudinally.

**Objective:** This study aimed to determine the impact that the COVID-19 pandemic had on the mental health of Nursing students, as well as to examine other associated factors such as anxiety, fear, sleep disturbances, and coping strategies.

**Method:** This systematic review and meta-analysis were designed following the PRISMA guidelines and were registered in PROSPERO with code CRD42024541904. PubMed, Web of Science, CINAHL, and Scopus electronic databases were utilized. Keywords indexed in the MeSH thesaurus were used (COVID-19, nurs\* student and mental health), following the Condition Context Population (CoCoPop) strategy. A total of 3866 studies were obtained of which 36 were selected for inclusion in the review. The Joanna Briggs Institute critical appraisal tool was used to assess the methodological quality of the selected studies, all of which were cross-sectional, finally including those with a cutoff point equal to or greater than 4 out of 8.

**Results:** The prevalence of total anxiety was found to be 33.6% in the meta-analysis. For depression, the prevalence was 37.92%, and for stress, it was 52.46%. The results of this study show increased levels of stress, anxiety, depression, fear, and sleep disturbances among Nursing students that coincide with the different waves of the pandemic, changes in the study methodology, and the increase or decrease in reports of cases of infection. A relationship is observed between variations in these variables and the implementation of protective measures and vaccinations in different countries.

**Conclusion:** As the pandemic progressed, hygiene and prevention measures became more effective, and the lethality of the virus decreased. The prevalence of the negative psychological effects also decreased from the onset in 2020 until the end of 2022. Due to the impact of the pandemic on global health, preventive measures should include personal, family, emotional, economic, educational, professional, and mental health approaches.

**Abbreviations:** AIS = Athenian Insomnia Scale, BIS = Bergen Insomnia Scale, Brief COPE = Brief COPE Inventory, BRS = Bidimensional Resilience Scale, COPE = Coping Behavior Questionnaire, CSS = COVID-19 Stress Scale, CSSQ = COVID-19 Student Stress Questionnaire, DASS-21 = Depression Anxiety and Stress Scale, FCV-19S = Fear of COVID-19 Scale, GAD-19 = Generalized Anxiety Disorder 19-Item Scale, GAD-7 = Generalized Anxiety Disorder 7-Item Scale, GADS = Generalized Anxiety Disorder Scale, GHQ-12 = 12-Item General Health Questionnaire, ISI-7 = Insomnia Severity Index, JBI = Joanna Briggs Institute, K6 = Kessler Psychological Distress Scale, MeSH = Medical Subject Headings, PRISMA = Preferred Reporting Items for Systematic reviews and Meta-Analyses, PSQI = Pittsburgh Sleep Quality Index, PSS = Perceived Stress Scale, PSS-10 = 10-Item Perceived Stress Scale, PSS-10-C = 10-Item Perceived Stress Scale related to COVID-19, SARS-COV-2 = Coronavirus type 2 Severe Acute Respiratory Syndrome, STAI = State-Trait Anxiety Inventory, WHO = World Health Organization, WHO-5 = WHO-Five Well-being Index.

**Keywords:** anxiety, coping strategies, COVID-19, depression, emotional well-being, fear, mental health, nursing, nursing students, pandemic, psychological distress, public health, SARS-Cov-2, sleep disturbances, undergraduate students

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All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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## 1. Introduction

The new worldwide pandemic caused by the Coronavirus type 2 Severe Acute Respiratory Syndrome (SARS-CoV-2), the virus that causes COVID-19 disease,<sup>[1]</sup> has drastically threatened the lives of millions of people and their health and quality of life at all levels, leading to an increase in suicide rates and mental illnesses.<sup>[2,3]</sup> Since the World Health Organization (WHO) declared a pandemic state in March 2020, along with associated severe confinement measures, the health sector, as well as the policy development, research, and education sectors, among other areas, have been significantly affected.<sup>[4,5]</sup>

At another level, families have faced the loss of loved ones. Since its onset, more than 6.5 million people have died from the virus and it has also had a major impact on the mental health of the population, with health professionals, women, young people, and students suffering the most from the psychological effects of the pandemic. In addition, their economies have been impacted.<sup>[6]</sup>

In the academic sphere, the onset of the pandemic meant the confinement of the population, and with it, an imposed change in the traditional teaching methodology. Institutions were forced to rapidly incorporate online teaching, with all the changes that this entailed, and the difficulties associated with such required adaptation on the part of teachers, academic institutions, and students.<sup>[7]</sup>

Students, due to the imposed adjustment to new learning methods, were forced to depend on themselves and their own responsibility to attend distance learning classes. They had a multitude of distracting factors to deal with, such as quick and easy access to social networks and entertainment channels.<sup>[8]</sup>

In higher education courses such as Health Sciences, and particularly in the case of Nursing, as the curriculum includes clinical practice that is fundamental for the development of the skills and abilities necessary for their professional future, confinement meant that in many cases the necessary periods of clinical practice had to be omitted, affecting the acquisition of fundamental knowledge as well.<sup>[9,10]</sup>

Concern on the part of the Nursing students was evident,<sup>[11]</sup> and the perceived worries about the future of these students and the impact that the COVID-19 pandemic could have on their next professional scenario were noted. This new situation could imply a serious negative impact on their skills, knowledge, employability, and self-confidence as future nurses.

Additionally, recent studies show an increase in the prevalence of mental health problems in various population groups as a result of the COVID-19 pandemic and its consequences. These include anxiety, stress, depression, fear, and sleep disturbances, along with the need to use existing coping strategies and even be able to learn new ones to cope with the emotions and situations arising from this new reality.<sup>[12–14]</sup>

One of the main conditions detected was high levels of stress, followed by fear of COVID-19.<sup>[15,16]</sup> Sleep pattern disturbances were closely related to the rest of the alterations, which in turn influenced the increase in these sleep-related disturbances.<sup>[17]</sup> Studies show the role that sleep plays in cognitive, social, and biological functioning and how it may contribute to disease prevention.<sup>[18]</sup>

Students have been particularly susceptible to the development of mental health disorders due to their vital transition

period, and this has been even more pronounced in Nursing students as future health professionals.<sup>[19–21]</sup>

Previous studies have assessed the ability of Nursing students to manage emotions, adapt to change and cope with change or resilience.<sup>[22–25]</sup> Such studies have shown the need to strengthen these skills, otherwise it may lead to substance and social network abuse, modification of lifestyle habits, inability to establish and maintain social relationships, and even the onset of mental illnesses.<sup>[26–30]</sup>

At the same time, there is evidence that women are more vulnerable than men to mental health problems, and that women are the group with the highest representation in the health sector.<sup>[31–34]</sup> Other groups, such as younger people or those with greater financial pressure, have also been significantly affected by the negative impact on the academic development of these young people and purchasing power, leading to stress, anxiety, and depression.<sup>[35]</sup>

Studies conducted on students show differences in the prevalence of mental health problems and resilience capacities at the beginning and at the end of the pandemic, finding a lower prevalence of psychological disturbances and enhanced coping strategies at the end of the pandemic than in studies before the confinement phase.<sup>[36]</sup> Similarly, studies conducted 2 to 3 years after the onset of the pandemic show significant differences in the occurrence of stress, anxiety, depression, and insomnia across countries. It can be concluded that these differences may be due to country-specific management of confinement measures, access to vaccination and health systems, and social support.<sup>[37]</sup>

At the same time, these studies following the end of confinement due to the COVID-19 pandemic show a significant evolution in many aspects of society thanks to the human capacity to learn and adapt, and thanks to the rapid development of vaccines against the virus.<sup>[38]</sup> With the decrease in virulence and lethality of SARS-CoV-2 through large-scale vaccination and individual protection measures implemented globally, improved survival was achieved, prevention and protection awareness were gained by the population, and human resilience was put to the test.<sup>[39]</sup>

Therefore, it is evidenced that the exceptional situation experienced worldwide due to the COVID-19 pandemic has had an impact on the mental health of the population, on the health and education systems, in addition to its direct effect on the future of Nursing students as the main assets as health professionals. Therefore, this study aimed to identify the impact that the COVID-19 pandemic has had on the mental health of Nursing students, as well as on other associated factors such as anxiety, fear, sleep disturbances, and coping strategies, while also identifying the validated scales used to measure the prevalence of the aforementioned alterations.

## 2. Methods

### 2.1. Design

This systematic review and meta-analysis were designed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 (PRISMA) guidelines<sup>[40]</sup> and registered in the International Prospective Register of Systematic Reviews<sup>[41]</sup> with code CRD42024541904. This study was waived from ethical approval or institutional review, as it is a systematic review of already published studies.

2.2. Search strategy

To identify the most relevant studies, a systematic search was carried out in the PubMed, Web of Science (WoS), Cumulative Index to Nursing and Allied Health Literature, and Scopus electronic databases using the keywords COVID-19, nurs\* student, anxiety and mental health, following the Condition Context Population strategy<sup>[42]</sup> (Table 1). The search in databases was carried out in January 2024, and it set the limits for the search between January 2020 and January 2024 to try to identify studies whose experimental or data collection phase had taken place during the pandemic status period (between March 2020 and May 2023).

The keywords used are indexed in the Medical Subject Headings (MeSH) thesaurus (Table 2). The search strategy applied in each database, as shown in Table 3, also included the Boolean operators AND and OR to obtain more exhaustive results.

2.3. Selection criteria

The following inclusion criteria were used to select the most relevant articles in line with the search objective:

- 1. Written in English or Spanish.
- 2. Nursing students as the target population.
- 3. Studies related to the mental health of Nursing students during the COVID-19 pandemic by assessing associated symptoms and factors such as anxiety, stress, fear, sleep disturbances, and coping strategies as main variables.

Also, the following exclusion criteria were applied:

- 1. Protocols, editorials, letters to Editor, reviews, and/or metanalyses.
- 2. Articles of low quality according to the Joanna Briggs Institute critical appraisal tools.
- 3. Those articles that could not be retrieved from databases.

Following these criteria, the articles were independently reviewed and selected by 2 researchers. In case of discrepancy, a third researcher could decide whether to include a study.

2.4. Study review and data collection

Finally, the review flowchart following the PRISMA methodology<sup>[40]</sup> is shown (Fig. 1). This review started with a total of n = 3866 studies after database searches, of which n = 141 were removed before screening for being duplicates. A total

n = 3725 studies were screened, being discarded n = 3079 after reading their titles and abstracts. Following this, n = 646 were sought for retrieval and n = 17 studies were eliminated because they could not be retrieved. Six hundred twenty-nine studies were assessed for eligibility excluding n = 593, specifically, due to several reasons, i.e. because they were not related to the main objective of this study (n = 44); because they were studies with a design, methodology or type of article that was not admitted, according to the exclusion criteria (n = 28); for not involving the population of interest (n = 502); and due to low quality according to the Joanna Briggs Institute (JBI)<sup>[43]</sup> critical appraisal tool (n = 19). Finally, 36 studies were included in this review.

2.5. Methodological quality assessment

Once the literature search was completed and the studies to be included in the present systematic review were selected, the critical appraisal tool of the JBI<sup>[43]</sup> was used following the checklist for analytical cross-sectional studies (File S1, Supplemental Digital Content, <http://links.lww.com/MD/O258>) to assess the methodological quality of the selected studies. Finally, those studies with a cutoff point of 4 or higher out of 8 were included.

2.6. Statistical analysis and metaanalysis

For the meta-analysis, prevalence rates for the GAD-7, Depression, Anxiety and Stress Scale (DASS-21), and PSS-10 scales were obtained directly from each study. Using the StatsDirect software package for performing meta-analyses (StatsDirect Ltd, Cambridge, UK), 4 random-effects meta-analyses were conducted to calculate the following proportional effect sizes using the DerSimonian-Laird method, with 95% CI: prevalence of depression; prevalence of the 3 DASS-21 dimensions; prevalence of stress; and prevalence of anxiety. Each effect size was calculated using the total sample of each study and the sample affected by depression, stress, and anxiety.

The effects and proportions of individual studies were assessed with a 95% confidence interval (CI). In addition, a heterogeneity analysis was performed using the *I*<sup>2</sup> value to decide upon a random-effects (*I*<sup>2</sup> > 50%) or fixed-effects (*I*<sup>2</sup> < 50%) meta-analysis. Publication bias was assessed using Egger's regression test for linear regression. Finally, a sensitivity analysis was performed excluding one study at a time, and no significant alteration of the effect size was found.

Heterogeneity has been depicted by forest plot diagrams presenting the proportions of individual studies and overall prevalence. Proportionality and 95% CI of pooled studies are provided. In all analyses, statistical significance was considered at *P* < .05 and 95% CI.

3. Results

3.1. Study characteristics

The initial search identified a total of 3866 references, which were then selected according to the topic of this review. A total of 36 studies<sup>[2–37]</sup> were finally included following the PRISMA 2020 guidelines (Fig. 1), all of which were quantitative with a cross-sectional design. The main characteristics (methods, objectives, and main findings) of each study are provided in Table 4.

