



ORIGINALES

Damage to the health of nursing workers due to the Covid-19 pandemic: an integrative review

Danos à saúde dos trabalhadores de enfermagem devido à pandemia da Covid-19: uma revisão integrativa

Daños a la salud de los trabajadores de enfermería debido a la pandemia Covid-19: una revisión integradora

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ABSTRACT:

Objective: To investigate, through an integrative review, the damage to nursing workers' health due to the Covid-19 pandemic.

Method: Integrative literature review performed in MEDLINE/PubMed, SciELO, LILACS and BDEF databases in September 2020, which generated 1,772 references. After removing the duplicates and using the inclusion and exclusion criteria, the final sample was composed of 22 articles.

Results: Sleep disorders, depression symptoms, somatic symptoms, anxiety, stress, fatigue, risk of Burnout syndrome, risk of post-traumatic stress, dermatitis and eczema of the hands were harms found in nursing professionals due to the Covid-19 pandemic. Among the protective factors, personal gratification, family relationship, resilience, and personal accomplishment stand out.

Conclusion: The protection of nursing workers' health involves urgent efforts related to the provision of basic conditions of worker safety, requiring public policies and investments for the preservation of nursing workers' health. Protection actions are related to the implementation of psychological safety management, establishing clear guidelines, promoting continuing education, and ensuring better working conditions.

Keywords: Coronavirus infections; Coronavirus; Nursing; Risk factors; Occupational Health.

RESUMO:

Objetivo: Investigar, por meio de uma revisão integrativa, os danos à saúde do trabalhador de enfermagem devido à pandemia da Covid-19.

Método: Revisão integrativa da literatura realizada nas bases de dados MEDLINE/PubMed, SciELO, LILACS e BDEF no mês de setembro de 2020, as quais geraram 1.772 referências. Após remoção das duplicatas e emprego dos critérios de inclusão e exclusão a amostra final foi composta por 22 artigos.

Resultados: Distúrbios de sono, sintomas de depressão, sintomas somáticos, ansiedade, estresse, fadiga, risco de síndrome de *Burnout*, risco de estresse pós-traumático, dermatite e eczema das mãos

foram danos encontrados nos profissionais de enfermagem devido à pandemia da Covid-19. Dentre os fatores de proteção, destacam-se a gratificação pessoal, a relação familiar, a resiliência e a realização pessoal.

Conclusão: Proteger a saúde do trabalhador de enfermagem envolve esforços urgentes relacionados à provisão de condições básicas de segurança do trabalhador, necessitando de políticas públicas e investimentos para a preservação da saúde dos trabalhadores de enfermagem. As ações de proteção estão relacionadas à implantação da gestão da segurança psicológica, estabelecimento de diretrizes claras, promoção de educação continuada e garantia de melhores condições de trabalho.

Palavras-chave: Infecções por coronavírus; Coronavírus; Enfermagem; Fatores de Risco; Saúde do trabalhador.

RESUMEN:

Objetivo: Investigar a través de una revisión integradora el daño a la salud de los trabajadores de enfermería debido a la pandemia Covid-19.

Método: Revisión bibliográfica integradora realizada en las bases de datos MEDLINE/PubMed, SciELO, LILACS y BDNF en septiembre de 2020, que generó 1.772 referencias. Tras eliminar los duplicados y aplicar los criterios de inclusión y exclusión, la muestra final constó de 22 artículos.

Resultados: Alteraciones del sueño, síntomas depresivos, síntomas somáticos, ansiedad, estrés, fatiga, riesgo de síndrome de Burnout, riesgo de estrés post-traumático, dermatitis y eccema de manos fueron daños encontrados en los profesionales de enfermería por la pandemia de Covid-19. Entre los factores protectores destacan la gratificación personal, las relaciones familiares, la resiliencia y la realización personal.

Conclusión: La protección de la salud de los trabajadores de enfermería implica esfuerzos urgentes relacionados con la provisión de condiciones básicas para la seguridad del trabajador, requiriendo políticas públicas e inversiones para preservar la salud de los trabajadores de enfermería. Las acciones de protección están relacionadas con la implementación de la Gestión de la seguridad psicológica, estableciendo lineamientos la educación continua y asegurando mejores condiciones laborales.

Palabras clave: Infecciones por coronavirus; Coronavirus; Enfermería; Factores de riesgo; Salud laboral.

INTRODUCTION

The Covid-19 pandemic has posed several challenges to health systems around the world due to the number of people infected and the increasing demand on resources needed to cope with it⁽¹⁾. Thus, the speed with which Covid-19 has spread between and within countries has influenced the daily lives of billions of people on the planet⁽²⁾.

