

Nursing professionals in the ICU and their role in the pandemic: Legacies of Covid-19

Profissionais de Enfermagem na UTI e seu protagonismo na pandemia: Legados da Covid-19

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ABSTRACT | OBJETIVO: To analyze the performance of nursing professionals in the Intensive Care Unit, considering their role in assisting patients with COVID-19 and the legacies of this pandemic so far. **METHOD:** Systematic review based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis protocol. Publications in Portuguese, English, and Spanish from the last 2 years (2019-2020) were considered, indexed in the Biblioteca Virtual do Ministério da Saúde of Brazil, PubMed, Cochrane Central, and Web Of Science. **RESULTS:** 14 articles were selected for data analysis. The role of nursing professionals in combating COVID-19 is a consensus in different countries with emphasis on their role as the front line and the need to adapt to an unprecedented context, dealing with the unknown and with frequent research that pointed to new discoveries. As future implications in the face of the current pandemic, factors such as greater appreciation of nursing professionals, including the use of intensive care professionals and anesthesiologists, diversification of forms of communication, better self-management and management of teams, and telecare in nursing care were found. **CONCLUSION:** The pandemic brought by COVID-19 highlighted the role of nurses. With changes and adaptations requiring new protocols and forms of assistance, they can be considered legacies.

DESCRIPTORS: Coronavirus infections. Intensive Care Units. Nurses. Nurse's Role. Pandemics.

RESUMO | OBJETIVO: Analisar a atuação dos profissionais de enfermagem na Unidade de Terapia Intensiva, considerando seu protagonismo no atendimento aos pacientes com COVID-19 e os legados dessa pandemia até o momento. **MÉTODO:** Revisão sistemática com base no protocolo *Preferred Reporting Items for Systematic Reviews and Meta-Analysis*. Foram consideradas publicações em português, inglês e espanhol dos últimos dois anos (2019-2020) indexados na Biblioteca Virtual do Ministério da Saúde do Brasil, na PubMed, Cochrane Central e *Web Of Science*. **RESULTADOS:** Foram selecionados 14 artigos para a análise dos dados. A atuação do profissional de enfermagem no combate ao COVID-19 é consenso em diferentes países, sendo destacada sua atuação como linha de frente e as necessidades de adaptação a um contexto inédito, lidando com o desconhecido e com pesquisas frequentes que apontavam novas descobertas. Como implicações futuras frente à atual pandemia verificou-se fatores como maior valorização dos profissionais de enfermagem, inclusive com uso de profissionais intensivistas e anestesistas, diversificação das formas de comunicação, melhor autogerenciamento e gerenciamento das equipes e o teleatendimento em cuidados de enfermagem. **CONCLUSÃO:** A pandemia trazida pela COVID-19 evidenciou o protagonismo dos enfermeiros. Com as mudanças e adaptações exigindo novos protocolos e formas de atendimento, podendo ser considerados como legados.

DESCRITORES: Infecções por Coronavirus. Unidades de Terapia Intensiva. Enfermeiras e Enfermeiros. Papel do Profissional de Enfermagem. Pandemias.

Introduction

The new coronavirus (named that way for its profile in the electronic microscopy in a crown shape) was identified and notified in China in 2019, provoking the disease that received the technical term of COVID-19 and its timeline shows an impressive speed at spreading. This situation made the World Health Organization (WHO) establish a situation of international emergency in public health since January 2020, demanding attention and immediate actions from countries across the world. The transmission is determined as communal, confirmed the aggressive manner of dissemination where the chains of infection cannot be traced from their origin anymore. In the month of August 2020, over 23 million people have been infected and 813.000 have died around the world, according to data from WHO¹.

In this scene, this project proposes a study about the performance of nursing professionals in the Intense Care Unit (ICU), considering their protagonism in the assistance of COVID-19 patients and the legacies of this pandemic until now. Learnings, equipment, new protocols, whatever stayed that could be taken from this situation to the improvement of their functions.

Among health professionals, the atmosphere is of complete attention and apprehension. The need to face a scene completely unknown in terms of the dissemination speed, possibility of infection on a scale never seen before, and the number of deaths only comparable to a war scene. This scene requires health professionals that are and will be in the front lines too much physical and emotional effort, along with the stress and high risk of catching the virus². Nursing professionals compose one of the vulnerable groups since the number of dead health professionals is a fact and causes concern to the authorities³.

In the research made by Bitencourt et al.⁴, the protagonism of nursing professionals was pointed in every interface of assistance to COVID-19 patients, since the composition of commissions, planning and functioning the physical structure, management of human resources, and construction of protocol and care flow, besides acting directly in the assistance.

The frontline position of the nursing professionals in the ICU environment makes suitable this protagonism by the own characteristics of the job that require that they spend a long time besides the patients. This way, as Barbosa et al.⁵ state, the competence of these professionals is highlighted by the application of protocols by the Health Ministry related to the pandemic. So, the interest in the topic came up so that the performance of these professionals in the ICU could be understood in this scene of a crisis.

This way, the proposed study is socially relevant, considering that it is about a professional class that is in the frontlines of preventing and combating the coronavirus, making it important to recognize the dynamics of their work in this time of pandemic and future perspectives of these professionals, for example, the new learnings and ways of working that were noticed by the professionals because of the crisis. It should be noted that the study has academic relevance, considering it is about a new topic, a period that could be considered unprecedented, still ongoing, that needs studies in the various spheres of society and economy.