The articles were published between 2020 and 2023; 1 of them in 2020,<sup>[25]</sup> 11 in 2021,<sup>[7–9,15,20,21,23,24,26,32,34]</sup> 13 in 2022,<sup>[2,3,5,6,11,14,16,18,22,28,29,31,33]</sup> and 11 in 2023.<sup>[4,10,12,13,17,19,27,30,35–37]</sup> All the questionnaires used were administered via online platforms except for one,<sup>[11]</sup> which was delivered during

| Table 1                   |                                                                           |
|---------------------------|---------------------------------------------------------------------------|
| CoCoPop format: key words |                                                                           |
| Condition                 | Mental health                                                             |
| Context                   | COVID-19 pandemic                                                         |
| Population                | Nursing students                                                          |
| Research question         | How has the COVID-19 pandemic affected mental health of nursing students? |

| Table 2          |                                                      |
|------------------|------------------------------------------------------|
| Search terms     |                                                      |
| MeSH             | Terms                                                |
| Nursing students | Nursing student OR Nursing students OR nurs* student |
| COVID-19         | COVID-19                                             |
| Mental health    | Mental health                                        |

**Table 3**  
Search strategy applied in each database

| Database | Search strategy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Search date | Outcomes | Selected |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|----------|
| PubMed   | Search: ((Covid-19) AND (mental health)) AND (nurs* student)<br>("covid 19"[All Fields] OR "covid 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms]<br>OR "covid 19 serotherapy"[All Fields] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid test-<br>ing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid<br>19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "sars cov 2"[All Fields] OR "sars cov 2"[MeSH Terms]<br>OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR<br>("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "cov"[All Fields]) AND 2019/11/01:3000/12/31[Date<br>- Publication]) AND ("mental health"[MeSH Terms] OR ("mental"[All Fields] AND "health"[All Fields]) OR "mental<br>health"[All Fields]) AND ("nurs*"[All Fields] AND ("student s"[All Fields] OR "students"[MeSH Terms] OR "students"[All<br>Fields] OR "student"[All Fields] OR "students s"[All Fields])) | 01/01/24    | 729      | 63       |
| WOS      | ((TS = (covid-19)) AND TS = (mental health)) AND TS = (nurs* student)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 07/01/24    | 819      | 36       |
| CINAHL   | Covid-19 AND mental health AND nurs* student<br>Broadening - Apply related words; Also search within the full text of the articles; Apply equivalent subjects<br>Specify by Language: - Spanish<br>Specify by Language: - English<br>Search methods - Boolean/Phrase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 13/01/24    | 1976     | 19       |
| Scopus   | (covid-19) AND (mental AND health) AND (nurs* AND students) AND PUBYEAR > 2019 AND PUBYEAR < 2025 AND<br>(EXCLUDE (DOCTYPE,"re") OR EXCLUDE (DOCTYPE,"cp") OR EXCLUDE (DOCTYPE,"ch") OR EXCLUDE (DOCTYPE,"ed")<br>OR EXCLUDE (DOCTYPE,"no") OR EXCLUDE (DOCTYPE,"le") OR EXCLUDE (DOCTYPE,"tb") OR EXCLUDE (DOCTYPE,"sh")<br>OR EXCLUDE (DOCTYPE,"bk") OR EXCLUDE (DOCTYPE,"dp")) AND (EXCLUDE (LANGUAGE,"Portuguese") OR EXCLUDE<br>(LANGUAGE,"Korean")) AND (LIMIT-TO (EXACTKEYWORD,"Students, Nursing"))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 20/01/24    | 342      | 15       |
| Total    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |          | 133      |

face-to-face classes at the University. All of them were conducted before the end of the pandemic decreed by the WHO in May 2023.<sup>[44]</sup> The percentage of studies in English was 97.2%, while the percentage of studies in Spanish was 2.8%.

The included studies had been conducted in different parts of the world: 1 in France<sup>[2]</sup>; 2 in Japan<sup>[3,24]</sup>; 2 in Australia<sup>[4,21]</sup>; 1 in Malaysia<sup>[5]</sup>; 3 in China<sup>[6,8,20]</sup>; 7 in Turkey<sup>[7,9,10,16,17,26,34]</sup>; 5 in Spain<sup>[11,12,15,31,33]</sup>; 1 in Serbia<sup>[13]</sup>; 1 in Italy<sup>[14]</sup>; 1 in Poland<sup>[18]</sup>; 1 in Saudi Arabia<sup>[19]</sup>; 1 in Israel<sup>[25]</sup>; 1 involving Portugal and Spain<sup>[26]</sup>; 1 in India<sup>[27]</sup>; 1 involving Greece, Albania, Cyprus, Spain, and Kosovo<sup>[28]</sup>; 1 including Greece, Albania, Cyprus, Spain, and Kosovo<sup>[28]</sup>; 2 in Iran<sup>[22,29]</sup>; 1 in Oman<sup>[30]</sup>; 1 in Norway<sup>[32]</sup>; 1 in Palestine<sup>[35]</sup>; 1 in Nepal<sup>[36]</sup>; and 1 involving United Arab Emirates, Saudi Arabia, Oman, and the United Kingdom.<sup>[37]</sup> Ten studies had a nationwide sample,<sup>[2-4,9,10,12,17,19,26,28]</sup> nineteen studies were set in an only city,<sup>[5-8,13-16,20-22,24,25,27,30,31,33-35]</sup> and 7 studies involved 2 or more cities.<sup>[11,18,23,29,32,36,37]</sup>

Altogether, 32,561 Nursing students composed the total sample. Approximately, 74.3% of the overall sample were women, the mean age was 22.06 years, and the ages of the sample ranged principally from 18 to +23 years. In some studies, the maximum age exceeded 30 years old.<sup>[2,6,17,18,26,32,36]</sup> Two studies did not report the mean age of their sample<sup>[3,14]</sup> and, also, 3 studies did not indicate the sex variable.<sup>[14,32,36]</sup> In all the selected articles, the sample consisted of pre-graduate Nursing students, one of them also included Medical students,<sup>[5]</sup> and another study also included Obstetrics and Surgery students.<sup>[22]</sup> Twenty studies were set in public universities,<sup>[5,7,8,11,13-16,18,20-23,25,29,31-34,36]</sup> 4 studies were located in private universities,<sup>[24,27,30,35]</sup> 2 studies combined public and private universities,<sup>[3,37]</sup> and 10 studies did not indicate the type of university.<sup>[2,4,6,9,10,12,17,19,26,28]</sup>

The main dimensions analyzed for this study were the following: psychological distress, anxiety, depression, fear, sleep disturbances, and coping strategies. Table 5 shows the sample sizes, methods of data collection, and the results of the assessments using validated scales for each of these dimensions, assessed in the 36 studies included in this review.

For the assessment of psychological distress, the following validated scales were used: COVID-19 Stress Scale (CSS),<sup>[45]</sup>

COVID-19 Student Stress Questionnaire (CSSQ),<sup>[46]</sup> DASS-21,<sup>[47]</sup> 12-Item General Health Questionnaire,<sup>[48]</sup> Impact of Event Scale-Revised,<sup>[49]</sup> Kessler Psychological Distress Scale (K6),<sup>[50]</sup> Perceived Stress Scale (PSS),<sup>[51]</sup> 10-Item Perceived Stress Scale (PSS-10),<sup>[52]</sup> 10-Item Perceived Stress Scale related to COVID-19 (PSS-10-C),<sup>[53]</sup> Hopkins Symptom Checklist, Symptom Checklist-25,<sup>[54]</sup> and WHO-Five Well-being Index (WHO-5).<sup>[55]</sup>

The following validated scales were used for the assessment of anxiety: Coronavirus Anxiety Scale<sup>[56]</sup>; DASS-21; Generalized Anxiety Disorder 7-Item Scale (GAD-7)<sup>[57]</sup>; Brief Goldberg Anxiety and Depression Scale (GADS)<sup>[58]</sup>; Hospital Anxiety and Depression Scale<sup>[59]</sup>; and State-Trait Anxiety Inventory (STAI).<sup>[60]</sup>

For the assessment of depression, the following validated scales were used: DASS-21 and Patient Health Questionnaire 9-Item.<sup>[61]</sup>

The following validated scales were used for the assessment of fear: the COVID-19 Phobia Scale<sup>[62]</sup> and the Fear of COVID-19 Scale (FCV-19S).<sup>[63]</sup>

To assess sleep disturbances, the following validated scales were used: Athens Insomnia Scale (AIS)<sup>[64]</sup>; Bergen Insomnia Scale (BIS)<sup>[65]</sup>; Insomnia Severity Index (ISI-7)<sup>[66]</sup>; and Pittsburgh Sleep Quality Index (PSQI).<sup>[67]</sup>

Finally, for the assessment of coping strategies, the following validated scales were used: Bidimensional Resilience Scale (BRS)<sup>[68]</sup>; Brief COPE Inventory (BriefCOPE)<sup>[69]</sup>; and Coping Behaviour Questionnaire (COPE).<sup>[70]</sup>

Psychological distress was present in 25 studies; the presence of anxiety was found in 27 studies; signs of depression in 20 studies; evidence of fear in 12 studies; sleep disturbances in 10 studies; and the most common coping strategies were described in 6 studies.

### 3.2. Methodological quality and risk of bias

The included studies were assessed with the JBI Model of Evidence-Based Healthcare critical appraisal tool, obtaining a minimum cutoff point of 4/8 (Table 4). Of the 36 selected studies, 6 of them scored 4/8,<sup>[8,9,13,23,29,32]</sup> 5 scored 5/8,<sup>[14,19,26,33,35]</sup> 14 scored 6/8,<sup>[2,4-7,10,15-18,28,30,34,37]</sup> 7 scored 7/8,<sup>[12,20,22,24,25,27,36]</sup> and 4 scored 8/8.<sup>[3,11,21,31]</sup>

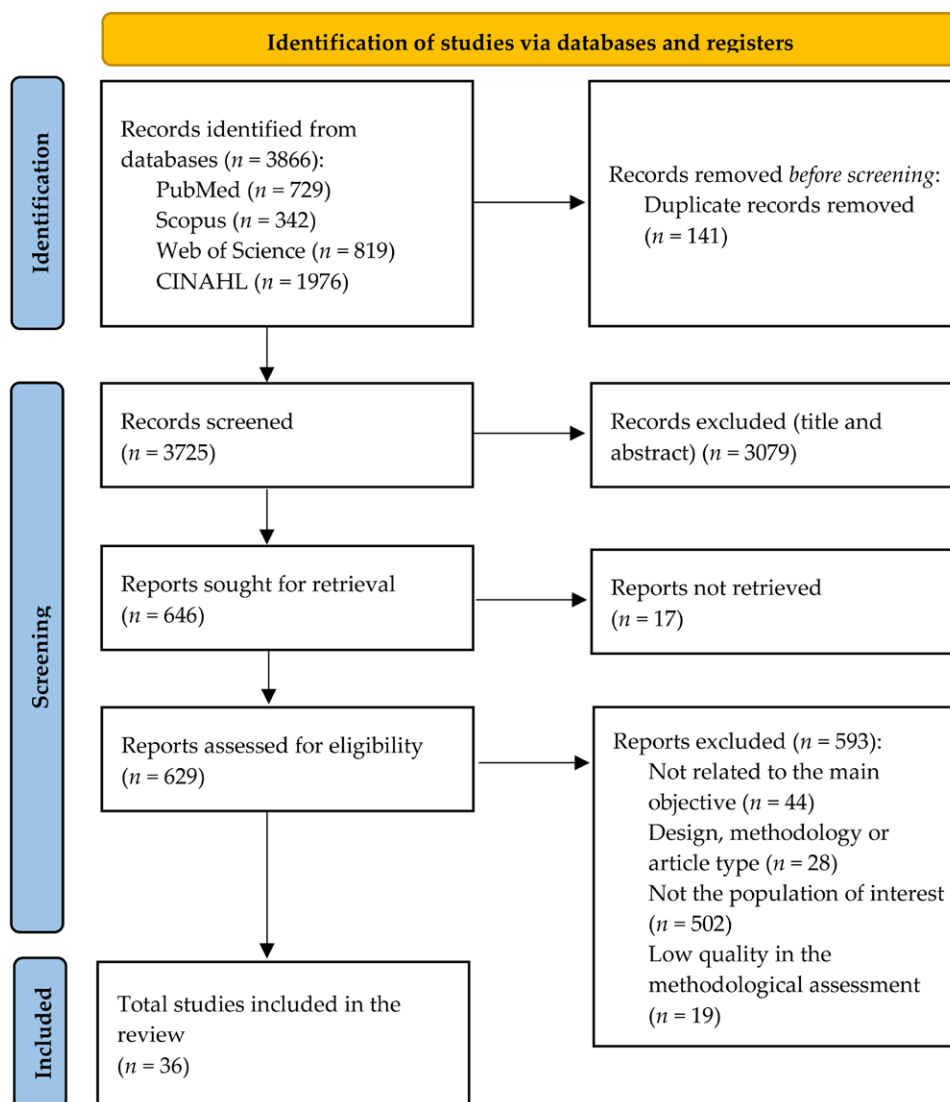


Figure 1. PRISMA flowchart.

### 3.3. Main dimensions related to the mental health of Nursing students

#### 3.3.1. Psychological distress, anxiety, and depression.

**3.3.1.1. Depression, Anxiety, and Stress Scale.** Most of the selected articles measured psychological distress, anxiety, and depression jointly using the Depression, Anxiety, and Stress Scale (DASS-21).

Usher et al<sup>[4]</sup> found a prevalence of psychological distress, anxiety, and depression among Nursing students during the COVID-19 pandemic of 78.7%, 61.4%, and 63.9%, respectively, with a 95% CI. This was higher in final-year students owing to the imminent proximity of their professional activity. Another study showed that, despite higher levels of depression, anxiety, and stress, the knowledge gained during the clinical practice period had resulted in improved mental health of the students.<sup>[6]</sup>

According to Mishra et al,<sup>[27]</sup> during the COVID-19 pandemic, 9.7% of Nursing students showed symptoms of stress, 27.7% showed symptoms of anxiety, and 26.2% showed symptoms of depression, with anxiety and depression being more prevalent than stress, and the latter being related to self-blame and substance abuse. Students who had not yet had contact with clinical practice showed lower levels of stress than those who

had already had such contact, and uncertainty was identified as contributing to stress, according to Subirón-Valera's study.<sup>[31]</sup>

According to previous studies,<sup>[21]</sup> the most significant factors for scoring high on the DASS-21 scale were: female sex, being young, having completed more years of studies, and scoring low on the general health scale. Also, anxiety, stress, and depression levels were higher at the beginning of the COVID-19 pandemic, at 37.2%, 40.2%, and 48.5%, respectively, than in studies conducted later in the pandemic.<sup>[29]</sup>

According to the study by Dastan et al,<sup>[34]</sup> during the COVID-19 pandemic, the prevalence of stress, anxiety, and depression, with 38.2%, 50.8%, and 56.3%, respectively, was significant in half of the Nursing students. Also, the students with the greatest psychological impact were those with the worst economic situation, those who knew someone diagnosed with COVID-19, and those who did not use social networks during the pandemic.

Other studies also revealed a high score on the DASS-21<sup>[7]</sup> and indicated that more than half of the Nursing students scored high on all 3 items. Of particular relevance were socioeconomic status, as well as age, sex, and place of residence.<sup>[35]</sup>

**3.3.1.2. Generalized Anxiety Disorder 7-Item Scale (GAD-7).** Other authors measured anxiety and depression using the Generalized Anxiety Disorder 7-Item Scale (GAD-7).