Healthcare workers are a risk group for Covid-19 because they are directly exposed to infected patients and thus receive a high viral load. In addition, they are under tremendous stress when caring for these patients, many of whom are severely ill, and under often inadequate working conditions⁽²⁾. Increased work hours, physical fatigue, and insufficient and/or negligent health protection and care measures are other factors that increase this risk⁽³⁾.

Thus, health workers involved, directly and indirectly, in facing the pandemic are exposed daily to the risk of getting sick from the coronavirus, and the heterogeneity that characterizes this contingent of the workforce determines different forms of exposure, both to the risk of contamination and to the factors associated with working conditions^(2,4,5).

Among these professionals are the nursing professionals, who represent about 2.2 million in Brazil and who work in different regions and in unequal proportions. They are

professionals who are on the front line in the care provided, regardless of the type of care and the health situation, pandemic or not⁽¹⁾.

Among those infected with Covid-19, nursing technicians and assistants are the most affected, followed by nurses. The working and socioeconomic conditions experienced by the vast majority of these workers, such as multiple jobs, lack of labor guarantees, and double work day is aggravated by the increased demand at work due to the pandemic situation, associated with the lack of personal protective equipment (PPE) and diagnostic tests, revealing a situation of negligence regarding the protection of professionals and devaluation of workers^(6,7).

In this context, Covid-19 can be considered the first new work-related disease to be described in this decade, showing the practical importance of infection control in work environments not only for healthcare workers, but for the protection of all groups of workers involved in care and assistance to the population⁽⁷⁾.

Therefore, this study aims to investigate the damage to the health of nursing workers due to the Covid-19 pandemic. From this perspective, the question that guided this investigative proposal stands out: what are the damages caused to nursing workers in the exercise of their profession during the Covid-19 pandemic?

MATERIAL AND METHODS

This is an integrative literature review conducted in seven steps⁽⁸⁾: 1) delimitation of the guiding question of the review; 2) definition of the inclusion and exclusion criteria; 3) extensive search of the literature; 4) identification of potential studies through evaluation of the title and abstract; 5) selection of the articles based on the full text; 6) evaluation of the quality of the included studies; 7) synthesis of the included studies.

The guiding research question was developed based on the PICO strategy: P - population and problem; I - intervention; C - comparison; and O - outcome. Thus, we considered P: nursing professionals; I: pandemic Covid-19; C: normal epidemiological circumstances; O: harm to physical and mental health. In this direction, the constructed question was: what damage was caused to nursing workers in the exercise of their profession during the Covid-19 pandemic?

The search for articles was conducted in September 2020 in the electronic databases MEDLINE/PubMed, Scientific Electronic Library Online (SciELO), Latin American and Caribbean Scientific and Technical Literature (LILACS) and the Nursing Database (BDENF).

To define the search terms, the Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) were consulted. The descriptor "Covid-19" and its correlates were chosen and combined with the search terms "Nursing", "Risk factors", and "Occupational health" and their respective expressions in English. The Boolean operators "AND" and "OR" were used for combination. The strategies built with the search terms and their results are presented in Chart 1.

Table 1: Search strategies and results of the identified productions. Brasilia, Federal District, 2020.

Information Sources	Search terms	Results
MEDLINE/PubMed	“COVID-19” [Supplementary Concept] OR (2019 novel coronavirus disease) OR (COVID19) OR (COVID-19 pandemic) OR (SARS-CoV-2 infection) OR (COVID-19 virus disease) OR (2019 novel coronavirus infection) OR (2019-nCoV infection) OR (coronavirus disease 2019) OR (coronavirus disease-19) OR (2019-nCoV disease) OR (COVID-19 virus infection) AND “Nurse Practitioners” [Mesh] OR (Nurse Practitioner) OR (Practitioner, Nurse) OR (Practitioners, Nurse) AND “Risk Factors” [Mesh] OR (Factor, Risk) OR (Factors, Risk) OR (Risk Factor) OR (Population at Risk) OR (Risk, Population at) OR (Populations at Risk) OR (Risk, Populations at) AND “Occupational Health”[Mesh] OR (Health, Occupational) OR (Industrial Hygiene) OR (Hygiene, Industrial) OR (Industrial Health) OR (Health, Industrial) OR (Safety, Occupational) OR (Occupational Safety) OR (Employee Health) OR (Health, Employee)	1,651
SCIELO	COVID-19 AND Nursing OR Risk factors OR Worker’s health	11
LILACS	COVID-19 AND Nursing OR Risk factors OR Worker’s health	95
BDEF	COVID-19 AND Nursing OR Risk factors OR Worker’s health	15
Total		1,772

Development: Alves CLM, Aguiar RS (2020).