In this context, this study has an objective to analyze the performance of nursing professionals in the Intense Care Unit (ICU), considering their protagonism in the assistance of COVID-19 patients and the legacy of this pandemic until now.

Method

This systematic review was planned to contemplate the proposed protocol by Preferred Reporting Items for Systematic Reviews and Meta-Analysis⁶. In this review the kind of articles that were searched for were the ones that explore the performance of nursing professionals in the ICU and their protagonism during the pandemic COVID-19, considering the quality of the researches made. This way, the study was directed by the following question: "Which legacies were left by the pandemic COVID-19 for the performance of the nursing professionals in the Intense Care Unit (ICU)?", which was elaborated by the description of PECOS (Table 1).

Table 1. Description of the PECOS strategy for the elaboration of the northing question of the review

Acronym	Description	
P (Patient/ Population)	Nursing professionals	The studies included were the ones that involved nursing professionals.
E (Exposition)	Performance in the ICU with COVID-19 patients	The exposition of interest was the performance of these professionals while frontliners in the ICU in the assistance of COVID-19 patients.
C (Comparison)	No group of comparison	In this review there was not a comparison between groups.
O (Outcomes)	Professional legacies	The main considered results are the legacies left for the professional performance of nurses in the ICU with patients with respiratory failure and high chance of contagion.
S (Study type)	Cross-section observational, clinical, field and case studies	Only theoretical and review studies were excluded.

Source: Elaborated by the authors.

The collection of articles was made based on base data of the data from Biblioteca Virtual do Ministério da Saúde do Brasil (BVMS) [Virtual Library of the Ministry of Health of Brazil] and from PubMed (US National Library of Medicine), between the months of August and September 2020, being considered publications in English, Portuguese and Spanish from the last 2 years (2019-2020). It should be noted that the short temporal cut was selected because the study of the pandemic began in 2019 and is still ongoing, which limits the collection to this period.

The keywords identified to define the search strategies were: "Infections by Coronavirus"; "Intense Care Unit"; "Nurses"; "Role of the Nursing Professional"; "Pandemics", and then, through Medical Subject Headings (MESH) on PubMed, descriptors were identified, also based on the PECOS strategy, that could rescue the higher number of articles. After elaborating the searching strategy on PubMed, it was used in the following bases: Cochrane Central and Web of Science (WOS). For the search in the LILACS database, the controlled descriptors were identified through the tool *Descritores em Ciências da Saúde* (DECS) [Descriptors in Health Science]. The saturation of literature was guaranteed through the analysis of reference lists of studies included or relevant reviews identified by manual research.

None of the authors of the review was blind to the magazine titles or the names of the authors or institutions of the studies. A flux diagram with measures such as Identification, Screening, Eligibility, and Inclusion of items with quantities and an explanatory declaration of the motives of the articles' exclusion was developed (PRISMA model).

The reviewers solved the disagreements through discussions and consensus. Some authors were approached by e-mail to ask for full articles that were not available online free, obtaining positive feedback, with the full article sent. To evaluate the risk of bias in the selected articles, the tool used was the JBI Critical Appraisal Checklist For Studies Reporting Prevalence Data⁷ (Figure 1), which shows the evaluation of four possible types of bias: bias of selection, of performance, of detection, and friction.

Figure 1. Checklist – Preferred Reporting For Systematic Reviews and Meta-analyses: The PRISMA Statement.
 JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not applicable
1. Was the sample frame appropriate to address the target population?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were study participants sampled in an appropriate way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was the sample size adequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the study subjects and the setting described in detail?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Was the data analysis conducted with sufficient coverage of the identified sample?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were valid methods used for the identification of the condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Was the condition measured in a standard, reliable way for all participants?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Was there appropriate statistical analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was the response rate adequate, and if not, was the low response rate managed appropriately?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall appraisal: Include <input type="checkbox"/> Exclude <input type="checkbox"/> Seek further info <input type="checkbox"/>				

Comments (Including reason for exclusion) _____

Results and discussion

After reading the articles, it was verified that the studies were very heterogeneous, which made it harder to make a meta-analysis. It was elaborated a systematic narrative synthesis and the results of the articles included. For a better understanding of the reasoning behind the exclusion of articles, a flowchart was made that summarizes the path followed in the inclusion and exclusion of articles (Figure 2).

The initial research found as results, adding all of the databases, 2.291 articles, 02 found by manual research, 32 articles showed duplicity, 366 stayed for the next step that was reading the titles and abstracts. On this occasion, 23 articles were declared eligible, however, 9 weren't available entirely, the remaining 14 articles for the data analysis.

The characteristics of the included articles are presented in table 2. When analyzing the type of research of the articles it was possible to verify the prevalence of experience reports. From the 14 articles selected, only 3 (21,43%) made exploratory studies, with nursing professionals as part of their research, and all three were done in Brazil, with interview or application of a questionnaire done through a messaging app (WhatsApp). The prevalence of experience reports can probably be explained by the difficulty in researching in hospitals because of the social distancing needed to fight the virus dissemination.