**Table 4****Summary of main characteristics and findings of the studies included in the systematic review**

| Author, year/<br>country                                                    | Methods                            | Objectives                                                                                                                                                                                                              | Main findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | JB1 |
|-----------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Fragerman et al (2022)/<br>France <sup>[2]</sup>                            | Cross-sectional quantitative study | To assess the mental health of health students during the third wave of the COVID-19 pandemic in France compared to the first wave.                                                                                     | The prevalence of psychological distress was 85%. The percentage of female students was higher in Nursing than in other health sciences (90% vs 81%). Nursing students had fewer opportunities for isolation than the rest (77% vs 85%). Being male and not living alone was associated with reduced risk of psychological distress. Not having the ability to isolate and having little or moderate financial hardship was associated with increased risk of psychological distress.                                                                                                                                                        | 6/8 |
| Ito et al (2022)/<br>Japan <sup>[3]</sup>                                   | Cross-sectional quantitative study | To assess the prevalence of anxiety, depression, and insomnia in Nursing students in Japan during the COVID-19 pandemic and to determine the associated risk factors.                                                   | Anxiety, depression, and sleep disturbances were present in 4.8%, 12.4%, and 18.0% of the sample, respectively. Results related to fear obtained a mean of $17.26 \pm 5.09$ . The risk factors that most precipitated anxiety, depression, and insomnia were "satisfaction" and "fear of COVID-19." The prevalence of anxiety, depression, and insomnia among Nursing students was lower than in previous studies due to the increase in COVID-19 vaccinations during the time of the questionnaire, as happened with fear of COVID-19.                                                                                                      | 8/8 |
| Usher et al (2023)/<br>Australia <sup>[4]</sup>                             | Cross-sectional quantitative study | To measure and describe the impact of COVID-19 on the mental health of Australian Nursing students.                                                                                                                     | Data showed a prevalence of 78.7% in terms of psychological distress, 61.4% for anxiety, and 63.9% for depression, being higher than at the pre-pandemic level. The psychological impact of COVID-19 was greater in students in their final academic year, as well as in those who already had a history of mental health problems. Coping strategies adopted were problem-focus, regulate emotions, and adaptation.                                                                                                                                                                                                                         | 6/8 |
| Arifin et al (2022)/<br>Malaysia <sup>[5]</sup>                             | Cross-sectional quantitative study | To assess the association between depression, anxiety, and behavioral changes among Medical and Nursing students during the COVID-19 pandemic in Malaysia.                                                              | 23.6% of the students showed severe or moderate symptoms of anxiety, 33.6% showed moderate to severe symptoms of depression, and 87% of students showed greater behavioral patterns related to COVID-19 prevention. Participants with high levels of anxiety had a greater preventive attitude against COVID-19. Females showed a greater preventive attitude than males.                                                                                                                                                                                                                                                                    | 6/8 |
| Hung, Ng & Choi (2022)/China <sup>[6]</sup>                                 | Cross-sectional quantitative study | To examine the mental health and quality of life of Hong Kong Nursing students during the COVID-19 pandemic.                                                                                                            | 39.5% of sample had psychological distress, 47.6% presented anxiety, and 57.1% presented symptoms of depression. Students who had completed a clinical stay during the pandemic showed a higher level of fear and lower of quality of life than those who had not done so. The FCV-19 scale and the WHOQOL-BREF questionnaire maintain a negative bi-directional correlation. The results of the study showed that Nursing students in Hong Kong had higher levels of fear, negative emotional state, and impact on their quality of life during the COVID-19 pandemic.                                                                      | 6/8 |
| Sentürk & Bakır (2021)/<br>Turkey <sup>[7]</sup>                            | Cross-sectional quantitative study | To determine the relationship between intolerance to uncertainty among Nursing students in Turkey, as well as depression, anxiety, and stress levels during the COVID-19 pandemic confinement.                          | Data showed a prevalence of psychological distress, anxiety, and depression of 54.0%, 74.0%, and 57.0%, respectively. More than half of the Nursing students scored high on the DASS-21 scale. Students living outside the capital had higher levels of intolerance to uncertainty than those living in the capital. The study shows the relationship between increased intolerance to uncertainty and increased depression, anxiety, and stress.                                                                                                                                                                                            | 6/8 |
| Zhu, Wang H & Wang A (2021)/China <sup>[8]</sup>                            | Cross-sectional quantitative study | To explore the mental health and emotional management of Nursing students in China during the COVID-19 pandemic.                                                                                                        | The study obtained a prevalence of 55.0% and 56.4% in terms of anxiety and depression, respectively. A total of 314 students out of 342 responded that both their lives and their studies had been negatively affected by the COVID-19 pandemic. Both depression and anxiety are mental illnesses that are not determined by age, but there is some susceptibility to them on the part of Nursing students. Due to the pandemic, the pressure on healthcare increased significantly. Due to this increase in care pressure, as well as job uncertainty, Nursing students experienced an increase in mental health-related pathologies.       | 4/8 |
| Göl & Erkin (2021)/<br>Turkey <sup>[9]</sup>                                | Cross-sectional quantitative study | To determine the mental state of Nursing students in Turkey when the COVID-19 pandemic was at its peak.                                                                                                                 | The main findings showed a prevalence of 71.5% and 2.8% of psychological distress and sleep disturbances, respectively. The GHQ-12 showed that Nursing students were at risk of developing mental problems, including those who slept or ate less during the pandemic, as well as those who thought they had symptoms compatible with COVID-19. Difficulty falling asleep and staying asleep, as well as poor sleep quality, are the most common problems in psychiatric illnesses. The study showed that most of the participants scored at risk of developing mental health problems.                                                      | 4/8 |
| Yurttaş et al (2023)/<br>Turkey <sup>[10]</sup>                             | Cross-sectional quantitative study | To evaluate the relationship between anxiety prior to the clinical practice period and anxiety about COVID-19 in Nursing students in Turkey.                                                                            | Statistically significant differences were found between the score of the STAI scale and the academic year of the students. The presence of own chronic diseases caused an increase in the mean score of the STAI. A statistically significant decrease in anxiety levels was found after the clinical practice. Students who had not been previously infected with COVID-19 had a significantly higher mean anxiety. It was concluded that the level of stress and anxiety of Nursing students was higher before the start of their first period of clinical practice during the COVID-19 pandemic, decreasing after the clinical practice. | 6/8 |
| Mendez-Pinto, Antuña-Casal & Mosteiro-Díaz (2022)/<br>Spain <sup>[11]</sup> | Cross-sectional quantitative study | To evaluate the psychological impact of the COVID-19 pandemic on Nursing students from 2 faculties in Asturias, Spain, and to explore sociodemographic differences that may be risk factors for mental health problems. | A prevalence of 37.2% was obtained for the presence of fear, and 60.9% reported feeling stressed. A total of 60.2% of students had normal levels of anxiety, 35.5% had borderline anxiety levels, and 4.2% had severe anxiety levels. In relation to depression, 84.5% of students had normal levels, 14.5% had levels borderline levels, and 1% had elevated levels. 19.5% of females had severe levels of psychological impact compared to 7.8% of males.                                                                                                                                                                                  | 8/8 |

(Continued)

**Table 4**  
**(Continued)**

| Author, year/<br>country                                        | Methods                            | Objectives                                                                                                                                                                                                                                                                     | Main findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | JBI |
|-----------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Mosteiro-Díaz et al (2023)/ Spain <sup>[12]</sup>               | Cross-sectional quantitative study | To determine the prevalence and levels of anxiety and depression in Nursing students in Spain during the confinement imposed following the COVID-19 pandemic, as well as to examine the factors associated with high levels of anxiety and depression in the study population. | Data obtained showed a prevalence of 56.4% in terms of anxiety and 38.2% in terms of depression. The factors related to the increase in depressive symptoms were: academic year, smoking, stress, fear, and having acquaintances diagnosed with COVID-19. Factors related to anxious symptoms were: being a healthcare worker, smoking, fear, stress, and having an acquaintance or family member infected with COVID-19. The majority of Spanish students reported medium and high levels of anxiety during the COVID-19 pandemic, and more than a third of them presented depressive symptoms. The results showed that first-year students had higher levels of anxiety than the rest.                                  | 7/8 |
| Tomic et al (2023)/ Serbia <sup>[13]</sup>                      | Cross-sectional quantitative study | To assess the level of fear and stress related to COVID-19 among Serbian Nursing students, as well as satisfaction with distance learning during the pandemic.                                                                                                                 | 78.4% of sample presented symptoms of psychological distress. Fear was described through the FCV-19 scale, with a mean of $14.41 \pm 5.88$ . Of the 167 students, 5 (3%) had very low stress levels, 31 (18.6%) had low stress levels, 62 (37.1%) had moderate stress levels, 48 (28.7%) had high stress levels, and 21 (12.6%) had very high levels of stress related to COVID-19. First-year students had significantly lower levels of stress than second and third-year students. First-year students had lower levels of fear than second and third-year students. A significant relationship was found between high levels of fear on the FCV-19 scale and high levels of stress on the CSS.                        | 4/8 |
| Curcio et al (2022)/Italy <sup>[14]</sup>                       | Cross-sectional quantitative study | To evaluate the perceived impact of the COVID-19 pandemic on nursing students, by assessing their emotions, the level of concern about contracting the virus, and their perceived stress.                                                                                      | 38.8% (n = 275) of responders stated to be "extremely" or "a lot" worried that their families might contract coronavirus, 41.9% (n = 297) were "moderately" worried, and only 19.3% (n = 137) were "little" or "not at all" worried for their families. The perceived risk for nurses contracting the virus during their work activity was "extremely" or "a lot" probable for 69.7% of the participants. According to the GAD-7 scale, most students showed mild to moderate levels of anxiety, while only 18.8% showed minimal levels of anxiety. According to the CSS scale, the majority of students (47.1%) showed moderate levels of stress, 25% showed low levels of stress, and 28% showed high levels of stress. | 5/8 |
| Marcén-Román et al (2021)/ Spain <sup>[15]</sup>                | Cross-sectional quantitative study | To analyze the stress caused by the impact of the COVID-19 pandemic on Health Sciences students (Nursing, Physiotherapy, and Occupational Therapy) from the University of Zaragoza, Spain, almost 1 year after the pandemic began.                                             | A positive correlation was obtained between perceived stress due to COVID-19, anxiety, and depression, with a strong correlation between the last two. Nursing students in the 3 <sup>rd</sup> year obtained a result of lower perceived stress than those from the rest of the disciplines in the same course. 13.1% of the total number of students were stressed, 71.4% of students showed anxiety, and 81% showed depressive symptoms. 90.9% of the students who showed stress were female. The results show that stress related to the COVID-19 pandemic could affect female and final year students to a greater extent, as well as the unemployed and those who had less contact with COVID-19.                    | 6/8 |
| Aksoy, Gurdogan & Dirik (2022)/ Turkey <sup>[16]</sup>          | Cross-sectional quantitative study | To examine the presence of COVID-19 phobia that Turkish Nursing students experienced during their clinical practice education and the factors affecting it.                                                                                                                    | 83.8% of the sample had anxiety when using common areas (toilets, elevators etc...). Students had a moderate level of COVID-19 phobia with a mean score of $47.85 \pm 12.87$ . High levels of phobia were related to: being diagnosed with the infection, the death of a family member from it, being afraid of becoming infected, being afraid to treat infected patients, and anxiety about sharing common areas.                                                                                                                                                                                                                                                                                                       | 6/8 |
| Çürük, Özgül & Karadag (2023)/ Turkey <sup>[17]</sup>           | Cross-sectional quantitative study | To determine the effect of COVID-19 on levels of fear, anxiety, and sleep in Nursing students.                                                                                                                                                                                 | The study shows that 51.8% of Nursing students had sleep problems and 70.9% showed anxiety (39.9% mild, 20.8% moderate, 12.2% severe). High levels of anxiety were obtained in: female, 1 <sup>st</sup> year students, ex-smokers, ex-drinkers, students with chronic diseases, drug users, students who did not apply self-protection measures against COVID-19, and those who were diagnosed with the infection. Fear of COVID-19 was statistically significant, with a mean of $18.23 \pm 6.31$ , and positively correlated with anxiety and insomnia.                                                                                                                                                                 | 6/8 |
| Bodys-Cupak, Czubek & Grochowska (2022)/ Poland <sup>[18]</sup> | Cross-sectional quantitative study | To evaluate stress levels, sleep disorders, and coping strategies in Polish Nursing students during the COVID-19 pandemic.                                                                                                                                                     | A high level of stress was obtained in 64.4% of students aged 20-30 years and in 69.7% of those over 30 years of age. High levels of stress were more common in females (66.7%) than in males (56%) and in students who had worked in hospitals with COVID-19 patients (78%) than in those who had not (64.3%). Sleep disorders were more frequent in students aged 30 years or older (67.2%) than in those under 30 (52%) and in students with family members in the health profession (50.9%). Students who had high stress levels also had greater sleep disorders (70.2%) than those who experienced stress at a low or average level (30.4%).                                                                        | 6/8 |
| Albikawi et al (2023)/Saudi Arabia <sup>[19]</sup>              | Cross-sectional quantitative study | To estimate the prevalence of fear related to COVID-19, depression, anxiety, and insomnia among female Nursing college students throughout the pandemic and to determine the predictors of insomnia.                                                                           | The results showed that 80.2%, 30.6%, and 38.7% of Nursing students showed fear of COVID-19, depression, and anxiety, respectively. 27.0% of them reported having insomnia problems. High levels of insomnia assessment were associated with a significant increase in the age of the participants. Anxiety and fear of COVID-19 showed a significant positive correlation with insomnia. It was concluded that depression, anxiety, fear of COVID-19, and the existence of chronic diseases had a substantial impact on insomnia in students, acting as possible predictors.                                                                                                                                             | 5/8 |
| Gao et al (2021)/ China <sup>[20]</sup>                         | Cross-sectional quantitative study | Assessing the mental health of Nursing students during the COVID-19 pandemic in Henan, China.                                                                                                                                                                                  | 22.8% of nursing students had insomnia, 2.9% had depression, 2.9% had anxiety, and 1.1% had symptoms of stress. Students in the second group (senior), male and urban, presented higher levels of depression, anxiety, and stress than those in the first group (junior), female sex and rural. The study shows that senior students were at increased risk for depression and anxiety. Being male was linked to a high risk of depression, stress, and insomnia.                                                                                                                                                                                                                                                         | 7/8 |

(Continued)