The inclusion criteria for the sample were: people aged 18 years or older; nursing professionals; addressing damage to the health of nursing workers due to the Covid-19 pandemic; studies with qualitative, quantitative, and mixed methods designs; articles published online in recent years (2019 to 2020), available in Portuguese, English, or Spanish, and in full. Literature reviews, editorials, letters to the editor, correspondence, comments, reflections, and essays were excluded.

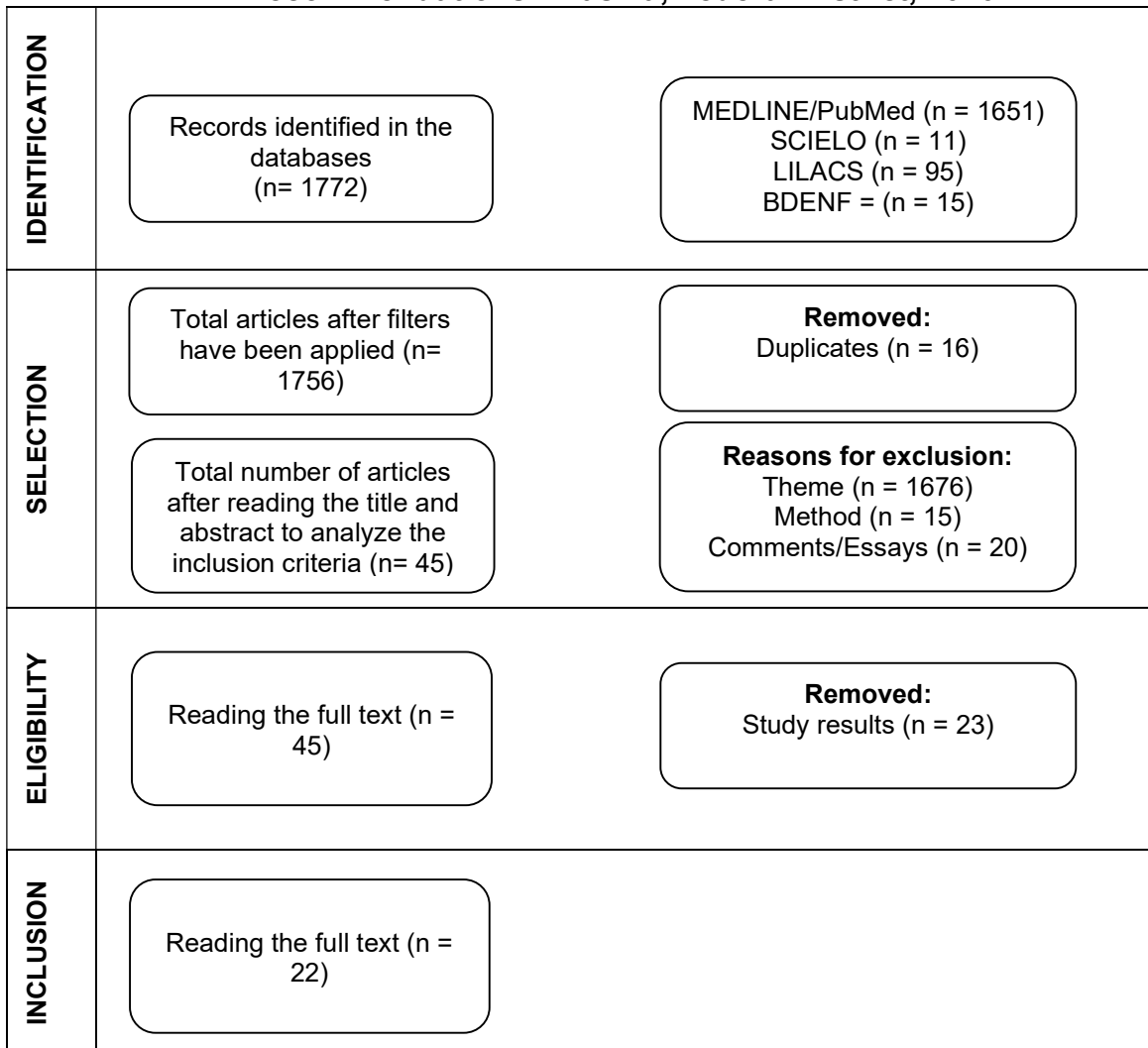
The screening of the publications was carried out by two researchers, independently, after reading the titles and abstracts, and, under any divergence during the selection process of the articles, a third researcher could be consulted.

The database search generated 1,772 references. The selection of studies was conducted by exporting the search results from the electronic databases to the EndNote desktop® reference manager. With the program, 16 duplicates were removed, resulting in 1,756 for evaluation of the remaining inclusion criteria by reading the titles and abstracts. Of these, 1,711 were excluded due to the topic (n= 1,676), method (n= 15) or being letters to the editor, correspondence, comments, reflections and essays (n= 20). In the end, 45 articles presented potential for inclusion in the sample and, from these, 22 were chosen after full reading (Figure 1).