Table 2. Descriptive synthesis of the included studies (to be continued)

Author/Year/Type of study/Magazine/Country/Keywords	Results			
	Methodology (Sample, type of study and instrument used)	Nursing role	Challenges faced	Implications for the nursing practice
Huang et al. (2020) Qualitative International Nursing Review Taiwan COVID-19, Global Health, Nursing, Nursing Leadership, Nurses' Role, Pandemic, Personal Protection Equipment, Taiwan	Experience report, descriptive, documental	The Taiwan Nurse Association and other nurse associations play a vital role of leadership in defending nurses, increasing public conscience, improving the professional profile of nursing and sharing experiences through national and international platforms.	Providing adequate personal protection equipment and safe personnel should be the highest priority for governments and policy all around the world to combat the pandemic successfully.	The implications for nursing and health policies are that we need to prepare well for any emerging unpredictable pandemic in the future.
McDonald (2020) Qualitative International Nursing Review Switzerland COVID-19, Health policy, History, Infection control, Leadership, Nursing policy, Nursing, Pandemic, Policy review.	Experience report, descriptive, documental	In every outbreak throughout history, nurses responded to the dangers the direct involvement with these crisis bring. The nurses that answer to populations in crisis learned to do not depend excessively on those in leadership positions to obtain resources and frontline protection, or even anticipated warning or open disclosure about the risk of contagion, number of cases and results.	The governmental and social support for people deprived of civil rights due to the pandemic will need to be effective to keep the social harmony, law and civil order. The nurses should be aware of these tendencies in their communities and be able to guarantee that supplies of essential equipment, medicine and personnel are available. Guarantee that nursing is accessible to the needing communities is a politic effort that some nurses might need to initiate.	The credibility of the research is crucial when getting involved with politic leaders that depend on specialists to obtain reliable information on which policies could be developed and obtaining resources. The information should be concise and clear about what is known and what is uncertain and how this will change over time; supply chains for essential equipment for future outbreaks are of interest to the nurses and will need to be controlled by them to be available for future outbreaks. The nurses will also need to review the models of personnel to allow up to 50% of nurses to be isolated or in quarantine most of the time.

Table 2. Descriptive synthesis of the included studies (continuation)

Author/Year/Type of study/Magazine/Country/Keywords	Results			
	Methodology (Sample, type of study and instrument used)	Nursing role	Challenges faced	Implications for the nursing practice
Nascimento, Hattori e Terças-Trettel (2020) Qualitative Humanidades Médicas Brazil Nursing; Occupational Health; Coronavirus.	Exploratory study 25 nurses from different health institutions Questionnaire through WhatsApp	-	The hardships and fears presented were related to the daily risk of exposition to the virus, access problems and use of personal protection equipment, doubts in differential diagnosis as well as overload of work and increase of demand for assistance to patients and family members.	-
Nascimento, Hattori e Terças-Trettel (2020) Qualitative Enfermagem em Foco Brazil Pandemics; Coronavirus; Health Personnel; Psychosocial deficiency.	Exploratory study 22 nurses Sent through Whatsapp, a northing question: "What are your personal needs in this moment of the COVID-19 pandemic?"	Frontline professionals that needed to face social distancing from their families given the nature of their work.	The personal needs of nurses reflect the impact of protective measures recommended during the COVID-19 pandemic in the work context as well as family context.	Bigger demand for self-management of the professional;
Silva et al. (2020) Qualitative Enfermagem em Foco Brazil Nursing; Pandemic; Coronavirus Infections.	Experience report Descriptive study	The nursing professionals have been standing out for their performances in the frontline of preventing and combating the disease, searching mitigation of the pandemic. In the face of absence of a vaccine and specific antiviral medicines, the teachings of Florence Nightingale have never been more current. Measures such as hand sanitizing, hospital and home cleansing and the implementation of epidemiologic reports as follow-up measures of the disease and epidemic curve, have become essential to the fight against this disease.	Work conditions, illnesses and death of those that face bravely the pandemic and the consequences in their professional and personal lives.	-

Table 2. Descriptive synthesis of the included studies (continuation)

Author/Year/Type of study/Magazine/Country/Keywords	Results			
	Methodology (Sample, type of study and instrument used)	Nursing role	Challenges faced	Implications for the nursing practice
Rodrigues et al. (2020) Qualitative Journal of nursing and health Brazil Employee health; Nursing Professionals; Occupational risks; Pandemics; Coronavirus Infections.	Experience report Descriptive study	-	The adaptation of assistance professionals in front of the drastic changes in their workspace could be seen as one of the main challenges presented in this pandemic. Actions such as attending confirmed or suspected patients, working hours, apparel, correct use of PPE and increase of assistance complexity have become major concerns.	Creating health protocol to adapt to the need of isolation for virus containment, as well as protection of the professionals and patient's safety.
Geremia et al. (2020) Qualitative Enfermagem em Foco Brazil Coronavirus Infections; Pandemics; Unified Health System; Assistance-Faculty Integration Services; Nursing Education.	Analytical study 12 manager nurses Interview	Devaluation scenario of nursing in Brazil, in which structure problems are evidenced in the management of the Unified Health System work and its influence in the scenario of the profession.	Beyond the long journeys and low payment, the nursing professionals face problems due to the exposition to SARS-CoV-2, lack of infrastructure and PPE.	The tragedies could represent opportunities, and in the COVID-19 conjecture, lies the expectation that the nursing professionals are respected financially, ethically and professionally; that the government, the managers and society understand the essentiality of the work performed by the nursing team in health care and expansion of the access to health services.