**Table 4**  
(Continued)

| Author, year/<br>country                                                                   | Methods                                      | Objectives                                                                                                                                                                                                             | Main findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | JB1 |
|--------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Wynter et al<br>(2021)/<br>Australia <sup>[21]</sup>                                       | Cross-<br>sectional<br>quantitative<br>study | To assess depression, anxiety, and stress among undergraduate Nursing and Midwifery students during the COVID-19 pandemic.                                                                                             | The results show moderate levels of depression, mild levels of anxiety, and severe levels of stress according to the score on the DASS-21 scale. 37.2% and 40.2% showed moderate to severe levels of anxiety and stress, respectively. 48.5% showed moderate to severe symptoms of depression. The most significant factors in obtaining a high score on the DASS-21 scale were: being female, being young, having completed more years of study, and obtaining a low score on the general health scale.                                                                                                                                                                                                                      | 8/8 |
| Haririan et al<br>(2022)/Iran <sup>[22]</sup>                                              | Cross-<br>sectional<br>quantitative<br>study | To investigate the mental health of Nursing, Midwifery, and Operating Theatre students and the intention to leave during the COVID-19 pandemic in Iran.                                                                | More than 20% of students experienced varying degrees of depression, anxiety, and stress. Nursing students showed a prevalence of psychological distress, anxiety, and depression of 12.36%, 25.3%, and 23.53%, respectively. Male students and those with moderate-high levels of depression had a higher intention to leave. A significant relationship was found between mental health and intention to leave among Nursing students. The highest levels of depression, anxiety, and stress were found among Nursing students, as well as the highest intention to quit.                                                                                                                                                   | 7/8 |
| Aslan & Pekince<br>(2021)/<br>Turkey <sup>[23]</sup>                                       | Cross-<br>sectional<br>quantitative<br>study | To evaluate Nursing students' views on the COVID-19 pandemic and their perceived stress levels.                                                                                                                        | It was found that the students presented a moderate level of stress. There were significant differences in stress levels across age ranges, with those aged between 18 and 20 having the highest levels of stress. Differences in stress levels related to sex were obtained, with females presenting higher levels of stress than males. No significant differences were found in stress levels related to the academic year.                                                                                                                                                                                                                                                                                                | 4/8 |
| Tanji & Kodama<br>(2021)/<br>Japan <sup>[24]</sup>                                         | Cross-<br>sectional<br>quantitative<br>study | To investigate the prevalence of psychological stress among Japanese Nursing students after the first semester of 2020 with shifted classes and online practice.                                                       | The prevalence of moderate and severe psychological distress among Nursing students at the Akita School of Nursing during COVID-19 was 58.5% (46% moderate and 12.5% severe). The prevalence of distress among the Nursing students in the study was almost twice as high as in the general population of the same age before the pandemic. The prevalence of sleep disturbances was 36.3%. The study shows that medical history, insomnia, and resilience were related to psychological distress among students.                                                                                                                                                                                                             | 7/8 |
| Savitsky et al<br>(2020)/Israel <sup>[25]</sup>                                            | Cross-<br>sectional<br>quantitative<br>study | To assess anxiety levels and coping strategies among Nursing students in Israel during the COVID-19 pandemic.                                                                                                          | The study showed a prevalence of moderate levels of anxiety of 42.8% and of severe anxiety of 13.1%. High levels of anxiety related to sex, lack of PPE, and fear of infection were obtained. Low levels of anxiety related to high resilience and the use of humor were obtained.                                                                                                                                                                                                                                                                                                                                                                                                                                            | 7/8 |
| Laranjeira et al<br>(2021)/<br>Portugal &<br>Spain <sup>[26]</sup>                         | Cross-<br>sectional<br>quantitative<br>study | To explore perceived stress during COVID-19 in Nursing students from Portugal and Spain and to analyze the related factors and psychological problems that may be associated with stress.                              | 64% of sample showed difficulties in sleep patterns. A total of 67.1% reported having severe somatic symptoms. High perceived stress scores were obtained in 558 of the participants. An inverse relationship was obtained between the level of perceived stress and daily satisfaction.                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5/8 |
| Mishra et al<br>(2023)/India <sup>[27]</sup>                                               | Cross-<br>sectional<br>quantitative<br>study | To assess the prevalence of psychological distress, associated lifestyle behaviors, and associated coping strategies among the students of the healthcare profession during the COVID-19 pandemic.                     | 26.2% had symptoms of depression, 27.7% had symptoms of anxiety, and 9.7% had symptoms of stress. 36.7% presented symptoms suggestive of any mental health problem. Factors such as BMI and consumption of carbonated beverages were identified as related to anxiety, depression, and stress. Self-blame was associated with depressive symptoms in female students. Substance abuse was associated with stress in female students. The main coping strategies adopted were acceptance, self-distraction, active coping, planning, and emotional support.                                                                                                                                                                    | 7/8 |
| Patelarou et al<br>(2022)/Greece,<br>Albania,<br>Cyprus, Spain<br>& Kosovo <sup>[28]</sup> | Cross-<br>sectional<br>quantitative<br>study | To assess fear among nurses and Nursing students during the second wave of the COVID-19 pandemic in 5 European countries (Greece, Albania, Cyprus, Spain, and Kosovo) before the start of mass vaccination.            | Fear was assessed by the FCV-19 validated scale, with a mean of $14.6 \pm 5.9$ . Nursing students experienced less fear than nurses. Women had higher levels of stress than men in the study. Marital status influenced the level of fear, with those in the "married" state reporting higher levels of fear than the rest due to the fear of infecting their relatives. The predictors of high levels of fear were being female, marital status, the existence of previous chronic diseases, and living in a country with high mortality from COVID-19.                                                                                                                                                                      | 6/8 |
| Cheraghbeigi et al<br>(2022)/Iran <sup>[29]</sup>                                          | Cross-<br>sectional<br>quantitative<br>study | To investigate the mental health of nursing students and associated factors during the fourth wave of the COVID-19 pandemic at the Universities of Ahvaz and Kermanshah, Iran.                                         | 61% of the students showed good mental health, 32.2% showed suspicion of having a mental health disorder, and 6.8% reported they had a severe mental health problem. The mean of anxiety and depression was $6.03 \pm 2.67$ and $3.96 \pm 1.91$ , respectively. The most common mental health problem was related to symptom somatization, and the second most common was obsessive-compulsive disorder. The female sex showed greater problems in their mental health compared to males, as well as a worse mental health. The variables sex, history of mental illness, history of COVID-19 or suspected infection, and level of trust in public statistics on COVID-19 had the greatest impact on students' mental health. | 4/8 |
| Al Maqbali et al<br>(2023)/<br>Oman <sup>[30]</sup>                                        | Cross-<br>sectional<br>quantitative<br>study | To describe the prevalence of mental health problems (fear, stress, anxiety, depression, and insomnia) and their contributing factors among Nursing students in Oman 2 years after the start of the COVID-19 pandemic. | The study showed a moderate level of fear of COVID-19 among the participants. 94% of them reported feeling stressed; 70% reported having anxiety; 53% showed symptoms of depression; and 38% showed symptoms of insomnia. The study concludes that fear of COVID-19 is related to moderate levels of stress, anxiety, depression, and insomnia among Nursing students.                                                                                                                                                                                                                                                                                                                                                        | 6/8 |

(Continued)

**Table 4**  
(Continued)

| Author, year/<br>country                                         | Methods                            | Objectives                                                                                                                                                                                                                                                                | Main findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | JBI |
|------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Subiron-Valera et al (2022)/ Spain <sup>[31]</sup>               | Cross-sectional quantitative study | To determine the degree of psychological distress and fear of COVID-19 in 2 <sup>nd</sup> and 3 <sup>rd</sup> year Nursing students at the University of Zaragoza before the start of their clinical placements during the 2020-2021 academic year.                       | According to the DASS-21 scale, a mean of $13.62 \pm 8.65$ , $7.26 \pm 6.56$ , and $8.66 \pm 8.61$ was obtained for stress, anxiety and depression, respectively. It is concluded that the students' overall psychological distress level was low before the start of their clinical practices. According to the FCV-19 scale, a moderate level of fear was obtained, with a mean of $2.94 \pm 0.66$ , especially related to illness, death from infection, and social isolation. The level of psychological distress and fear of COVID-19 was slightly higher when they lived with their relatives. Students who did not know their placement location for the clinical placements showed a higher level of anxiety and fear of social isolation. | 8/8 |
| Beisland et al (2021)/ Norway <sup>[32]</sup>                    | Cross-sectional quantitative study | To explore the associations between self-reported fear of COVID-19, general health, psychological distress, and overall quality of life (QoL) in a sample of Norwegian baccalaureate Nursing students compared to pre-pandemic baseline data from the general population. | In the FCV-19 scale, Nursing students showed a higher level of fear than the pre-pandemic baseline data of the general population, with a mean of $2.45 \pm 0.8$ . Nursing students had a significantly lower level of general health, higher levels of psychological distress, with a mean of $2.68 \pm 1.03$ , and a lower level of quality of life compared to pre-pandemic data.                                                                                                                                                                                                                                                                                                                                                               | 4/8 |
| Roldan-Merino et al (2022)/ Spain <sup>[33]</sup>                | Cross-sectional quantitative study | To evaluate the psychological impact on Nursing students at the end of period of confinement during the first wave of the COVID-19 outbreak in Spain.                                                                                                                     | In relation to lifestyle habits during confinement, low levels of consumption of energy drinks (12.3%), alcohol (27.6%), and fast food (37.4%) were obtained, in contrast to the increase in the consumption of anxiolytics (6.4%), television (38.4%), social networks (69%), WhatsApp (59.1%), and reading (40.4%). Regarding the psychological state, 44.3% of the students presented a low level of psychological well-being related to stress and 22.2% presented a severe level of anxiety. The study shows that anxiety levels in Nursing students due to the COVID-19 confinement have been high, and that levels of psychological well-being have decreased for the same reason.                                                          | 5/8 |
| Dastan et al (2021)/ Turkey <sup>[34]</sup>                      | Cross-sectional quantitative study | To examine psychosocial and mental effects of COVID-19 pandemic among Nursing students in Turkey.                                                                                                                                                                         | The results showed a prevalence of stress of 38.2%, anxiety of 50.8%, and depression of 56.3%. The students who experienced the most psychological damage were those with average and bad economic status, those having a COVID-19 diagnosed relative, those not contended with the information gained on COVID-19 and those not using social media during COVID-19 pandemic situation. The study concludes that half of the Nursing students showed levels compatible with stress, anxiety, and depression related to the COVID-19 pandemic.                                                                                                                                                                                                      | 6/8 |
| Abu Liel (2023)/ Palestine <sup>[35]</sup>                       | Cross-sectional quantitative study | To assess the psychological state in terms of stress, anxiety, and depression of Nursing students during the COVID-19 pandemic.                                                                                                                                           | The study revealed that 24.3% of the students showed symptoms of stress, 37.8% showed anxiety, and 22.5% depression. Socioeconomic status had a significant effect in terms of anxiety, stress, and depression. Age had a significant effect on depression levels; place of residence had a significant effect on anxiety levels; and the sex had a significant effect on stress levels.                                                                                                                                                                                                                                                                                                                                                           | 5/8 |
| Kalikotay et al (2023)/ Nepal <sup>[36]</sup>                    | Cross-sectional quantitative study | To assess levels of anxiety and ways of coping among Nursing students on the selected campuses in Nepal.                                                                                                                                                                  | The study shows a prevalence of mild anxiety levels of 45.6%, moderate anxiety levels of 25%, and severe anxiety levels of 13%. Age, educational programme, and type of family unit showed a significant correlation with the level of anxiety. The coping strategies most used by the students were: the use of PPE (94.9%), relaxation activities (81%), family and friends support (79.5%), and the use of spiritual strategies (42.3%). Almost a third (28.4%) had to go to the doctor in order to reduce their stress levels.                                                                                                                                                                                                                 | 7/8 |
| Maqbali et al (2023)/Saudi Arabia, Oman, UAE, UK <sup>[37]</sup> | Cross-sectional quantitative study | To assess levels of fear, stress, anxiety, depression, and insomnia among undergraduate Nursing students in 4 countries 2 years after the start of the pandemic.                                                                                                          | 91.6% of the students presented stress, 46.2% showed fear, 69.1% anxiety, 59.8% depression, and 73.2% insomnia. The comparison between countries showed that 52.5% of students in Saudi Arabia reported fear of COVID-19, being this the country with a higher level than the rest. The prevalence of anxiety was higher in the United Arab Emirates (80%) than in England (79%), Saudi Arabia (71%), and Oman (59%). The prevalence of depression was 70% in Saudi Arabia, 64% in the United Arab Emirates, 63% in England, and 41% in Oman. A higher prevalence of insomnia was found in the United Arab Emirates and Saudi Arabia than in England and Oman. Finally, there were no significant differences regarding stress across countries.   | 6/8 |

This is the case of the study by Ito et al in 2022,<sup>[31]</sup> where the prevalence of anxiety was 4.8%, detecting fear of COVID-19 and daily satisfaction as risk factors. The prevalence of anxiety among Nursing students was lower than in previous studies due to the increase in vaccinations against COVID-19 during the time of the questionnaire, and the risk of anxiety was lower in students with acquaintances infected with COVID-19 than in those who did not have acquaintances infected with COVID-19.