The results, the screening and the selection process were presented by means of a flowchart according to the recommendations of the Preferred Reporting Items for Systematic reviews and MetaAnalyses (PRISMA) and also by tables and in a descriptive way with the objective of synthesizing and fostering discussion about the

damage caused to nursing workers in the exercise of their profession during the Covid-19 pandemic.

Figure 1: Flowchart of the database search according to PRISMA recommendations. Brasília, Federal District, 2020.



Development: Aguiar RS, Alves CLM, 2020.

The evidence from the articles was classified into six levels: Level I - studies related to meta-analysis of multiple controlled studies; Level II - single experimental studies; Level III - quasi-experimental studies, such as non-randomized clinical trial, single group pre- and post-test, and time series or case-control; Level IV - non-experimental studies, such as descriptive, correlational, and comparative research, with a qualitative approach, and case studies; Level V - systematically obtained program evaluation data; and Level VI - expert opinion, experience reports, consensus, regulations, and legislation⁽⁹⁾.

To facilitate data extraction and synthesis, a synthesis matrix described in an Excel® spreadsheet was prepared. Data was collected as: journal, country and year of publication, author(s), title, study design, main results, and factors related to quality of care and level of evidence. In addition to forming a database, this tool was used to map relevant points, integrate data and characterize the sample reviewed. Thus, part of this data is represented in Chart 2.

Table 2: Final sample of articles. Brasília, Federal District, 2020.

Study	Journal	Author (s)	Year	Title	Study design	Level of evidence
N1	Cuban Journal of Nursing	Alvarez AK, Almaguer AYC, Santos EDZ ⁽¹⁰⁾	2020	Gestión de seguridad psicológica del personal sanitario en situaciones de emergencia por COVID-19 en el contexto hospitalario o de aislamiento	Qualitative	IV
N2	Psychiatry Research	Barello S, Palamengui L, Graffigna G ⁽¹¹⁾	2020	Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic.	Quantitative	IV
N3	Occupational Medicine	Wang S et al. ⁽¹²⁾	2020	Sleep and Motion Disorders of Physicians and Nurses Working in Hospitals Facing the Pandemic of COVID 19	Quantitative	IV
N4	European Psychiatry	Zai-Quan Dong et al. ⁽¹³⁾	2020	The social psychological impact of the COVID-19 pandemic on medical staff in China: A cross-sectional study	Quantitative	IV
N5	Contact Dermatitis	Guertler A et al. ⁽¹⁴⁾	2020	Onset of occupational hand eczema among healthcare workers during the SARS-CoV-2 pandemic – comparing a single surgical site with a COVID-19 intensive care unit	Quantitative	IV
N6	Medical Science Monitor	Huang L et al. ⁽¹⁵⁾	2020	Factors Influencing Anxiety of Health Care Workers in the Radiology Department with High Exposure Risk to COVID-19	Quantitative	IV
N7	Military Medical Research	Jin Y et al. ⁽¹⁶⁾	2020	Perceived infection transmission routes, infection control practices, psychosocial changes, and management of COVID-19 infected healthcare workers in a tertiary acute care hospital in Wuhan: a cross-sectional survey	Cross-sectional study	IV
N8	International Journal of Environmental Research and Public Health	Luceño-Moreno L et al. ⁽¹⁷⁾	2020	Symptoms of Posttraumatic Stress, Anxiety, Depression, Levels of Resilience and Burnout in Spanish Health Personnel during the COVID-19 Pandemic	Cross-sectional study	IV
N9	International Journal of Environmental Research and Public Health	Magnavita N et al. ⁽¹⁸⁾	2020	Symptoms in Health Care Workers during the COVID-19 Epidemic. A Cross-Sectional Survey	Cross-sectional study	IV
N10	Journal of Primary Care & Community Health	Maraqa B et al. ⁽¹⁹⁾	2020	Palestinian Health Care Workers' Stress and Stressors During COVID-19 Pandemic: A Cross-Sectional Study	Cross-sectional study	IV
N11	Journal of Nursing Management	Mo Y et al. ⁽²⁰⁾	2020	Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic	Cross-sectional study	IV