Table 2. Descriptive synthesis of the included studies (continuation)

Author/Year/Type of study/Magazine/Country/Keywords	Results			
	Methodology (Sample, type of study and instrument used)	Nursing role	Challenges faced	Implications for the nursing practice
Renke et al. (2020) Qualitative Journal of Pediatric Health Care Estados Unidos COVID-19 pandemic, pediatric nurse, advanced practice, intense care	Case Study Descriptive	The focus of the team expanded beyond the individual patient to include global general health. The efforts to limit the provider exposition and preserve the PPE changed the flux of patient attendance and required non-conventional communication methods when face-to-face communication was not possible.	The COVID-19 pandemic burdened the health infrastructure, revealing flaws in the medical system and lack of every needed resources for patient attendance.	The teams of COVID-19 ICU care were multidisciplinary and composed by members of various origins and experiences. Standardized functions and responsibilities were developed to support the team in an environment of work process and attendance standards in quick change, with special attention to team safety. Knowing the potential lack of personnel, the teams of providers were organized using a hybrid of personal strategy in layers adapted by the Society of Critical Care Medicine. In this model, the lack of adult intensivists require the support of other doctors and apps to attend to the needs of patient care.
Stucky et al. (2020) Qualitative Journal of PeriAnesthesia Nursing United States COVID-19; Perioperative; Perianesthesia; Nursing; Pandemic; Soldiers	Experience report Descriptive study	Nurses have historically led efforts to improve the health of populations, at the same time providing care in a simultaneous and selfless manner in crucial moment of national need. Perioperative and perianesthesia nurses are vital to the general viability of nursing in the health system.	-	New models of ICU teams can be needed to guarantee that every patient receive the care needed. Society of Critical Care Medicine recommends a strategy of personnel in layers, in which the non-ICU nurses work in pairs or with teams of experienced doctors.

Table 2. Descriptive synthesis of the included studies (continuation)

Author/Year/Type of study/Magazine/Country/Keywords	Results			
	Methodology (Sample, type of study and instrument used)	Nursing role	Challenges faced	Implications for the nursing practice
Monica et al. (2020) Qualitative Infection, Disease & Health Singapore Pandemic outbreak; Practice of infection prevention; Nursing of infection control; Nursing task-force	Case Report Descriptive study	Nurses play a vital role before and after the pandemics, with leader nurses taking the leadership in the preparation for the outbreaks.	-	In response to an outbreak, the earlier recognition and the preparation for the growing threat, managing the personnel challenges along with the well-being of the nurses are of extreme importance. Strategies to promote the social distancing without compromising the continuing nursing education and the care to the patients are also essential.
Chen et al. (2020) Qualitativo Journal of PeriAnesthesia Nursing China Perianesthesia nurse; Coronavirus disease 2019; Medical rescue team	Experience report Descriptive study	Anesthesia nurses have professional specialties of their own, like handling airways, using and maintenance of life support equipment, including ventilation, and the use of equipment of high flux oxygen. With rich experience in emergency responses and nursing, anesthesia nurses along with emergency nurses and intense care nurses play important roles during the treatment of COVID-19 patients.	The transportation of critical patients is a high-risk procedure. It is a challenge to guarantee the safety of patients who are critically sick during transportation. During the epidemic of severe acute respiratory syndrome in 2003, the personal protection was the main source of stress to nurses. [...] the nurses that were not familiar with isolation, protection and intense care are subjected to the mental stress, physical tiring and even other complications. The anesthesia nurse works routinely in the surgical center and, therefore, may not have experience in the nursing procedures in regular wards and communication with the patient, that are two deficiencies.	The anesthesia care by nurses is relatively new in China, and the role of the anesthesia nurses during a response to disaster were not totally appreciated. It is hoped that the authorities consider the inclusion of anesthesia nurses in the national teams of medical rescue in response to disasters.

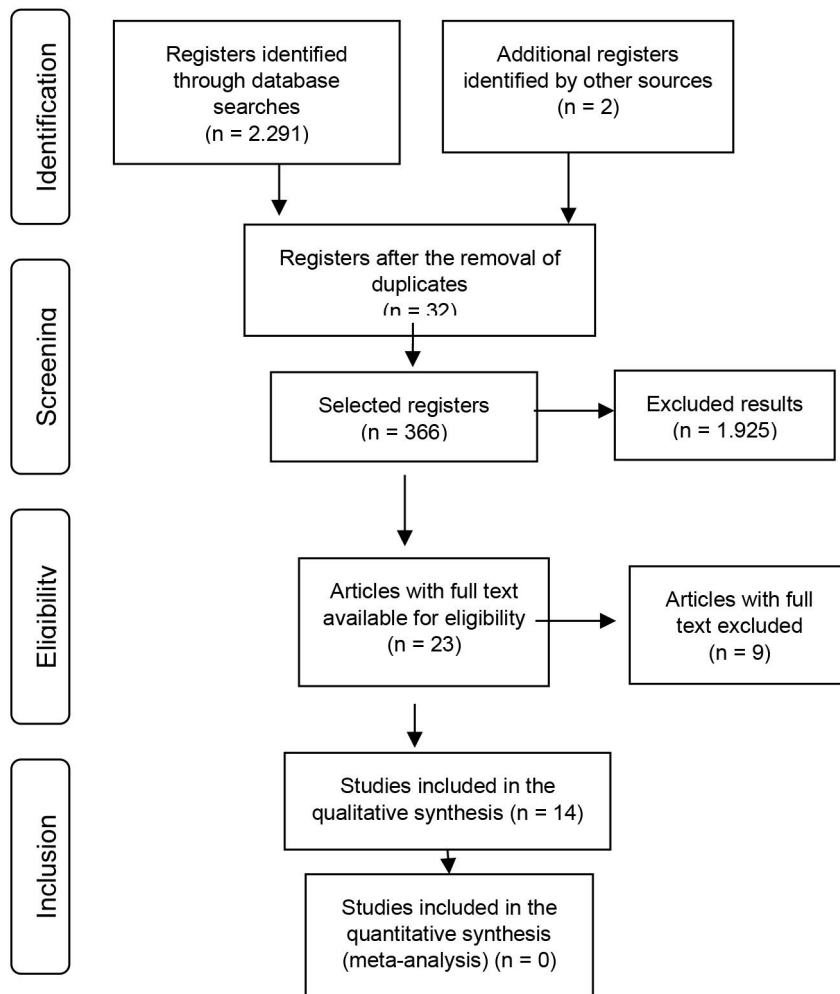
Table 2. Descriptive synthesis of the included studies (continuation)