Zhu et al, in 2021,<sup>[18]</sup> using both the GAD-7 and the Patient Health Questionnaire 9-Item, obtained data showing a

prevalence of 55.0% anxiety and 56.4% depression among Nursing students. The study explains that both depression and anxiety are mental illnesses that are not determined by age, but that there is indeed a certain degree of susceptibility to them on the part of Nursing students. High levels of emotional repression and low levels of cognitive reappraisal were associated with increased susceptibility to symptoms of anxiety and/or depression. Other studies based on the same scale echo these findings,<sup>[14,19]</sup> adding that participants with high levels of anxiety had a greater preventive attitude towards COVID-19.<sup>[15]</sup>

**Table 5****Summary of selected studies and main findings in Nursing students during the COVID-19 pandemic**

| Author, Year/Country                                                                                                                                                                                                                                                                                                                                                                                             | Sample Size                                                                | Data collection      | Psychological distress (N/% or Mean) | Anxiety (N/% or Mean) | Depression (N/% or Mean) | Fear (N/%, Mean or Median) | Sleep disturbances (N/%) | Coping strategies                            | Validated Scales                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------|--------------------------------------|-----------------------|--------------------------|----------------------------|--------------------------|----------------------------------------------|-------------------------------------|
| Fragerman et al (2022)/France <sup>[2]</sup><br>Nationwide study                                                                                                                                                                                                                                                                                                                                                 | 9207<br>90% women<br>Age range: 19 to + 27;<br>46% from 19–21 years.       | 04/04/21 to 11/05/21 | 7793/85.0                            | –                     | –                        | –                          | –                        | –                                            | K6                                  |
| Ito et al (2022)/Japan <sup>[3]</sup><br>Nationwide study                                                                                                                                                                                                                                                                                                                                                        | 1197<br>94.1% women                                                        | 16/08/21 to 16/10/21 | –                                    | 57/4.8                | 148/12.4                 | 17.26 ± 5.09               | 215/18.0                 | –                                            | GAD-7, PHQ-9, ISI-7, FCV-19S        |
| Kobe, Ako, Munakata, Kurashiki, Okayama, Nago, Tokyo and Nagakute. University of Hyogo (Public), Kansai University of School Welfare (Private), Japanese Red Cross Kyushu International College of Nursing (Private), Kawasaki University of Medical Welfare (Private), Okayama Prefecture University (Public), Meio University (Public), Kitasato University (Private), and Aichi Medical University (Private). |                                                                            |                      |                                      |                       |                          |                            |                          |                                              |                                     |
| Usher et al (2023)/Australia <sup>[4]</sup><br>Nationwide study                                                                                                                                                                                                                                                                                                                                                  | 516<br>87.8% women<br>Mean: 26.7; SD = 8.5 years.                          | 27/02/21 to 03/11/21 | 406/78.7                             | 317/61.4              | 330/63.9                 | –                          | –                        | Problem focus, regulate emotions, adaptation | IES-R, CAS, BRS, BriefCOPE, DASS-21 |
| Arifin et al (2022)/Malaysia <sup>[5]</sup><br>Kuala Lumpur. International Islamic University Malaysia (Public).                                                                                                                                                                                                                                                                                                 | 292<br>76.3% women<br>Age range: 20 to 25 years.<br>67.5% from 21–23 years | 03/2021 to 07/2021   | –                                    | 41/23.6               | 58/33.6                  | –                          | –                        | –                                            | GAD-7, PHQ-9                        |
| Hung, Ng & Choi (2022)/China <sup>[6]</sup><br>Hong Kong                                                                                                                                                                                                                                                                                                                                                         | 380<br>65.5% women<br>Age range: 18 to + 30 years. 62.6% from 22–25 years. | 09/2020 to 06/2021   | 150/39.5                             | 180/47.6              | 216/57.1                 | 23.50 (RIC: 19.00–26.00)   | –                        | –                                            | FCV-19S, DASS-21                    |
| Sentürk & Bakir (2021)/Turkey <sup>[7]</sup><br>Burdur. Burdur Mehmet Akif Ersoy University (Public)                                                                                                                                                                                                                                                                                                             | 506<br>72.1% women<br>Age range: 18 to + 22 years. 51.6% from 20–21 years. | 18/05/20 to 29/05/20 | 275/54.0                             | 376/74.0              | 290/57.0                 | –                          | –                        | –                                            | DASS-21                             |
| Zhu, Wang H & Wang A (2021)/China <sup>[8]</sup><br>Nanjing. Nanjing University of Chinese Medicine (Public)                                                                                                                                                                                                                                                                                                     | 342<br>86.8% women<br>Mean age 20.72; SD = 1.39 years                      | 06/03/20 to 01/04/20 | –                                    | 188/55.0              | 193/56.4                 | –                          | –                        | –                                            | GAD-7, PHQ-9                        |
| Göl & Erkin (2021)/Turkey <sup>[9]</sup><br>Nationwide study                                                                                                                                                                                                                                                                                                                                                     | 2360<br>82.1% women<br>Mean age: 21.30; SD = 1.95 years                    | 06/2020              | 1687/71.5                            | –                     | –                        | –                          | 66/2.8                   | –                                            | GHQ-12                              |

(Continued)

**Table 5**  
**(Continued)**

| Author, Year/Country                                                                                                                                                                                                          | Sample Size                                                                                                       | Data collection         | Psychological distress (N/% or Mean) | Anxiety (N/% or Mean) | Depression (N/% or Mean) | Fear (N/%, Mean or Median) | Sleep disturbances (N%) | Coping strategies                                         | Validated Scales           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------------------|-----------------------|--------------------------|----------------------------|-------------------------|-----------------------------------------------------------|----------------------------|
| Yurttaş et al (2023)/Turkey <sup>[10]</sup><br>Nationwide study                                                                                                                                                               | 166<br>81.4% women<br>Mean age:<br>19.74;<br>SD = 1.38<br>years.                                                  | 15/04/21 to<br>15/06/21 | 1.97 ± 2.58                          | 43.33 ± 9.4           | —                        | —                          | —                       | —                                                         | STAI, CAS                  |
| Mendez-Pinto, Antuña-Casal & Mosteiro-Díaz (2022)/Spain <sup>[11]</sup><br>Gijón and Oviedo (Two Public Universities)                                                                                                         | 304<br>87.5% women<br>Mean age:<br>22.11;<br>SD = 4.905<br>years.                                                 | 10/09/22 to<br>12/11/22 | 185/60.9                             | 118/39.7              | 45/15.5                  | 12/37.2                    | —                       | —                                                         | IES-R, HADS                |
| Mosteiro-Díaz et al (2023)/Spain <sup>[12]</sup> Nationwide study                                                                                                                                                             | 1319<br>87.1% women<br>Mean age: 22.33;<br>SD = 5.677<br>years.                                                   | 04/04/20 to<br>21/04/20 | —                                    | 743/56.4              | 501/38.2                 | —                          | —                       | —                                                         | HADS                       |
| Tomic et al (2023)/Serbia <sup>[13]</sup><br>Novi Sad. University of Novi Sad (Public)                                                                                                                                        | 167<br>88.0% women<br>Mean age: 21.3;<br>SD = 5.3<br>years.                                                       | 02/2020 to<br>05/2020   | 130/78.4                             | —                     | —                        | 14.41 ± 5.88               | —                       | —                                                         | CSS, FCV-19S               |
| Curcio et al (2022)/Italy <sup>[14]</sup><br>Sardinia. University of Sassari (Public) and University of Cagliari (Public)                                                                                                     | 701                                                                                                               | 17/03/21 to<br>27/03/21 | 531/75.0                             | 326/46.0              | —                        | —                          | —                       | —                                                         | GAD-7, CSSQ                |
| Marcen-Roman et al (2021)/Spain <sup>[15]</sup><br>Zaragoza. University of Zaragoza (Public).                                                                                                                                 | 252<br>81.7% women<br>Mean age:<br>21.02;<br>SD = 5.20<br>years.                                                  | 01/2021                 | 35/13.1                              | 178/71.4              | 204/81.0                 | —                          | —                       | —                                                         | PSS-10-C, GADS             |
| Aksoy, Gurdogan & Dirik (2022)/Turkey <sup>[16]</sup><br>Edirne. Trakya University (Public).                                                                                                                                  | 321<br>82.2% women<br>Mean age: 20.73;<br>SD = 1.73<br>years.                                                     | 03/2021 to<br>07/2021   | —                                    | 268/83.8              | —                        | 47.85 ± 12.87              | —                       | —                                                         | C19P-S                     |
| Çürük, Özgül & Karadag (2023)/Turkey <sup>[17]</sup> Nationwide                                                                                                                                                               | 1222<br>82.9% women<br>Mean age:<br>21.44;<br>SD = 2.14.<br>Age range:<br>18–40 years.                            | 06/2020 to<br>08/2020   | —                                    | 866/70.9              | —                        | 18.23 ± 6.31               | 632/51.8                | —                                                         | GAD-7, FCV-19S, BIS        |
| Bodys-Cupak, Czubek & Grochowska (2022)/Poland <sup>[18]</sup><br>Tarnów and Krakow. Institute for Health Protection of the State Higher Vocational School (Public) and the Jagiellonian University Medical College (Public). | 397<br>93.7% women<br>Age range:<br>20–60<br>years of<br>age. 69.3%<br>between<br>20 and 30<br>years.             | 03/2020                 | 363/91.4                             | —                     | —                        | —                          | 93/23.4                 | Positive reappraisal, sense of humor, venting of emotions | PSS-10, AIS, COPE          |
| Albikawi et al (2023)/Saudi Arabia <sup>[19]</sup> Nationwide                                                                                                                                                                 | 111<br>100% women<br>Mean: 21.6;<br>SD = 0.63<br>years. Age<br>range: 18<br>to + 23.<br>76.6% from<br>18–22 years | 10/03/21 to<br>28/04/21 | —                                    | 43/38.7               | 34/30.6                  | 89/80.2                    | 30/27.0                 | —                                                         | WHO-5, GAD-7, FCV-19S, BIS |

(Continued)

**Table 5**  
**(Continued)**

| Author, Year/Country                                                                                                                       | Sample Size                                                                          | Data collection         | Psychological distress (N/% or Mean) | Anxiety (N/% or Mean) | Depression (N/% or Mean) | Fear (N/%, Mean or Median) | Sleep disturbances (N/%) | Coping strategies                                                         | Validated Scales             |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------|--------------------------------------|-----------------------|--------------------------|----------------------------|--------------------------|---------------------------------------------------------------------------|------------------------------|
| Gao et al (2021)/China <sup>[20]</sup><br>Zhengzhou. Henan Technical Institute (Public).                                                   | 1532<br>82.2% women<br>Mean: 19.95;<br>SD = 1.24<br>years                            | 12/04/20 to<br>23/04/20 | 16/1.1                               | 44/2.9                | 44/2.9                   | —                          | 349/22.8                 | —                                                                         | IES-R, DASS-21, PSQI         |
| Wynter et al (2021)/Australia <sup>[21]</sup><br>Melbourne.Deakin University (Public)                                                      | 638<br>92.8% women<br>Mean: 23.56;<br>SD = 6.8<br>years. Age range:<br>18–24 years   | 18/08/20 to<br>15/09/20 | 255/40.2                             | 236/37.2              | 306/48.5                 | —                          | —                        | —                                                                         | DASS-21                      |
| Haririan et al (2022)/Iran <sup>[22]</sup><br>Tabriz. Tabriz Nursing and Midwifery Faculty (Public)                                        | 170<br>52.35% women<br>Mean: 22.47;<br>SD = 2.84<br>years                            | 02/2021 to<br>05/2021   | 21/12.3                              | 43/25.2               | 40/23.5                  | —                          | —                        | —                                                                         | DASS-21                      |
| Aslan & Pekince (2021)/Turkey <sup>[23]</sup><br>Inonu, Kilis, and Bingol. Inonu, Kilis and Bingol University (All Public)                 | 662<br>71.9% women<br>Mean: 20.67;<br>SD = 1.61<br>years. Age range: 18 to +21 years | 04/2020 to<br>05/2020   | 31.69 ± 6.91                         | —                     | —                        | —                          | —                        | —                                                                         | PSS                          |
| Tanji & Kodama (2021)/Japan <sup>[24]</sup><br>Akita. Japanese Red Cross Akita College of Nursing (Private)                                | 289<br>91.7% women<br>Range: 20–24<br>years                                          | 25/09/20 to<br>30/11/20 | 169/58.5                             | —                     | —                        | —                          | 105/36.3                 | Innate & acquired resilience                                              | BRS, AIS, K6                 |
| Savitsky et al (2020)/Israel <sup>[25]</sup><br>Ashkelon. Ashkelon Academic College (Public)                                               | 215<br>88.4% women<br>Mean: 25.62;<br>SD = 2.87<br>years                             | 04/2020                 | —                                    | 120/55.9              | —                        | —                          | —                        | Resilience, seeking information                                           | COPE, GAD-7                  |
| Laranjeira et al (2021)/Portugal & Spain <sup>[26]</sup> Nationwide                                                                        | 1075<br>87.81% women<br>Mean: 22.5;<br>SD = 4.99<br>years. Age range: 18 to 53 years | 04/2020 to<br>05/2020   | 558/51.0                             | —                     | —                        | —                          | 688/64.0                 | —                                                                         | PSS-10                       |
| Mishra et al (2023)/India <sup>[27]</sup><br>Bhubaneswar. KIIT University (Private)                                                        | 588<br>71.9% women<br>Mean: 20.9;<br>SD = 1.55<br>years.                             | 09/2020 to<br>10/2020   | 57/9.7                               | 162/27.7              | 152/26.2                 | —                          | —                        | Acceptance, self-dis-traction, active coping, planning, emotional support | DASS-21, BriefCOPE           |
| Patelarou et al (2022)/Grece, Albania, Cyprus, Spain & Kosovo <sup>[28]</sup> Nationwide                                                   | 1920<br>84% women<br>Mean: 21 years                                                  | 12/2020 to<br>01/2021   | —                                    | —                     | —                        | 14.6 ± 5.9                 | —                        | —                                                                         | FCV-19S                      |
| Cheraghbeigi et al (2022)/Iran <sup>[29]</sup><br>Ahvaz and Kermanshah. Ahvaz and Kermanshah Universities of Medical Sciences (All Public) | 384<br>56.1% women<br>Mean: 23.26;<br>SD = 4.54<br>years                             | 10/05/21 to<br>26/06/21 | —                                    | 6.03 ± 2.67           | 3.96 ± 1.91              | —                          | —                        | —                                                                         | SCL-25                       |
| Al Maqbali et al (2023)/Oman <sup>[30]</sup><br>Muscat. Oman College of Health Sciences (Private)                                          | 548<br>84.7% women<br>Range: 18 to 20; 21 to 22; >23 years                           | 11/2021 to<br>12/2021   | 515/94.0                             | 383/70.0              | 290/53.0                 | 16,39 ± 6,04               | 208/38.0                 | —                                                                         | FCV-19S, PSS-10, HADS, ISI-7 |

(Continued)