N12	Medical Humanities	Nascimento VF et al. ⁽²¹⁾	2020	Dificultades y temores de las enfermeras que enfrentan la pandemia de COVID-19 en Brasil	Quantitative	IV
N13	International Journal of Environmental Research and Public Health	Nienhaus A, Hod R ⁽²²⁾	2020	COVID-19 among Health Workers in Germany and Malaysia	Mixed method	IV
N14	Journal of Nursing and Health	Rodrigues NH, Silva LGA ⁽²³⁾	2020	Coronavirus pandemic management in a hospital: report of professional experience	Exploratory study	IV
N15	JAMA Network Open	Rossi R et al. ⁽²⁴⁾	2020	Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy.	Cross-sectional study	IV
N16	Euro Surveill	Totmann A et al. ⁽²⁵⁾	2020	Strong associations and moderate predictive value of early symptoms for SARS-CoV-2 test positivity among healthcare workers, the Netherlands, March 2020	Quantitative	IV
N17	Occupational Medicine	Wang S et al. ⁽²⁶⁾	2020	Sleep disturbances among medical workers during the outbreak of COVID-2019	Cross-sectional study	IV
N18	Journal of Orthopaedic Surgery and Research	Wong KC et al. ⁽²⁷⁾	2020	The psychological impact on an orthopaedic outpatient setting in the early phase of the COVID-19 pandemic: a cross-sectional study	Cross-sectional study	IV
N19	Medicine	Xiong Y et al. ⁽²⁸⁾	2020	Clinical and CT characteristics of healthcare workers with COVID-19: A single-centered, retrospective study	Quantitative	IV
N20	Journal of Pain and Symptom Management	Yifan T et al. ⁽²⁹⁾	2020	Symptom Cluster of ICU Nurses Treating COVID-19 Pneumonia Patients in Wuhan, China	Quantitative	IV
N21	German Medical Science	Zerbini G et al. ⁽³⁰⁾	2020	Psychosocial burden of healthcare professionals in times of COVID-19 - a survey conducted at the University Hospital Augsburg	Quantitative	IV
N22	Current Medical Science	Zhan Y et al. ⁽³¹⁾	2020	Prevalence and Influencing Factors on Fatigue of First-line Nurses Combating with COVID-19 in China: A Descriptive Cross-Sectional Study	Cross-sectional study	IV

Development: Aguiar RS, Alves CLM, 2020.

The compiled data was then analyzed using thematic analysis⁽³²⁾, being organized and presented in thematic categories obtained from the following stages of analysis: 1) data familiarization (results of the studies that comprised the sample and were related to the research question); 2) generation of initial codes; 3) search for themes; 4) review of themes; 5) definition and titling of themes; 6) production of the report.

RESULTS

The final sample of this review was composed of twenty-two articles, as described in Table 2.

All publications refer to the year 2020. Quantitative and cross-sectional designs were the most prevalent among the researches, corresponding to nine articles in each type (40.9%). Regarding the place of publication and development, eight studies (36.3%) were conducted in China, three (13.6%) in Germany (one in conjunction with a report from Malaysia), three (13.6%) in Italy, two (9%) in Brazil, and one (4.5%) in Cuba, Spain, Greece, the Netherlands, Palestine, and Singapore. Regarding the level of evidence of the articles, all studies (100%) fit in level IV that corresponds to non-experimental studies, such as descriptive, correlational and comparative research, with a qualitative approach and case studies.

Thematic analysis of the articles' results allowed the organization into two main thematic categories: 1) Harms to the mental health and physical body of nursing workers in the Covid-19 pandemic; and 2) Opportunities for improvement.

Mental and physical health harms of nursing workers in the Covid-19 pandemic

Most of the articles brought aspects related to the mental health of the professionals. Thus, levels of anxiety, depression and stress were analyzed and emotional exhaustion, risk of post-traumatic stress and risk of Burnout were identified. The need for psychological support services to professionals was mentioned in several articles (N1, N2, N4, N6, N12, N14, N15, N17, N18, N22)^(10,11,13,15-21,23,24,26,27-31).

Study N1 identified the need for the development of specific actions to manage the psychological safety of health professionals, indicating it as an indispensable point for care due to the professional's vulnerability for the close and constant contact with the pain and suffering of patients⁽¹⁰⁾.

Warning of prolonged negative effects and risk of post-traumatic stress disorder, study N2 highlights workers' struggle to cope with the challenge of the pandemic threatening their own health. The professionals reported significant psychological pressure, Burnout, and somatic symptoms. The study suggested offering counseling services and support systems for treatment and prevention of future problems arising from these situations⁽¹¹⁾.

Added to this, according to study N15, are symptoms of post-traumatic stress and depression, anxiety, insomnia, and perceived stress, especially in young women and frontline pandemic workers. Additionally, experiencing hospitalization and death of coworkers was also identified as a contributor to post-traumatic stress⁽²⁴⁾.