Author/Year/Type of study/Magazine/Country/Keywords	Results			
	Methodology (Sample, type of study and instrument used)	Nursing role	Challenges faced	Implications for the nursing practice
Wu et al. (2020) Qualitative Annals of Global Health China Pandemic outbreak; Practice of infection prevention; Nursing of infection control; Nursing task-force	Experience report about the realization of a series of management measures in nursing in the strategic phase and in the implementation phase.	Through a series of nursing management measures, every COVID-19 patient was healed and discharged. All non-COVID19 patients and hospitalized staff during the same period were not infected with the virus. During this period, our hospital completed 7.466 operations. Therefore, our nursing management measures were effective.	Due to the rapid dissemination of the pandemic, there might be a lack in the supply of protection equipment that were not used frequently in the past, especially personal medical protection equipment, such as aprons, protection goggles, N95 masks and similar.	The use of the internet to communicate our message to every nurse and to realize remote training was news to us and played a huge role in equip everyone with relevant knowledge for fighting the disease.
Chamboredon, Roman e Colson (2020) Qualitative International Nursing Review France COVID-19, France, Health emergency, Health policy, Nursing policy, Nursing of primary care for pandemics, Public health, Functions and responsibilities	Experience report Descriptive study	Hospitals and primary attention services, with significant investment by nurses, played a fundamental role in people care with and without COVID-19.	France should manage the pandemic's first wave and, at the same time, use every mean to avoid a second wave. The health policies should adapt to a virus whose dissemination is not completely known and treatments are being evaluated.	Nurses are known for their social utility in France. However, it is important to consider the collateral effects of this crisis on nurses and nursing and integrating nursing emergency skills established during the pandemic in the standard field of nursing competence. The nursing profession waits for a reflection and review of the nurses' competence, as well as their valorization in the French health system, namely taken carried out to the Nurses Order of the National Council of France.

Table 2. Descriptive synthesis of the included studies (conclusion)

Author/Year/Type of study/Magazine/Country/Keywords	Results			
	Methodology (Sample, type of study and instrument used)	Nursing role	Challenges faced	Implications for the nursing practice
Ridley, Freeman-Sanderson e Haine (2020) Qualitative Australian Critical Care Australia Workers; Pandemic; Allied health; Coronavirus disease; Outbreak capacity; Models of care	Experience report Descriptive study	Professionals in health specialized in intense care have been known as a fundamental workforce incorporated in the Australians intense care units (ICU), where along with medicine and nursing, take care of some of the sickest patients in the hospitals.	One of the main limitations of pandemic planning in Australia during COVID-19 is the general lack of available data about the work capacity of the professional specialized in intense care and the subsequent response to the outbreak available in Australia.	The planning and preparation of the workforce in allied health work during COVID-19 should be considered when considering attendance to the patient extensive and based on evidence.

Figure 2. Flowchart of the search of articles of systematic review and selection criteria



The searches in Brazil related to the performance of nursing professionals, the way of work, and the legacies left by the pandemic related to the practice of the profession in the ICU are still scarce but, even so, they were the majority in this study, 5 being made in the country, and the rest being made 1 in Taiwan, 1 in Switzerland, 2 in the United States, 1 in Singapore, 2 in China, 1 in France and 1 in Australia. All of the Brazilian articles were published in the magazine *Enfermagem em Foco* (Nursing in Focus).

As for the factor of impact (table 3), the medical data are 2.034, 4.285, 1.987, 1.615, 805, 2.577, 2.037, and 2.214 verifying *Enfermagem em Foco* (Nursing in Focus) as the magazine with the biggest factor of impact.

