

## The professional training of nurses: the link between teaching virology and SARS-CoV-2 in a public university

*La formación profesional de enfermeras: el vínculo entre la enseñanza de virología y el SARS-CoV-2 en una universidad pública*

*A formação profissional do enfermeiro: entrelace entre ensino da virologia e SARS-CoV-2 em uma universidade pública*

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### Abstract

The aim was to analyze the training of nurses related to the teaching of Virology to work in times of pandemic. Descriptive, exploratory, and qualitative research was carried out through content analysis carried out from June to August 2020, serving as a subsidy for the construction of an integrative review based on analytical reading, which included the appreciation of nine articles, considering the methodological rigor. The theoretical orientation focused on the development of competences of Philippe Perrenoud; in the National Curriculum Guidelines for undergraduate courses in the health area, which deal with the professional training of nurses; and in the onset of the pandemic caused by SARS-COV-2. The data showed that the training of nurses focused on acting in times of pandemic emerges as a thematic category, where the training process of this professional in relation to the teaching of Virology is presented as relevant. The construction of nurses' competence is important, as they work with the patient, who plays the leading role in care, especially in times of pandemic. This makes them able to serve in the SUS.

**Descriptors:** Professional Training; Teaching; Nurse; Virology; Pandemic.

### Resumén

El objetivo fue analizar la formación de enfermeros relacionados con la enseñanza de Virología para trabajar en tiempos de pandemia. Se realizó una investigación descriptiva, exploratoria y cualitativa a través del análisis de contenido realizado de junio a agosto de 2020, sirviendo de subsidio para la construcción de una revisión integradora basada en la lectura analítica, que incluyó la valoración de nueve artículos, teniendo en cuenta el rigor metodológico. La orientación teórica se centró en el desarrollo de competencias de Philippe Perrenoud; en los Lineamientos Curriculares Nacionales para los cursos de pregrado en el área de la salud, que tratan de la formación profesional de enfermeras; y en el inicio de la pandemia causada por el SARS-COV-2. Los datos mostraron que la formación de enfermeros enfocados a actuar en tiempos de pandemia surge como una categoría temática, donde se presenta como relevante el proceso de formación de este profesional en relación a la docencia de Virología. La construcción de la competencia del enfermero es importante, ya que trabaja con el paciente, quien juega un papel protagónico en la atención, especialmente en tiempos de pandemia. Esto los capacita para asistir al SUS.

**Descriptorios:** Formación Profesional; Enseñando; Enfermero; Virología; Pandemia.

### Resumo

Objetivou-se analisar a formação do enfermeiro relacionada ao ensino da Virologia para a atuação em tempos de pandemia. Foi feita pesquisa descritiva, exploratória e qualitativa por meio de análise de conteúdo realizada nos meses de junho a agosto de 2020, servindo de subsídio para a construção de uma revisão integrativa pautada em leitura analítica, que contou com a apreciação de nove artigos, atendendo ao rigor metodológico. A orientação teórica teve o enfoque no desenvolvimento das competências de Philippe Perrenoud; nas Diretrizes Curriculares Nacionais para os cursos de graduação da área da saúde, que tratam sobre a formação profissional do enfermeiro; e no surgimento da pandemia causada pela SARS-COV-2. Os dados mostraram que a formação do enfermeiro voltada para a atuação em tempos de pandemia emerge como categoria temática, onde o processo formativo desse profissional com relação ao ensino da Virologia apresenta-se como relevante. A construção da competência do enfermeiro é importante, pois ele atua junto ao paciente, que ocupa o papel de protagonista do atendimento, principalmente, em tempos de pandemia. Isso os torna capacitados para atender no SUS.

**Descritores:** Formação Profissional; Ensino; Enfermeiro; Virologia; Pandemias.



## Introduction

This study addresses the training of nurses, considering the context of the Pandemic. Its purpose is to problematize the teaching of Virology at a federal university and give relevance to this discipline. Once, the emergence of SARS-COV-2 evidenced the existing mismatch between the training of health professionals and the care needs that the population started to demand during this period.

Historically, the professional training of nurses is involved with the inclusion of the State in the context of the health and education sectors. It is noticed that the impact of this insertion influences society, drives the nursing development process and the conceptual framework of the profession, regarding the population's search for the health-disease process; the characteristics of the diseases and their aggravations; the evolution of science and technology<sup>1</sup>.