**Table 5**  
**(Continued)**

| Author, Year/Country                                                                                                                                                                                                                                        | Sample Size                                                  | Data collection      | Psychological distress (N/% or Mean) | Anxiety (N/% or Mean) | Depression (N/% or Mean) | Fear (N/%, Mean or Median) | Sleep disturbances (N/%) | Coping strategies                                                                                               | Validated Scales             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------|--------------------------------------|-----------------------|--------------------------|----------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------|
| Subiron-Valera et al (2022)/Spain <sup>[31]</sup>                                                                                                                                                                                                           | 100<br>92% women                                             | 10/2020 to 11/2020   | 13.62 ± 8.65                         | 7.26 ± 6.56           | 8.66 ± 8.61              | 2.94 ± 0.66                | —                        | —                                                                                                               | FCV-19S, DASS-21             |
| Zaragoza. University of Zaragoza (Public)                                                                                                                                                                                                                   | Mean: 21.09 years                                            |                      |                                      |                       |                          |                            |                          |                                                                                                                 |                              |
| Beisland et al (2021)/Norway <sup>[32]</sup>                                                                                                                                                                                                                | 2605                                                         | 27/01/21 to 28/02/21 | 2.68 ± 1.03                          | —                     | —                        | 2.45 ± 0.8                 | —                        | —                                                                                                               | FCV-19S, SCL-5               |
| Oslo, Bergen, Adger, Trondheim & Stavanger. Oslo Metropolitan University, Western Norway University of Applied Sciences, University of Agder, Norwegian University of Science and Technology, and the University of Stavanger (All Public)                  | Age range: <25, 25–29, ≥ 30 years                            |                      |                                      |                       |                          |                            |                          |                                                                                                                 |                              |
| Roldán-Merino et al (2022)/Spain <sup>[33]</sup>                                                                                                                                                                                                            | 203<br>87.2% women                                           | 06/2020              | 89/44.3                              | 44/22.2               | —                        | —                          | —                        | —                                                                                                               | WHO-5, GAD-7                 |
| Barcelona. University of Barcelona (Public)                                                                                                                                                                                                                 | Mean age: 24.7; SD = 6.6 years                               |                      |                                      |                       |                          |                            |                          |                                                                                                                 |                              |
| Dastan et al (2021)/Turkey <sup>[34]</sup>                                                                                                                                                                                                                  | 419<br>66.6% women                                           | 11/05/20 to 30/06/20 | 160/38.2                             | 209/50.8              | 235/56.3                 | —                          | —                        | —                                                                                                               | DASS-21                      |
| Kars. Kafkas University (Public)                                                                                                                                                                                                                            | Mean: 21.40; SD = 1.59 years.                                |                      |                                      |                       |                          |                            |                          |                                                                                                                 |                              |
| Abu Liel (2023)/Palestine <sup>[35]</sup>                                                                                                                                                                                                                   | 320<br>40.3% women                                           | 05/2020 to 06/2020   | 77/24.3                              | 120/37.8              | 72/22.5                  | —                          | —                        | —                                                                                                               | DASS-21                      |
| Jenin. Arab American University (Private)                                                                                                                                                                                                                   | 84.4% between 20–25 years                                    |                      |                                      |                       |                          |                            |                          |                                                                                                                 |                              |
| Kalikotay et al (2023)/Nepal <sup>[36]</sup>                                                                                                                                                                                                                | 215                                                          | 10/2020 to 12/2020   | —                                    | 179/83.6              | —                        | —                          | —                        | Personal protective measures, relaxation activities, family & friends support, and use of spiritual strategies. | GAD-7                        |
| Kathmandu and Koshi. Maharajgunj Nursing Campus of Tribhuvan University (Public) and College of Medical and Allied Health Science of Purbanchal University (Public).                                                                                        | Mean age: 23.42; SD = 3.534. Age range: from 19 to 41 years. |                      |                                      |                       |                          |                            |                          |                                                                                                                 |                              |
| Maqbali et al (2023)/Saudi Arabia, Oman, UAE, UK <sup>[37]</sup>                                                                                                                                                                                            | 918<br>85.7% women                                           | 12/2021 to 04/2022   | 840/91.6                             | 634/69.1              | 548/59.8                 | 424/46.2                   | 671/73.2                 | —                                                                                                               | FCV-19S, PSS-10, HADS, ISI-7 |
| Newcastle upon Tyne (UK), Muscat (Oman), Jazan (Saudi Arabia), Abu Dhabi (UAE). UK—Northumbria University (Public), Oman—Oman College of Health Sciences (Private), Saudi Arabia—Jazan University (Public), UAE—Fatima College of Health Sciences (Public). | Age range: 18 to + 23 years. 47.2% from 21 to 22 years.      |                      |                                      |                       |                          |                            |                          |                                                                                                                 |                              |

AIIS = Athenian Insomnia Scale, BIS = Bergen Insomnia Scale, BRS = Bidimensional Resilience Scale, Brief COPE = Brief COPE Inventory, CAS = Coronavirus Anxiety Scale, COPE = Coping Behavior Questionnaire, CSS = COVID-19 Stress Scale, CSSQ = COVID-19 Student Stress Questionnaire, C19P-S = COVID-19 Phobia Scale, DASS-21 = Depression Anxiety and Stress Scale, FCV-19S = Fear of COVID-19 Scale, GAD-7 = Generalized Anxiety Disorder 7-Item Scale, GAD-19 = Generalized Anxiety Disorder 19-Item Scale, GADS = Generalized Anxiety Disorder Scale, GHQ-12 = 12-Item General Health Questionnaire, HADS = Hospital Anxiety and Depression Scale, IES-R = Impact of Event Scale-Revised, ISI-7 = Insomnia Severity Index, K6 = Kessler Psychological Distress Scale, PHQ-9 = Patient Health Questionnaire 9-Item Scale, PSS = Perceived Stress Scale, PSS-10 = 10-Item Perceived Stress Scale, PSS-10-C = 10-Item Perceived Stress Scale related to COVID-19, PSQI = Pittsburgh Sleep Quality Index, SCL-5 = Hopkins Symptom Checklist, SCL-25 = Symptom Checklist-25, STAI = State-Trait Anxiety Inventory, WHO-5 = WHO-Five Well-being Index.

Roldán-Merino et al,<sup>[33]</sup> using the (GAD-7) and the WHO-Five Well-being Index (WHO-5) in their study, report that anxiety levels in Nursing students due to COVID-19 confinement

have been high, and levels of psychological well-being have decreased for the same reason. Also, almost a third of the students required medical support for these same reasons.<sup>[36]</sup>

**3.3.1.3. 10-Item Perceived Stress Scale (PSS-10).** Studies such as the one by Bodys-Cupak et al in 2022<sup>[18]</sup> employed this scale to distinguish by age, with the 20 to 30 age group having the lowest level of stress (64.4%) compared to the 30+ age group (69.7%). The study stated that high levels of stress were more common among students who had worked in hospitals with COVID-19 patients (78%) than among those who had not (64.3%), and among students who had a close friend who worked with COVID-19 patients (82.5%).

Sex-related differences in stress levels were also obtained, with women showing higher levels of stress than men.<sup>[23]</sup> Using the same scale, the study by Laranjeira et al in 2021<sup>[26]</sup> showed a 51.0% of this prevalence associated with stress.

**3.3.1.4. Other Scales.** Mosteiro-Díaz et al<sup>[12]</sup> used the Hospital Anxiety and Depression Scale in their study on anxiety and depression in Nursing students during confinement due to COVID-19. The results showed a prevalence of anxiety of 56.4%, as well as a prevalence of depression of 38.2%. Studies conducted 3 months after the end of the confinement phase<sup>[11]</sup> found a prevalence of anxiety and depression of 39.7% and 15.5%, respectively. Both studies, conducted in Spain at different times during the pandemic, reflected the severity of the situation and its impact in terms of mental health.

As can be seen, the COVID-19 pandemic has motivated the evaluation of the mental health of Nursing students by a multitude of researchers and by means of various validated scales. However, alongside the aforementioned, there are many other scales that have been mentioned by the authors included in this study. One example is the study by Usher et al in 2023,<sup>[4]</sup> which uses both the DASS-21 scale and the Coronavirus Anxiety Scale to assess anxiety.

Yurttaş et al<sup>[10]</sup> used the STAI for the same purpose. Their study showed statistically significant differences between the STAI score and the academic year of the students. It also revealed that the presence of chronic illnesses increased the level of anxiety, and concluded that the level of stress and anxiety among Nursing students was higher before the beginning of their first clinical practice period during the COVID-19 pandemic, decreasing after the end of the practice period.

In the study by Marcén-Román et al,<sup>[15]</sup> anxiety and depression were examined with the Brief Goldberg Anxiety and Depression Scale (GADS), showing a prevalence of 71.4% for anxiety and 81.0% for depression 1 year after the onset of the COVID-19 pandemic.

By applying the CSS, a stress prevalence of 78.4% was obtained among Nursing students during the pandemic, concluding that the Nursing student population is highly susceptible to developing mental illness due to the fear and stress associated with COVID-19.<sup>[13]</sup> The study by Göl and Erkin,<sup>[9]</sup> using the 12-Item General Health Questionnaire, obtained results along the same lines. Additionally, the CSSQ also yielded results of moderate-high stress.<sup>[14]</sup>

Using the Symptom Checklist-25, the study by Cheraghbeigi et al,<sup>[29]</sup> conducted during the fourth wave of the COVID-19 pandemic, showed a change in the mental health of Nursing students, with somatization being the most common problem. Sex differences were also found, with female students being more likely to report mental health problems than male students.

### 3.3.2. Fear.

**3.3.2.1. Fear of COVID-19 Scale.** In their study using the FCV-19S, Hung et al in 2022<sup>[6]</sup> found that students who had had a clinical stay during the pandemic scored higher on the fear dimension than those who had not had a clinical stay during the pandemic. Similarly, Beisland et al in 2021<sup>[32]</sup> found higher levels of fear among students than pre-pandemic baseline data from the general population. Likewise, studies conducted at the end of the same year also found moderate levels of fear of COVID-19.<sup>[30,37]</sup>

Other authors who obtained data related to fear of COVID-19, such as Tomic et al in 2023,<sup>[13]</sup> found that first-year students reported lower levels of fear than students in their second and third years, in line with Hung et al,<sup>[6]</sup> and in this case, no sex differences were obtained. Consistent with other studies, the results of the study by Tomic et al<sup>[13]</sup> again suggested that Nursing students are a population at risk of developing mental illness due to fear and stress associated with COVID-19.

Moreover, the “married” marital status group reported higher levels of fear than the rest owing to fear of infecting their family members. Again, predictors of high levels of fear were female sex, marital status, previous chronic illness, and living in a country with high COVID-19 mortality rates.<sup>[28]</sup>

In this vein, the study by Aksoy et al<sup>[16]</sup> used the COVID-19 Phobia Scale to go a step further and assess COVID-19 phobia. In their study, students scored a moderate level of COVID-19 phobia. High levels of phobia were associated with: being diagnosed with the infection, the death of a family member from the infection, fear of becoming infected, fear of treating infected patients, and anxiety about sharing common areas.

**3.3.3. Sleep disturbances.** Sleep disturbances were also examined in relation to the pandemic caused by the SARS-COV-2 virus. Some authors used the ISI-7, obtaining a prevalence of 18.0% for sleep disturbances in Nursing students. They also obtained data indicating, for the first time, that the worsening of the economic situation was a risk factor for insomnia, as was fear of COVID-19 a risk factor for depression and insomnia.<sup>[3]</sup>

By using the BIS, the study by Albikawi et al in 2023<sup>[19]</sup> showed a prevalence of insomnia of 27.0% among Nursing students, with a positive correlation with anxiety and fear of COVID-19. It was concluded that depression, anxiety, fear of COVID-19, and the existence of chronic diseases had a significant impact on insomnia among students, acting as potential predictors of this condition.

Likewise, Gao et al in 2021<sup>[20]</sup> used the PSQI to obtain a prevalence of 22.8% for sleep disturbances. The AIS also showed a high prevalence of students with such alterations. In this case, a comparison was also established across age groups, showing that sleep disturbances were more frequent among students aged 30 years and older (67.2%) than among those below 30 years (52.0%), and among students with family members in the health profession (50.9%).<sup>[18]</sup> Also, it was shown that medical history, insomnia, and resilience were associated with psychological distress among students.<sup>[24]</sup>

Al Maqbali et al<sup>[30]</sup> also assessed sleep disturbances, in this case using data from the ISI-7, showing a prevalence of insomnia of 38.0% among Nursing students. In the same year, Cürük et al<sup>[17]</sup> obtained in their study a 51.8% prevalence of sleep disturbances using the BIS.

To conclude, other authors<sup>[37]</sup> made an assessment of insomnia among Nursing students 2 years after the onset of the pandemic by comparing variables across 4 countries, also using the ISI-7 scale. They obtained the highest prevalence of sleep disturbances, with 73.2%. Their study found a higher prevalence of insomnia in the United Arab Emirates and Saudi Arabia than in England and Oman. Likewise, a statistically significant and positive relationship was found between fear of COVID-19, stress, anxiety, depression, and insomnia. Nursing students had moderate-severe levels of fear of COVID-19, stress, anxiety, depression, and insomnia 2 years after the onset of the COVID-19 pandemic.

**3.3.4. Coping strategies.** The main coping strategies obtained in the studies show the use of adaptive coping, emotion regulation and problem focus,<sup>[4]</sup> the use of humor and positivity,<sup>[18]</sup> the use of innate and acquired resilience,<sup>[24,25]</sup> acceptance, distraction and coping methods, planning and emotional support,<sup>[27]</sup> as well as the use of self-protection measures, relaxation activities, family and friends support, and use of spirituality-related strategies.<sup>[36]</sup>

For the assessment of coping strategies in Nursing students, scales such as the BRS were used for this purpose, with participants with higher innate resilience factors presenting less psychological distress.<sup>[24]</sup> Another scale, the BriefCOPE, was used by several authors, showing that Nursing students used adaptive methods, problem focus, acceptance, active coping, planning, use of humor, and seeking emotional support to manage the new situation.<sup>[4,25,27]</sup>

In the study carried out by Bodys-Cupak et al in 2022,<sup>[18]</sup> the COPE was used to show the relationship between strategies such as positive attitude, sense of humor, denial, expression of emotions, and self-blame and the level of psychological distress among Nursing students.

### 3.3.5. Results of the prevalence meta-analysis.

**3.3.5.1. GAD-7 meta-analysis.** For the meta-analysis of the prevalence of anxiety using the GAD-7 scale, 9 studies were reviewed,<sup>[3,5,8,14,17,19,25,33,36]</sup> involving a total sample of  $n = 4498$  Nursing students. The prevalence of anxiety obtained was 28.57% (95% CI: 16.18–42.86). The meta-analysis performed for the present review, based on Egger's test, revealed a publication bias ( $P = .022$ ). The  $I^2$  value for between-study heterogeneity was 99% (Fig. 2).

**3.3.5.2. DASS-21 meta-analysis.** For the meta-analysis of prevalence based on the DASS-21 scale, 10 studies were reviewed<sup>[4,6,7,20–22,27,31,34,35]</sup> in its 3 dimensions (anxiety, stress, and depression), involving a total sample of  $n = 5169$  Nursing students. A prevalence value of 38.40% (95% CI 20.43–58.18) was obtained for the anxiety dimension; 37.92% (95% CI: 20.20–57.49) for the depression dimension; and 31.06% (95% CI: 13.22–52.48) for the stress dimension.

The meta-analysis performed for the present review, based on Egger's test, revealed a publication bias as follows:  $P = .0027$  for the anxiety dimension;  $P = .0013$  for the depression dimension; and  $P = .0058$  for the stress dimension. The following  $I^2$  values were obtained for between-study heterogeneity: 99.5% for the prevalence of anxiety; 99.5% for the prevalence of depression; and 99.6% for the prevalence of stress (Fig. 3).