Table 3. Distribution of results of the selected studies according to author, title and factor of impact. Fortaleza – CE, Brazil, 2020

Name of the authors	Title of the articles	Factor of impact
Huang et al. (2020) ^{ref 8}	Roles of nurses and National Nurses Associations in combating COVID-19: Taiwan experience	2.034
McDonald (2020) ^{ref 9}	Getting the COVID-19 pandemic into perspective: a nursing Imperative	2.034
Nascimento, Hattori e Terças-Trettel (2020) ^{ref 10}	Dificultades y temores de las enfermeras que enfrentan la pandemia de COVID-19 en Brasil	4285
Nascimento, Hattori e Terças-Trettel (2020) ^{ref 11}	Necessidades pessoais dos enfermeiros durante a pandemia da COVID-19 em Mato Grosso	4285
Silva et al. (2020) ^{ref 12}	Protagonismo da Enfermagem Brasileira no combate ao COVID-19.	4285
Rodrigues et al. (2020) ^{ref 13}	Gestão da pandemia Coronavírus em um hospital: relato de experiência profissional.	1987
Geremia et al. (2020) ^{ref 14}	Pandemia COVID-2019: Formação e atuação da enfermagem para o sistema único de saúde	4285
Renke et al. (2020) ^{ref 15}	Utilization of Pediatric Nurse Practitioners as Adult Critical Care Providers During the COVID-19 Pandemic: A Novel Approach	1615
Stucky et al. (2020) ^{ref 16}	COVID-19: Initial Perioperative and Perianesthesia Nursing Response in a Military Medical Center	0805
Monica et al. (2020) ^{ref 17}	Preparation and response to COVID-19 outbreak in Singapore: A case report	2577
Chen et al. (2020) ^{ref 18}	Role of Anesthesia Nurses in the Treatment and Management of Patients With COVID-19	0805
Wu et al. (2020) ^{ref 19}	Contingency Nursing Management in Designated Hospitals During COVID-19 Outbreak	2.037
Chamboredon, Roman e Colson (2020) ^{ref 20}	COVID-19 pandemic in France: health emergency experiences from the field	2.034
Ridley, Freeman-Sanderson e Haine (2020) ^{ref 21}	Surge capacity for critical care specialised allied health professionals in Australia during COVID-19	2.214

The articles selected in this research were also analyzed according to the JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data. Table 4 shows these results.

Table 4. Evaluation of the main flaws in the articles according to the JBI Critical Appraisal Checklist for Studies Reporting Prevalence Data. Fortaleza - CE, Brazil (2020)

Author, year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Risk of Bias
Huang et al. (2020) ^{ref 8}	NA	NA	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
McDonald (2020) ^{ref 9}	NA	NA	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Nascimento, Hattori e Terças-Trettel (2020) ^{ref 10}	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	90%	Low risk
Nascimento, Hattori e Terças-Trettel (2020) ^{ref 11}	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	90%	Low risk
Silva et al. (2020) ^{ref 12}	NA	NA	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Rodrigues et al. (2020) ^{ref 13}	NA	NA	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Geremia et al. (2020) ^{ref 14}	Yes	Yes	Yes	Yes	Yes	Yes	No	NA	NA	NA	90%	Low risk
Renke et al. (2020) ^{ref 15}	NA	NA	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Stucky et al. (2020) ^{ref 16}	NA	NA	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Monica et al. (2020) ^{ref 17}	NA	Yes	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Chen et al. (2020) ^{ref 18}	NA	Yes	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Wu et al. (2020) ^{ref 19}	NA	Yes	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Chamboredon, Roman e Colson (2020) ^{ref 20}	NA	Yes	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk
Ridley, Freeman-Sanderson e Haine (2020) ^{ref 21}	NA	NA	NA	NA	Yes	Yes	NA	NA	Yes	Yes	100%	Low risk

NA: Does not Apply

Q1. Was the sample chart adequate to approach the target-population? Q2. Were the study participants sampled properly? Q3. Was the size of the sample adequate? Q4. Were the characteristics of the study subjects described in detail? Q5. Was the data analysis conducted with enough coverage of the identified sample? Q6. Was the measurement of the condition objective and with standardized criteria? Q7. Was the measured condition reliable? Q8. Was the statistic analysis appropriate? Q9. Were all of the factors of confounding important/subgroups/differences identified and counted? Q10. Were the subpopulations identified using objective criteria?

As it is possible to verify in Table 4, all of the articles showed a low risk of bias, with questions referring to the sample and statistics that did not apply to the articles used as a methodology experience report. For those that made exploratory studies, flaws were verified only in the reliability of the condition of measurement^{10,11,14}. As for all of the factors of confounding important/subgroup/differences were identified and counted that all of the articles met this request.

As for the results, it was verified that the performance of the nursing professional in combating COVID-19 is a different consensus in different parts of the world, being highlighted their performance as frontliners and the need to adapt to an unprecedented context, dealing with the unknown and with frequent researches that pointed new discoveries, making it important that the professionals provided care to the patients but at the same time having to take the appropriate care for their own protection.

The challenges and legacies also converged among the authors, independently of the country in which the research was done. It was verified that the care of the professionals has been specially referred to cleaning and using personal protection equipment (PPE), with the teachings of Florence Nightingale being more current than ever in this scene. The adaptations of these professionals were also directed by the need for social distancing, which required the creation of specific wings for these patients' care, just like the creation of a protocol that could attend to critical patients without putting themselves at risk, that being probably their biggest challenge.

With future implications in the nursing assistant in the face of the current pandemic, it was verified factors such as a bigger valorization of nursing professionals, including the use of intensive professionals and anesthetists in these cases, diversification of the ways of communication, the better self-management and management of teams, and the teleattendance in nursing care.

The selected articles showed the importance of the role of nurses as frontliners in fighting COVID-19, verifying challenges and future implications for the work of these professionals in the Intense Care Unit (ICU).