Moreover, it was revealed in studies N4 and N8, the great concern of professionals for their families^(13,17). Nurses are afraid of infecting themselves and also of transmitting the virus to their relatives (N10, N12, N14, and N19)^(19,21,23,28). As a measure to mitigate workers' fear for their health and that of their families, study N13 indicates the provision of high quality personal protective equipment (PPE)⁽²²⁾. However, it was

verified the lack of protective materials or the threat of lacking them, resulting in their reuse due to use limitations (N6, N12 and N14)^(15,21,23).

In addition, professionals have difficulty in meeting the increased demand at work and for their families during measures to close down establishments and circulate the population (N12)⁽²¹⁾. Corroborating with this result, study N11 in its analysis showed that children, working hours per week and anxiety were the main factors affecting nurse's stress⁽²⁰⁾.

Among the workers' wearing-out processes, work overload, which generates stress, and fatigue were the most prominent (N11, N12, N14, N18, N20, N21, and N22)^(20,21,23,27,29-31). Study N11 warns about the risk of Burnout due to long working hours in a state of stress, since nurses are prevented from even performing physiological functions by the use of protective clothing⁽²⁰⁾. In study N20, falling goggles was identified as a risk factor for pain symptoms; the study identified environmental stress along with personal disorders as a cause of somatic disorders⁽²⁹⁾. Additionally, study N14 mentions as of great concern the adaptation of professionals to the workload, dressing and increased complexity of care⁽²³⁾. This change in work and increase in stressors impacts both frontline workers in hospitals, ICU care, and emergencies, as well as those attending to chronic and elective conditions, and there is also the possibility of burnout in these caregivers with the extended duration of the pandemic (N18)⁽²⁷⁾.

Also identifying high levels of stress and exhaustion, study N21 suggested improvements such as sufficient staffing, maintenance of teams and work schedules, and also cited leisure time away from work as important⁽³⁰⁾.

Study N3, aiming to better understand the relationship between physical activity and sleep disturbances in a stressful situation like the pandemic, revealed parameters related to sleep disturbances. The participants reported feeling sleepy during the working day and having to make a great effort to stay awake⁽¹²⁾.

Corroborating this result, study N15 observed that nurses and assistants were more prone to severe insomnia⁽²⁴⁾. Study N17, on the other hand, observed that the prevalence of sleep disturbance was high (38%) in workers at a pediatric hospital during the Covid-19 outbreak. The analysis showed that sleep disturbance was independently associated with Covid-19 patient exposure and depression. Thus, heavy work interfering with the health status of professionals may impact the quality of patient care⁽²⁶⁾.

Studies N7, N9, N16 and N19 were conducted with Covid-19 infected workers^(16,18,25,28). Thus, study N7 aimed to explore the characteristics of infected workers, and fever, lethargy, and muscle pain were identified as the first symptoms, and the main form of transmission was during nasal and oropharyngeal swab collection. The study recommends annual training on PPE use and additional education during outbreaks. In addition, it was identified that workers also experienced psychological stress and emotional changes that required psychological intervention⁽¹⁶⁾.

Infected professionals in study N9 reported respiratory symptoms present in about half of the cases, in addition to anosmia and dysgeusia. About one in three had no

symptoms at all. The frequency of anxiety disorder and depression was not higher than commonly recorded in pre-pandemic checks. There was significant risk of anxiety, especially in those with poor sleep quality. The study recommended mental health support, interventions to improve and promote sleep quality, especially for infected workers⁽¹⁸⁾.

Study N16 identified non-respiratory symptoms (contrary to study N9) and anosmia as strongly associated with coronavirus infection. Muscle pain, eye pain, general malaise, headache, fatigue, and fever were reported more frequently. The study suggests that the results may help in targeted screening in settings with a lack of diagnostic tests⁽²⁵⁾.

In a retrospective analysis, the N19 study compared clinical, laboratory, and computed tomography (CT) characteristics between contaminated professionals and common patients. Symptoms and laboratory findings were similar to those of ordinary patients, being fever, fatigue, cough, and increased CRP, ESR, and LDH; lymphopenia in some cases and ground-glass opacity on CT consolidation were also similar⁽²⁸⁾.

The differences observed were lower initial severity of opacities, credited to possible reduction in viral load and extent of infection due to careful use of protective equipment such as N95 mask and face screen reducing virus intrusion. In addition, probably greater awareness of symptoms and readiness to perform examinations resulted in less observation of opacifications. Thus the study suggested performing examinations and treatment as early as possible (N19)⁽²⁸⁾.

Finally, study N5, aiming to raise awareness about occupational hand eczema identified a high prevalence of acute hand dermatitis in all professionals regardless of direct patient care with Covid-19 with the intensification of hand hygiene practice due to the pandemic⁽¹⁴⁾.