**3.3.5.3. Meta-analysis of the stress dimension: DASS-21-S and PSS-10.** For the meta-analysis of the prevalence of stress, based on the Stress dimension of the DASS-21 scale and the PSS-10 scale, 14 studies were reviewed,<sup>[4,6,7,18,20–22,26,27,30,31,34,35,37]</sup> involving a total sample of  $n = 8107$  Nursing students. A prevalence value of stress was 52.46% (95% CI: 25.70–78.47). The meta-analysis performed for the present review, based on Egger's test, revealed no publication bias ( $P = .1939$ ). The  $I^2$  value for between-study heterogeneity was 99.8% (Fig. 4).

**3.3.5.4. Meta-analysis of the anxiety dimension: DASS-21-A and GAD-7.** For the meta-analysis of the prevalence of anxiety, based on the Anxiety dimension of the DASS-21 scale and the GAD-7 scale, 19 studies were reviewed,<sup>[3–8,14,17,19–22,25,27,31,33–36]</sup> involving a total sample of  $n = 9667$  Nursing students. A prevalence value of anxiety 33.66% (95% CI: 22.70–45.60) was obtained. The meta-analysis performed for the present review, based on Egger's test, revealed a publication bias ( $P < .0001$ ). The  $I^2$  value for between-study heterogeneity was 99.3% (Fig. 5).

## 4. Discussion

This review aimed to determine the impact that the COVID-19 pandemic had on the mental health of Nursing students, as well as other associated factors such as anxiety, fear, sleep disturbances, and coping strategies, and to identify the validated scales used to measure the prevalence of the aforementioned

conditions. To this end, 36 studies were reviewed that included different scales validated to assess these variables. The results of the meta-analysis showed, for overall anxiety, a prevalence of 33.6%; for depression, a prevalence was 37.92%; and for overall stress, a prevalence was 52.46%.

The main results related to the 3 variables of the DASS-21 scale (stress, anxiety, and depression), which was used in 10 of the selected studies,<sup>[4,6,7,20–22,27,31,34,35]</sup> show their relationship with aspects such as social isolation, fear of contagion and fear of contagion of family and friends, uncertainty, as well as the coping capacity of each person. However, differences have been observed across countries regarding the prevalence of these variables, which may be higher in some countries than in others at the same time of the year.<sup>[37]</sup>

These differences in the levels of anxiety, stress, and depression among Nursing students depending on the country of origin may be due not only to cultural differences, but also to the access to health resources<sup>[71]</sup> and vaccination. This may be due to the fact that this was regulated independently by each country, i.e. not following a homogeneous distribution across countries, thus favoring, in some cases, a lower prevalence of stress.<sup>[20]</sup>

Other studies indicate a prevalence of psychological distress of up to 94.0% and a clear relationship between increased stress levels and the interruption and/or adjustment of their studies and restrictions due to the confinement resulting from the pandemic.<sup>[14]</sup> On the other hand, as Ladewig-Bernaldez et al<sup>[72]</sup> indicate in their study, the greatest concern of health students regarding their training was related to not being able to acquire the necessary knowledge and skills to develop their professional activity, noting that anxiety was the predominant feeling.

Another aspect that was mentioned was the difference between the sexes, with the female sex showing a higher prevalence of stress than the male sex.<sup>[2,21,23,29,35]</sup> Other authors, such as Dosil-Santamaria et al,<sup>[73]</sup> confirmed in their study a high prevalence of psychological disorders such as stress, anxiety, depression, and insomnia, with a predominance in women and the older population. Other studies also found that the female sex, is associated with a higher prevalence of intrusive and avoidant thoughts, producing symptoms compatible with post-traumatic stress disorder.<sup>[74]</sup> From a global perspective, it must be borne in mind that the female sex has been prevalent in the field of care for centuries<sup>[75]</sup> and this aspect may lead to confusion and biases due to the large difference between the female and male population depending on the group to be studied.

The prevalence of fear of COVID-19 was found as high as 80.2%. To a large extent, fear was related to the consumption of news about the pandemic, fear of infection, use of enclosed spaces, and having acquaintances who died from COVID-19. After analyzing the articles, it can be concluded that, as the pandemic progressed, hygiene and prevention measures evolved, so the lethality of the virus decreased and so did the prevalence of the assessed variables.<sup>[31,36,37]</sup>

Although no validated scale that measures both fear and anxiety can be found in the articles reviewed, a group of researchers in Spain has designed the Anxiety and Fear of COVID-19 Assessment Scale (AMICO, for its acronym in Spanish),<sup>[76]</sup> composed of 16 items, which is intended to be a tool for the assessment of both variables. This recently created scale has already been validated for use in the adult population in Spain, as well as in pregnant women, the elderly, and the UK population.<sup>[77–79]</sup>

The AIS, the BIS, the ISI-7, and the PSQI were used by the authors in 8 of the articles<sup>[3,17–20,24,30,37]</sup> to assess the prevalence of sleep disturbances, obtaining a prevalence of up to 73.2%, with fear of COVID-19 being the item that most affected sleep patterns.<sup>[3,9]</sup> Differences were also found in relation to insomnia according to the age of the students, with older students showing a higher prevalence of sleep disturbances.<sup>[18,19]</sup>

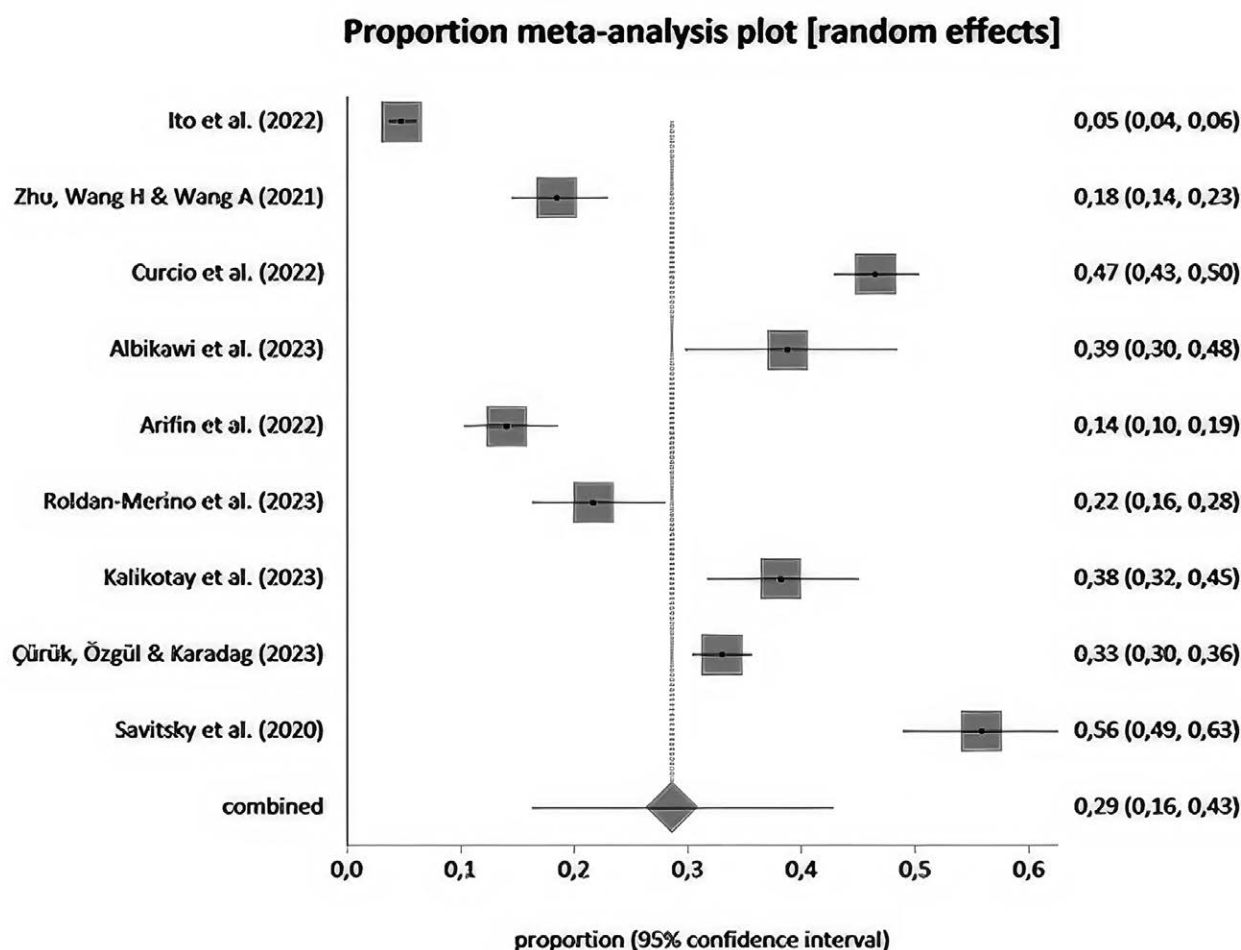


Figure 2. Forest plot for the prevalence of anxiety using the GAD-7 scale. GAD-7 = Generalized Anxiety Disorder 7-Item Scale.

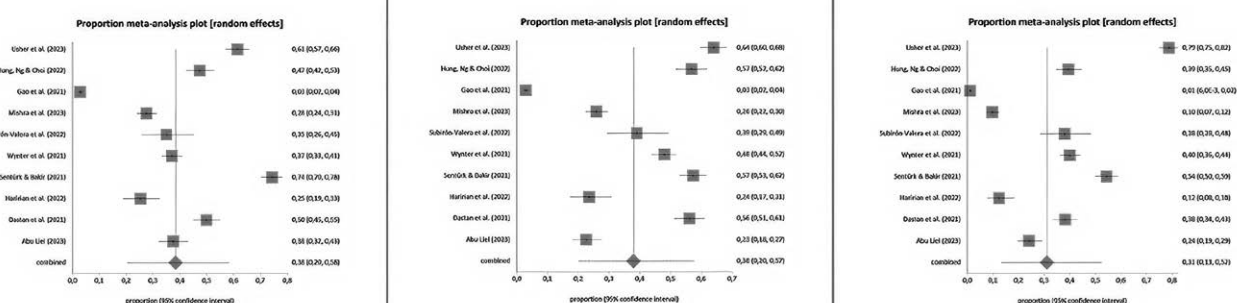


Figure 3. Forest plot for the prevalence of anxiety, depression, and stress using the DASS-21 scale. DASS-21 = Depression Anxiety and Stress Scale.

Regarding coping strategies, as measured by the authors using the BRS, BriefCOPE, and COPE,<sup>[4,18,24,25,27,36]</sup> for many Nursing students, the COVID-19 pandemic had a negative impact on their daily life patterns, promoting substance abuse, junk food consumption, social media abuse, and sedentary lifestyles.<sup>[27,32,33]</sup> Conversely, Oliveira et al.<sup>[80]</sup> found in their study an overall decrease in tobacco, alcohol, and drug use among students during the COVID-19 pandemic confinement. However, there was an increase in the use of anxiolytics among students with higher academic performance and

among those who were more socially active before the onset of confinement.

#### 4.1. Limitations

One limitation of this study is that articles that were not written in English or Spanish were discarded, which could have affected the collection of relevant data. Besides, there was variability between the reviewed studies due to the evolution of the pandemic from 2020 to 2023, which is why the results have

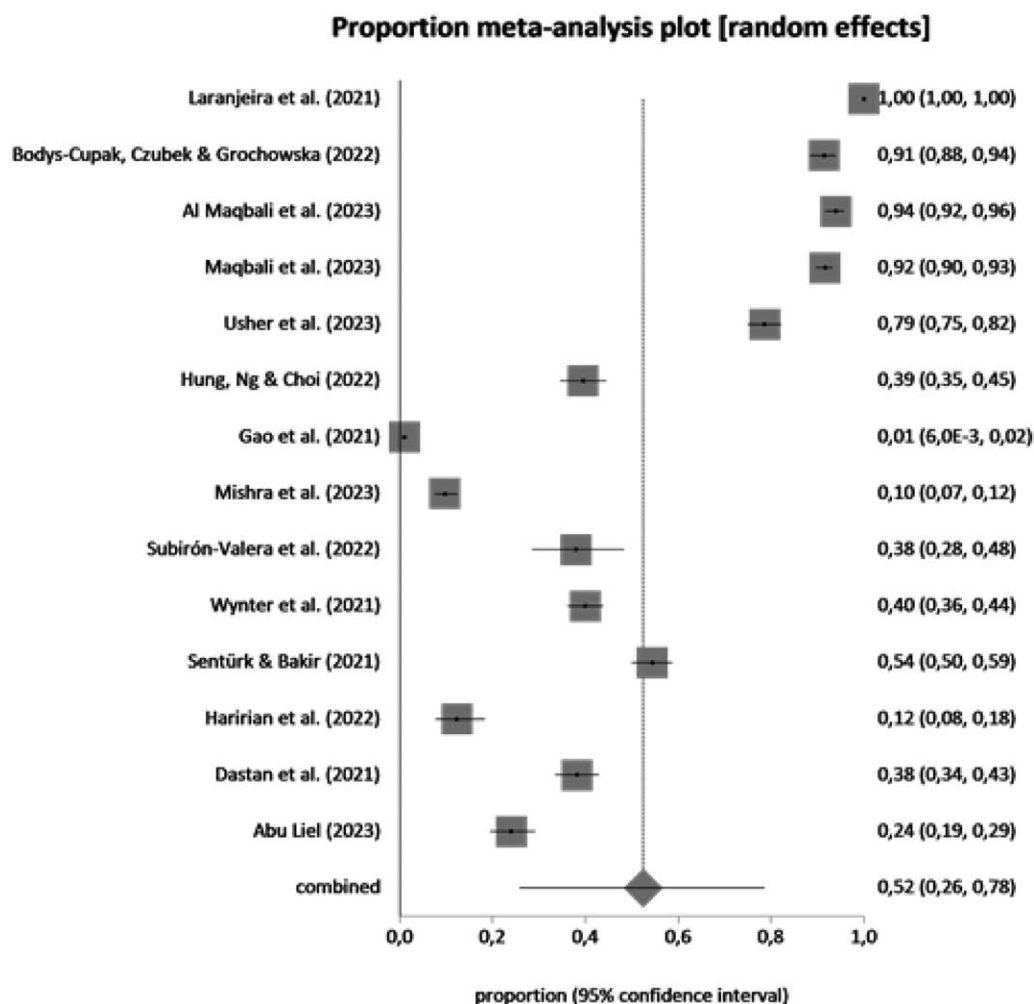


Figure 4. Forest plot for the prevalence of stress.

been analyzed chronologically below. In addition, the use of different validated scales to measure the same variables may have represented another limitation. Other variables such as Post-Traumatic Stress Syndrome (PTSD) or “thoughts about dropping out of university” were also described in 2 and 3 studies respectively. However, it was decided not to include them in the results and metanalyses due to the low number of studies that analyzed them or because they were not evaluated as widely as the rest of the factors. Indeed, in the case of the “thoughts about dropping out of university” variable, it was not measured with a validated scale. For these reasons, it was not possible to extract broadly generalizable or interpretable data from these variables.