Protagonism of nursing professionals

Silva et al.¹² mention the importance of nursing professionals in Brazil while being protagonists in fighting the coronavirus. The authors highlight the teachings of Florence Nightingale as more current than ever, giving that the basic care was fundamental for the decrease of the disease's dissemination, such as hand washing, cleaning of hospitals and domestic environments. It should be noted that, as a science, nursing relies on a vast range of theoretical references and specific nursing theories that are the basis of care. It is accomplished through the *Sistematização da Assistência de Enfermagem (SAE)* [Systemization of Nursing Assistance] in the health institutions, nowadays a mandatory requirement for the performance in nursing and operationalized by the *Processo de Enfermagem (PE)* [Nursing Process].

According to Fernandes²², the concept of intense care emerged in the conflict of Crimea, when Florence Nightingale in Scutari (Turkey), where she attended, together with 38 nurses, British soldiers severely wounded, grouped, and isolated in areas with preventive measures to avoid dissemination of diseases such as dysentery and tetanus, the reduction of mortality being very remarkable. Fernandes²² points out in his observations that the main point of Intense Care Units (ICUs) is to keep a structure capable of providing support for critical patients with the potential risk of death.

In the same sense, Renke et al.¹⁵ highlight that the COVID-19 pandemic emphasized the collapse in public health around the world, mainly because of the lack of resources, material, and human. The nursing profession showed to be fundamental in this environment, with the deployment of pediatric nurses for adult care.

Chamboredon, Roman, and Colson²⁰, in a study realized in France, also were emphatic to highlight the importance of nursing professionals during the pandemic, being mentioned the need for bigger recognition of these professionals. The research done by the authors converge with the others found as to the major strategy in the hospitals to prevent the dissemination of the virus, such as good hand sanitization, avoiding close contact with other people, or social distancing and respecting the rules of respiratory hygiene.

McDonald⁹ shares this same thought when considering the reality of professionals in Switzerland, highlighting the relevant role in fighting COVID-19. The author mentions the importance of nurses in health education and in the search to guarantee resources and supplies for the needy population.

Challenges faced

Nascimento, Hattori, and Terças-Trettel¹⁰ elucidate that in Brazil the nursing professionals faced difficulties similar to the rest of the world, emphasizing the factors related to the daily risk of exposition to the virus, problems of access and use of personal protection equipment, doubts in the differential diagnosis as well as the overload of work and the increase of the demand for attendance of patients and family.

Considering the Taiwan experience, Huang et al.⁸ elucidate that, despite having many concerns about the adequacy of resources and medical supplies for the attendance to the patients, the number of nurses is critical, which brought to light the need for better preparation of the teams, in number and capacitation, to help to deal with the pandemic. The authors mention that the fast answer and rapid vigilance of the Central Epidemic Command Center (CECC) were essential to contain COVID-19.

McDonald⁹ adds as a challenge the lack of support of professionals in leadership positions to obtaining resources and protection of the frontline or even early warnings or open disclosure about the risk of contagion, number of cases, and results. Geremia et al.¹⁴, however, verified that the scene is still devaluation of the nurses, being highlighted under the point of view of nursing managers, structure problems in the management of SUS work. The authors highlight that the overload of work of the professionals is one of the main problems along with the low payment, exposition to the virus, lack of structure and Personal Protection Equipment (PPE) for these professionals

The difficulties pointed by Chamboredon, Roman, and Colson²⁰ turn to the need of dealing with an unprecedented pandemic, with an unknown virus, where it's not known its real way of dissemination, and the most appropriate treatment is still in analysis, demanding constant adaptations since studies are frequently done looking for a more effective result for treatment, while still waiting for a vaccine that guarantees the immunity of the population.

Another research was done by Nascimento, Hattori, and Terças-Trettel¹¹ personal needs were highlighted from nurses from Mato Grosso – Brazil during the pandemic, verifying that the situation of isolation to reduce the contagion by coronavirus was one of the biggest challenges faced by them, appearing four central ideas: self-care, need for affection, understanding of the social distancing and harm to marital relationships. This need for adaptation of the professionals was also mentioned by Rodrigues et al.¹³ that also mentioned that as one of the biggest challenges faced by these professionals, mentioning attendance to the patient with suspect or confirmed,

workload, apparel, correct use of PPE, and increase of assistance complexity are turning out to be huge concerns.

Pandemic legacies

As to the implications brought by the practice in COVID-19, McDonald⁹ mentions a series of factors, since the perception of the need of credibility of the information from the specialists that should be concise and clear about what is known and what is uncertain and how that will change over time until a bigger control of the chain of supplies by the nursing team and review of the personnel models to allow that 50% of the nurses stay isolated or in quarantine for most of the time.

According to Nascimento, Hattori, and Terças-Trettel¹⁰ it's possible to highlight as a legacy of the practical learning brought by this pandemic a better self-management from the own professional. In this sense, Rodrigues et al.¹³ highlight the protocol created for adapting to the needs of isolation for the contention of the virus, just like the protection of the professionals and safety of the patients. As a legacy, Geremia et al.¹³ hope that the scenario created by COVID-19 provides a higher valorization of the nursing work, considering their importance in fighting the coronavirus, understanding the essentiality of the job.