Opportunities for Improvement

Article N1 indicates the need for worker safety management with a system of actions to organize work by seeing the worker's vulnerabilities as a person⁽¹⁰⁾. Study N2, meanwhile, drew attention to the possibility of prolonged emotional distress caused by the stress professionals faced during the pandemic, including the risk of post-traumatic stress. The study suggests providing timely counseling services and support systems to mitigate today's damage and its consequences⁽¹¹⁾.

Corroborating the indication of action to reduce stress and its effects over time, several studies point to mental health support actions by maintaining surveillance and monitoring (N4, N6, N7, N9, N10)^(13,15,16,18,19).

Promoting resilience as a protective factor was indicated in studies N6, N7, N8 and N11 for stress relief^(15,16,17,20). With emphasis on social support and keeping in touch with family and friends, as well as fostering support among colleagues for encouragement (N11)⁽²⁰⁾.

Study N4 mentions as coping strategies compliance with infection control procedures, getting enough sleep and exercise. It also highlights resting time as essential⁽¹³⁾. Sleep hygiene is also mentioned in several articles (N2, N7, and N9), in addition to maintaining a healthy life (N22)^(11,16,18,31). Study N20 with ICU nurses who presented

somatic symptoms also suggested as specific interventions physical exercises and guidelines related to infection control, in addition to behavioral therapy⁽²⁹⁾.

Among the infection control measures, PPE stands out. The lack or rationing of PPE is mentioned as a reason for anxiety and fear. Therefore, several studies recommend the provision of adequate protective material in sufficient numbers for the worker to be safe and thus avoid psychological distress (N7, N12, N13, and N14)^(16,21,22,23). Furthermore, training on the use and performance of procedures is fundamental for the professional's safety. (N7)⁽¹⁶⁾.

Other recommended measures regarding work were: increasing the number of professionals; maintaining teams; maintaining work schedules; and clear and updated guidelines (N22)⁽³¹⁾. In addition, essential policies for the protection and protection of workers such as work accident insurance benefits for infected workers were encouraged (N11)⁽²⁰⁾.

Furthermore, early detection of contaminated workers facilitates isolation and is important for the protection of health care workers and the community. Thus, studies N4 and N19 recommend attention to symptoms and application of imaging tests promptly^(13,28).

Chart 3 allows us to visualize a compilation of the results described by the studies that make up the final sample of this integrative review, as well as the possible solutions. Intervening in grievances requires specific management actions for psychological safety that include assessment, follow-up, and monitoring of the nursing team; preventive measures for occupational health; provision of PPE; improvement of the work environment and promotion of protective factors; promoting education of managers and nurses, as well as expansion of psychological support actions, counseling services, and social support.

Chart 3: Summary of the results and possible solutions described by the studies included in the integrative review. Brasília, Federal District, 2020.

Results	Possible solutions
Sleep disorders ^(N3,N9,N15,N17,N20) Depression symptoms ^(N4,N8,N15,N17,N19,N21,N22) Somatic Symptoms ^(N2,N20) Anxiety ^(N4,N6,N8,N11,N12,N15,N19,N22) Stress ^(N7,N8,N10,N11,N13,N15,N18,N20,N21,N22) Fatigue ^(N20,N22) Risk of Burnout Syndrome ^(N2,N14) Risk of post-traumatic stress ^(N2,N8,N15)	Encouraging a healthy lifestyle ^(N22) Psychological support ^(N2,N4,N9,N10,N11,N17,N18,N21) Counseling Services ^(N2,N10,N18) Peer Support System ^(N10,N22) Psychological safety management ^(N1,N11,N14) Mental health monitoring and interventions ^(N6,N7,N15,N18,N19,N22) Social support ^(N18,N21,N22) Valuing leisure time (family and friends) ^(N21) Provide PPE properly ^(N7,N10,N12) Provide a break from intense work ^(N19) Ensure a better working environment ^(N21,N22) Keeping teams stable ^(N21) Promotion of resilience ^(N8) Monitor, provide clarification and advice on infection control ^(N20)
Lack of PPE or risk of lack thereof ^(N7,N12,N13,N14) Work overload ^(N11,N12,N14,N21,N22)	Make adequate PPE available in sufficient quantity ^(N7,N12,N13,N14,N18,N19) Adjust work hours to the mode and workload ^(N22) Reasonable allocation of human resources ^(N22)
Difficulties regarding preventive measures ^(N13)	Clear and strict rules on the use of PPE ^(N18)