The greater presence of the female sex in the studies should be highlighted since, as mentioned, this is reflected in the reality of health professions. Additionally, there is evidence of a higher prevalence of emotional well-being disturbances in the female population group, which may therefore constitute a risk of bias.

As regards the level of heterogeneity obtained in the meta-analyses, this is high in all measurements and is noted as a limitation. The reason for this is the diversity of countries, each with different characteristics, across the studies. As for the weight of the studies in the meta-analysis, this was not relevant because randomized methods were used motivated by the said heterogeneity. The analyses were not statistically affected by removing some studies. Therefore, it was decided to keep all of the studies in the analyses. Finally, the risk of bias exists if  $P$  value is below .1 in Egger’s test, so only one of the analyses scored positively in this respect ( $P = .1939$ ).

#### 4.2. Impact

A chronological analysis of each of the 36 studies selected for this review was conducted and a timeline was drawn showing the beginning and end of data collection for each study (Fig. 6).

Data collection began in 2020, the year of the onset of the COVID-19 pandemic.<sup>[81]</sup> During this year, the number of cases of infection with the virus gradually increased. In April, a daily peak of 94,468 cases of infection was recorded.<sup>[82]</sup> Studies conducted in the first 3 months of the pandemic<sup>[8,13,18]</sup> showed that levels of stress, anxiety, depression, fear, and sleep disturbances among Nursing students were high (Table 5), with levels of stress reaching 91.4% at the beginning of the pandemic.<sup>[18]</sup> Anxiety levels remained high during the second quarter of that year,<sup>[7,9,12,17,20,23,25,26,33–35]</sup> obtaining anxiety levels above 50%, which slightly decreased as July approached, possibly due to greater access to personal protective equipment.<sup>[35]</sup> The same occurred with the high presence of sleep disturbances.<sup>[26]</sup>

By July 2020, a peak of 287,462 daily cases were reported, rising to 472,105 cases per day in October 2020, with a global peak on 16 December, when an average of 757,994 cases per day was reported in the previous week.<sup>[82]</sup> In the second half of the year, the prevalence of stress, anxiety, and depression was moderately lower than at the beginning of the year,<sup>[6,21,24,27,28,31,36]</sup> with a substantial decrease in December of the same year, especially in Western European countries.<sup>[28,31]</sup>

In the first half of 2021, according to Johns Hopkins University,<sup>[82]</sup> a maximum of 898,791 cases per day was reported worldwide in April, progressively decreasing during

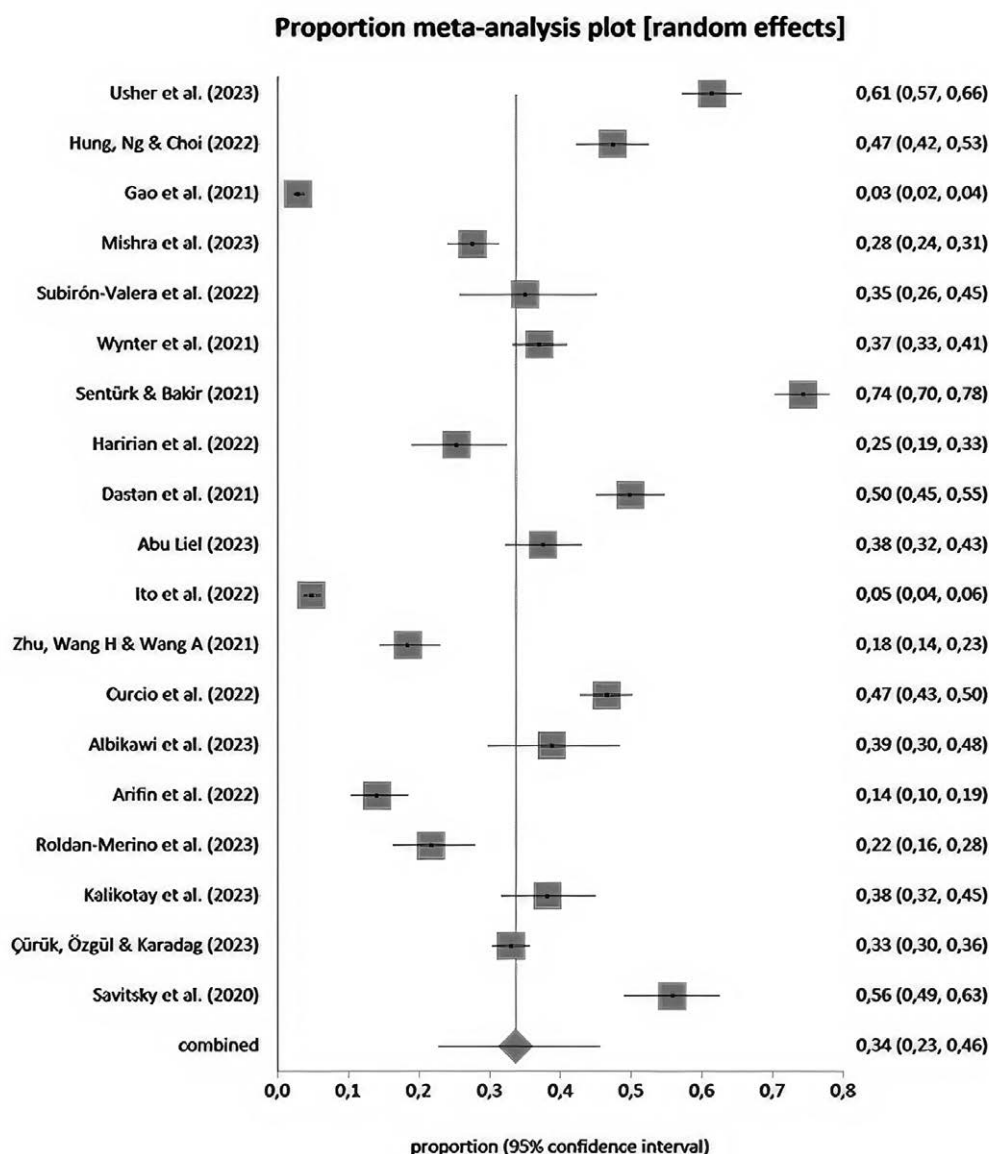


Figure 5. Forest plot for the prevalence of anxiety.

the second half of the year to the lowest figure reported since February of that year, i.e. an average of 406,951 cases in October 2021. This evolution was likely to be the result of the release of the first vaccine against the disease by Pfizer Pharmaceuticals, approved by the US Food and Drug Administration (FDA) in August of that year.<sup>[83]</sup> However, there was a sharp increase in the number of cases reported in the last 2 months of the year, reaching 1,327,641 cases by 31 December.

In the first half of 2021, studies carried out by that date,<sup>[2,4,5,10,14–16,19,22,29,32]</sup> as shown in Figure 6, reflect an increase in the levels of stress and anxiety among Nursing students,<sup>[2,10,16]</sup> coinciding with the increase in the number of cases of infection. Studies conducted in the second half of the year<sup>[3,30,37]</sup> show moderate levels of fear of the virus coinciding with the decrease in cases of infection,<sup>[3]</sup> with levels of stress, anxiety, depression, and fear being considerably higher in the last 2 months of the year.<sup>[30]</sup>

The study by Usher et al.<sup>[4]</sup> collected data on stress, anxiety, depression, and coping strategies from February to November 2021. It showed that levels were sustained despite improvements

in the management of the pandemic and the initiation of access to vaccination.

In 2022, according to Johns Hopkins University, there were more reported cases of COVID-19 infection than in any other year of the pandemic. January of that year saw the highest average number of cases of the entire pandemic, with 3436,886 cases worldwide, which could be due to the relaxation of public health measures initiated at the end of the previous year.<sup>[84]</sup> Following this increase, the number of cases gradually declined until March, when figures increased again to 1813,575 worldwide. According to data obtained by the same University, this was the last month in which such a large number of new cases of the virus were recorded, followed by a gradual decrease in figures, a moderate increase in the summer months of that year, and a considerable decrease until this day.

Coinciding with the abrupt increase in cases of infection in 2022, the article by Maqbali et al.<sup>[37]</sup> which began in December 2021 and collected data until April of the following year, shows the high prevalence of stress, anxiety, depression, fear, and sleep disturbances among Nursing students from different countries, some located in the most eastern part of Europe and others in Western Europe.

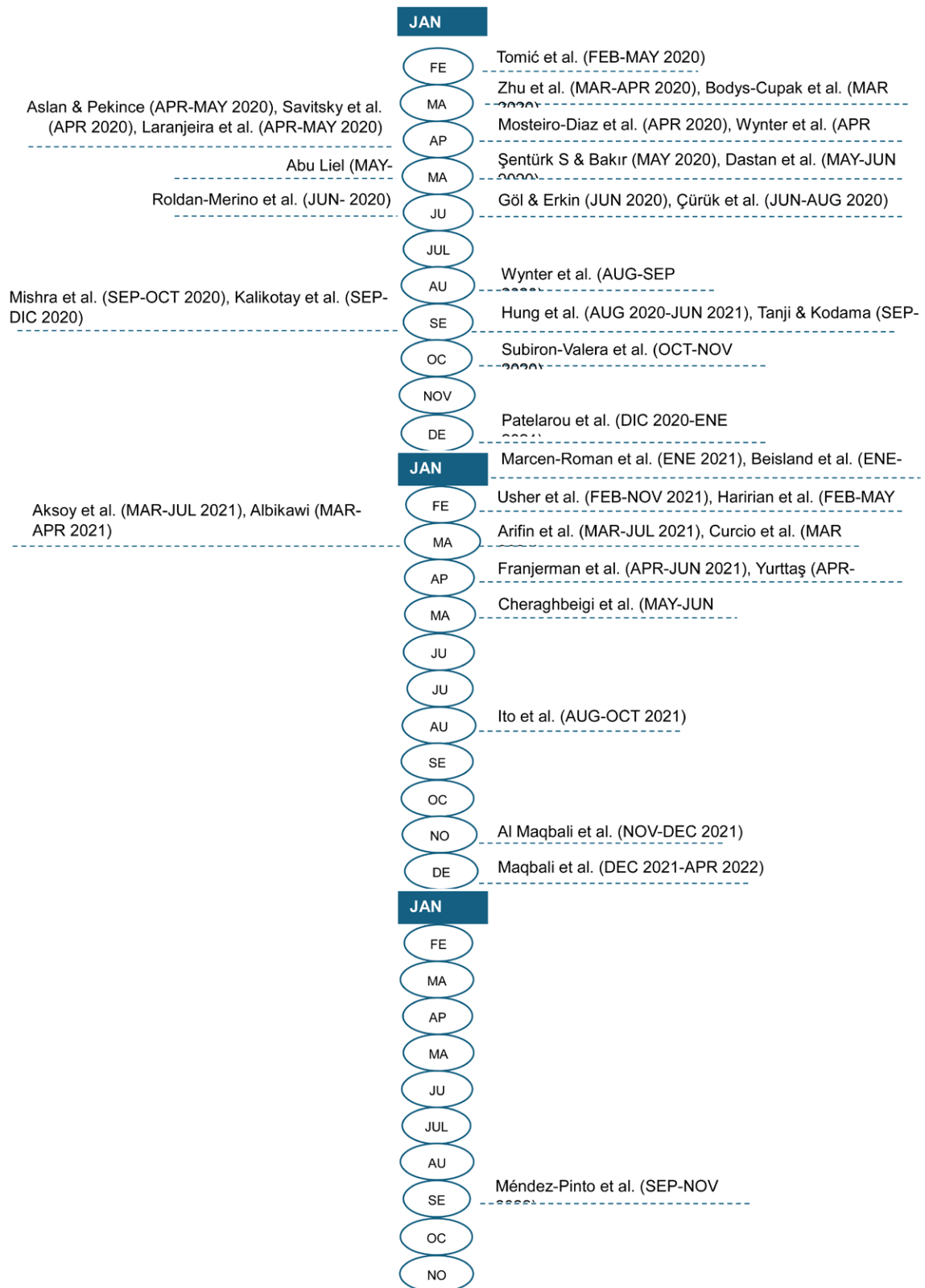


Figure 6. Timeline.

## 5. Conclusion

This study shows, following the analysis of the existing evidence and the subsequent meta-analysis of prevalence, that the COVID-19 pandemic has clearly affected Nursing students worldwide in a wide range of aspects of their lives. The

pandemic and the resulting confinement have produced a multitude of alterations, affecting these students to a greater or lesser extent depending on variables such as sex, place of residence, economic capacity, and the acquisition or presence of emotional coping skills.

The meta-analysis conducted showed a prevalence for general anxiety, depression, and stress of 33.6%, 37.92%, and 52.46%, respectively. Accordingly, there have been related consequences such as the abuse of harmful substances, changes in eating and exercise routines, changes in family and social relationships leading to the abuse of social networks, changes in study routines negatively affecting the development of skills as future health professionals, as well as changes in the emotional and psychological state of these individuals. All of these have led to an increase in stress, anxiety, depression, and fear of contagion, both for themselves and for their family and friends, with associated negative consequences both in terms of sleep quality and willingness to continue or abandon their studies.

It is therefore essential to care for Nursing students in all spheres by fostering the acquisition of coping and resilience skills and strategies both during their studies and with a view to their future careers as health professionals. This review calls for the implementation of educational and follow-up strategies and emotional support at the curricular level as part of Nursing studies, as well as in other health sciences programmes, in order to support the care of future health professionals.

#### *“What is already known”*

There is an increased prevalence of mental health problems in various population groups as a result of the COVID-19 pandemic and its consequences, especially regarding anxiety, stress, depression, fear, and sleep disturbances, require to be investigated longitudinally.

Students have been particularly susceptible to the development of mental health disorders due to their vital transition period, and this has been even more pronounced in Nursing students as future health professionals.

#### *“What this paper adds”*

The COVID-19 pandemic has clearly affected Nursing students worldwide in a wide range of aspects of their lives, such as the abuse of harmful substances, changes in eating and exercise routines, changes in family and social relationships leading to the abuse of social networks, or changes in study routines negatively affecting the development of skills as future health professionals.

The meta-analysis conducted showed a prevalence for general anxiety, depression, and stress of 33.6%, 37.92%, and 52.46%, respectively. It is therefore essential to care for Nursing students in all spheres by fostering the acquisition of coping and resilience skills and strategies both during their studies and with a view to their future careers as health professionals.

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