Renke et al.¹⁵ elucidate that the legacy left by the pandemic can be seen in different spheres, from the communication that requires non-conventional methods to the reorganization of teams with standardized functions and responsibilities, with personnel strategies in layers to promote a higher safety of the professionals and patients. Like the lack of intensivists for grown-ups and the need for relocation of pediatric nurses to supply the demand.

As for the professionals specialized in intensive care, Ridley Freeman-Sanderson and Haine²¹ in their study done in Australia highlighted the importance of these professionals along with the medical team and the other nursing professionals, given the specific knowledge to deal with critical patients, being gifted with exclusive knowledge that could contribute significantly for the better management of patients in the pandemic.

Stuck et al.¹⁶ highlights as contributions of the COVID-19 pandemic the management and teams with new models of UCI teams becoming necessary for the assistance of the demand, a strategy of personnel in layers, in which the non-ICU nurses work in pairs or teams with experienced doctors. The perioperative and perianesthesia nurses can perform significantly in attending COVID-19 patients, standing out in their functions: managing medications, monitoring lab results, supplying enteral nutrition and psychosocial attendance, liberating qualified ICU doctors to manage several patients that require advanced mechanic ventilation or oxygenation through the extracorporeal membrane.

The case reported by Monica et al.¹⁷ mentions the measures taken by the Singapore General Hospital that, until August 2020, didn't have any case of nurses being contaminated in their installations. To reach that result, Monica et al.¹⁷ affirm that a nursing command post was organized to coordinate the efforts in different nursing units, which guaranteed precise and suitable communication, as well as workforce availability, equipment, and supplies among the units. Additional areas were also created in the emergency department to shelter patients with signs of respiratory infections and areas of isolation to accommodate COVID-19 patients.

According to Monica et al.¹⁷, physical distancing was practiced since the beginning, with nursing professionals being divided into teams of smaller care for a group of patients. Social distancing was a practice among staff as well as professionals and patients, and for that to be possible the use of technology was needed, with devices connected to the patients to make it possible to monitor them remotely through a mobile app.

A similar result was pointed out by Chamboredon, Roman, and Colson²⁰, which highlighted the use of telecare in nursing, which could be considered as a practice that will probably remain being used after the pandemic. The authors describe the use of the strategy affirming that the health context made it possible to create the first procedure of teleattending related to handling COVID-19 patients with home care nurses, as long as the patient had a medical prescription and guaranteed the availability and owned telemonitoring tools (smartphone, computer with Wi-Fi connection

or at least a phone). The service was covered by the French health insurance and allowed the patients follow-up, decreasing drastically the exposition to the risk of contamination of the caretakers.

Wu et al.¹⁹ also considered the reality of a hospital, in this case in China, and they also pointed out the good management practices that made it possible to obtain effective results in the assistance of patients and the protection of the professionals. The authors describe the strategy mentioning that, in the first place, all of the available workforces was effectively mobilized; in second place, qualified and trained personnel in a very short period; in third place, logistic and reliable support was provided for protective equipment to the frontline; and, finally, the nurses were motivated during this time to contribute significantly to the fight against the COVID-19 pandemic.

Communication among professionals was easier due to the internet, just like the arrival of new knowledge to them. It should be noted as an innovation to the assistance the fact that instead of transferring patients severely sick to the department of intense care, the hospital maximized the space for the patients with COVID-19 to search treatment and reduce the flux of patients in the hospital, and with that, also reduced the consumption of resources and hospital costs^{17,19,21}.

Chen et al.¹⁸ consider as a legacy of the crisis brought by COVID-19 the better use of anesthetist nurses for the management of critical cases, as they have their own professional specialties, such as handling airways, the use and maintenance of life support equipment, including ventilation, and the use of equipment of high flux oxygen, fundamental in handling COVID-19 patients. However, since the routine of these professionals generally is limited to the surgical centers, they lack experience in regular nursing procedures, as well as communication with the patient, making it necessary that they train so that they could perform better in cases of crises or the formation of teams that include emergency nurses and intensive care nurses. Thus, considering the results obtained in a hospital in China concerning anesthetist nurses attending COVID-19 patients, it is hoped that these professionals be seen and included in the teams of the medical rescue of the answer to disasters.

It should be noted that this study was limited by the lack of researches about the topic, considering that it still is a new issue with an ongoing pandemic. Although many researchers are dedicated to the subject, the researchers are still concentrating on the pursuit of treatment, vaccine, and other investigations about the disease itself, with the work of the nursing professional not being the main concern.

Conclusion

The study showed that the pandemic brought by COVID-19 has evidenced the protagonism of nursing professionals. The researches done in different countries converged in relating the importance of these professionals in preventing and combating the disease. With the changes and adaptations needed in the assistance of patients and simultaneous protection of the professionals, new protocols were needed and ways of service could be considered legacies of the current pandemic, hoping for a bigger valorization of these professionals by the population as well as government organizations.

Author contributions

Bandeira FLF and Melo KAS participated in the interpretation of the final results of the manuscript. Silva PS discussed the results found. Pinho MAB and Andrade JMF participated in writing the manuscript. Ribeiro JF was responsible for the idealization, planning, manuscript reviews, and approval of the final draft.

Competing interests

No financial, legal, or political conflicts involving third parties (government, companies and private foundations, etc.) was declared to any aspect of the submitted work (including, but not limited to subventions and funding, participation in the advisory board, study design, manuscript preparation, statistical analysis, etc.).

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