Lack of mastery of the proper use of PPE ^(N13,N14) Difficulties regarding the complexity of the service ^(N14) Constant protocol changes ^(N14)	Technical-scientific updating, training ^(N14) Providing clarity of guidelines ^(N21) Outbreak Response Training ^(N21)
Protective factors: personal gratification ^(N2) , family relationship ^(N4) , resilience ^(N6,N8) , personal fulfilment ^(N8)	Promoting Resilience ^(N8) Improve communication and recognition at work ^(N21) Social support system ^(N2,N21)
Nurses with the highest number of suspected infections ^(N13) Infection cases with mild, severe progression and death ^(N13) Cases of major infection in nursing homes, shelters, and correctional facilities ^(N13) Reduction of viral load and extent of infection in infected persons ^(N19) Perception of contagion when performing swab collection ^(N7)	Update of protective equipment in case of new disease ^(N7) Training for proper use of PPE ^(N7,N14) Make adequate PPE available in sufficient quantity ^(N7,N12,N13,N14,N18,N19) Systematic analysis of occupational examinations ^(N13) Early diagnosis facilitating isolation and treatment ^(N19)
Acute dermatitis and eczema of the hands ^(N5)	Increased awareness of the problem ^(N5)

Development: Alves CLM, Aguiar RS, 2020.

Finally, study N5 points to the need for greater awareness of occupational hand eczema and preventive measures that can be taken⁽¹⁴⁾.

DISCUSSION

The attention to the occupational health of nursing staff should be based on the prevention of diseases and improvement of the level of health of workers.¹⁸ To achieve occupational health and productivity, strategies must be used to reduce risks, as well as to ensure that the work environment is improved, sufficient human resources and supplies are allocated, training is provided, and communication and recognition of the worker is promoted^(30,31).

Nursing work is known to be heavy and physically and mentally exhausting⁽¹⁹⁾. In a pandemic situation especially, it is necessary to take preventive and interventional measures to reduce work-related health risks by providing mental health support, monitoring and interventions during and after the outbreak to prevent prolonged illness and to maintain work capacity^(16,24,31).

Therefore, investments in PPE, training, standardization of procedures, and clear guidelines are necessary for the worker's physical and mental safety and primordial for the promotion of resilience, because they increase the feeling of control over adverse situations^(17,19,29,31).

Furthermore, the use of systematic analysis of occupational examinations⁽²²⁾, the evaluation and monitoring of mental health need to be carried out as strategies for minimizing risks in the practice of workers' management in health institutions. The work environment also needs to be improved, maintaining the conformation of teams, adjusting them to the mode of work and hours according to the workload, not jeopardizing rest, because long shifts and intense work with great wear and tear due to the necessary paramentation, complexity of work and emotional exposure contribute to the exhaustion of the workforce, also putting at risk the safety of patients^(23,31).

In addition to these needs, problems with food, transportation, and family provision demand worker social support and humanistic care in order to reduce personal difficulties^(21,31).

The nursing worker is in constant and close contact with patients, being witness to their suffering. Thus, it is important to see them as vulnerable people and to adopt psychological support measures with peer support systems and counseling services^(10,11,19).

Therefore, specific permanent actions for the management of the psychological safety of the professionals are necessary for the qualification and improvement of the protection of the worker's health in the scope of the health institutions, and the creation of partnerships with institutions such as class entities may serve as support for the realization of this measure^(10,27,31).

But in addition to training to manage the psychological stress of the nursing worker, it is necessary to reflect on more structural changes regarding the deficiency of basic human, material and equipment resources, pointing to the need for better funding^(19,31). Therefore, by exploring the potential solutions for protecting workers' health and maintaining their working capacity, the articulation between health institutions, class entities, governments and society with the participation of the worker can ease the difficulties of deficit health systems^(19,21,31).

CONCLUSION

From the data obtained in the review, we identify the existence of risk factors and deteriorating conditions of the nursing staff in the Covid-19 pandemic that impact the physical and mental health of the worker, as well as the quality of care offered by these professionals. Aspects involving lack of PPE, training, clear guidelines and protocols, human resources, infrastructure, and psychosocial support were identified.

Moreover, by associating this with the reality of underfunding of some health systems, precarious working conditions are seen as a difficult, complex, and already sickening problem for nursing professionals. Parallel to this, protection factors, resilience and personal accomplishment were identified as positive aspects for the health of the worker, as well as the need to value the recognition of professionals about their work.

Thus, this review suggests the need for recognition of the need for greater protection of the nursing worker in the sense of adopting effective safety measures, because the already precarious working conditions, in a public health emergency situation with increased patient demand and complexity of care are aggravated.

Therefore, short, medium and long term efforts are necessary related to the provision of basic safety conditions and the formulation of public policies for the preservation of workers' health, considering that wear and tear and illness are a reality in nursing work and impact not only on the health of workers, but also on the health of the population they care for.

Regarding the limitations of the study, it is believed to be related to the novelty of the theme, a fact that may have limited the supply of scientific articles in Portuguese about the Brazilian reality.

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