During the 20th century in Brazil, public health services in the basic network and, later, in the hospital network, evidenced the need to train nursing staff with a broad vision and full participation in the control of endemic diseases, through epidemiological control. On the other hand, the teaching of Nursing was marked by reforms in higher education that generated diversifications in the curricula of undergraduate courses<sup>1</sup>.

In the 21st century, the document implemented in 2001 by the Chamber of Higher Education of the National Council of Education (CNE) stands out, which created the National Curriculum Guidelines (DCNs) for undergraduate courses in the health area, including: Nursing, Medicine and Nutrition. In the DCNs, new guiding criteria were specified, as well as the general and specific content of each area, as well as the fundamental skills and abilities for the formation of the student. Since then, there have been different normative acts that guide and regulate the professional training of nurses, aiming at the cohesion between professional training and the health model, centered on the holistic view of the patient<sup>2</sup>.

Thus, nurses must obtain theoretical and practical foundation throughout their training, supported by dialogue, to build a generalist, humanist, critical and reflective professional, focusing on the various demands of society and the Unified Health System (SUS), which covers simpler actions in primary care to more complex care, such as a transplant. It is also highlighted the importance of the role of the nurse, as a member of the health team, in the control and assistance in endemic/pandemic situations; as well as in the field of education, as he has an intrinsic role as an educator, whether for his team or society<sup>2</sup>.

Therefore, researchers<sup>3</sup> state that nursing graduation aims to introduce the student to technical-scientific competence for the development of care, management, teaching and research activities. Thus, it is essential that during graduation, principles are established that will guide the nursing education process and the theoretical disciplines that must relate to the actions of taking care of oneself and others. Whether preventive, recovery and/or rehabilitation, as well as the safety of health team workers. Students must act as protagonists in their process of learning to be a nurse.

It is crucial that, in the process of training the future nurse, subjects in Microbiology and, Virology, are offered in the curriculum, on a mandatory basis, which is the focus of the study due to its relevance, which has been exacerbated in the current scenario. of Pandemic. Basic concepts, risks and threats, prevention measures, immune system functioning in a viral infection and mechanisms of spread need to be properly understood and taught. Since now, there is a worldwide effort to prevent the spread of the virus, be it investments in research related to the production of drugs to cure those affected or in the production of vaccines to prevent the disease<sup>4</sup>.

Thus, this study highlights the theme of teaching Virology in the professional training of nurses. Its pertinence is to show the importance of training professionals trained to serve in the SUS and to prepare future health educators, concerned with taking knowledge in a simple and effective way. Another motivation comes from the moment that also involves professors and students of the undergraduate Nursing course and health in general.

Coronavirus 2 severe acute respiratory syndrome (SARS-COV-2) was first identified in December 2019 in Wuhan, China. This is a new type of Coronavirus that has been identified as the etiologic agent of Coronavirus 2019 disease (COVID-19). Its spread was characterized as a Pandemic by the World Health Organization (WHO) in March 2020<sup>5</sup>.

Since then, different types of preventive measures have been inserted into the daily lives of the world population so that the proliferation of Coronavirus is contained. The goal is that the damage is minimal, the transition to normality is quick, while awaiting the result of a vaccine. In this sense, the study focuses on professional training and qualification, identifying the relevance of teaching the Virology curriculum component in an undergraduate nursing course at a public university. Thus, its objective is to analyze the training of nurses related to Virology to act in times of pandemic.

## Methodology

This is a descriptive and exploratory study, with a qualitative approach, having as theoretical support the theory of Philippe Perrenoud, which focuses on the development of competences. The data survey was carried out from June to August 2020. Initially, an integrative literature review was carried out, which served as a subsidy for the analysis and discussion of the curriculum of the undergraduate Nursing course, taught at the Aurora Nursing School in Afonso Costa (EEAAC), from the Fluminense Federal University (UFF).

The definition of the theme and the information extracted in relation to the evidence of scientific production were based on the guiding question about professional training and qualification<sup>6</sup>, which was: What is the relevance of teaching the Virology curriculum component in this undergraduate course?

Thus, for the development of the integrative review stage of the study, eight stages were covered: 1) identification of the theme and the formulation of the



guiding question; 2) establishment of inclusion and exclusion criteria for studies; 3) definition of research databases; 4) definition of bibliographic search resources; 5) definition of the information to be extracted from the selected studies; 6) evaluation of included studies; 7) interpretation of results; and 8) presentation to review<sup>7</sup>.

As for the criteria established for inclusion, they were scientific articles published in Portuguese and English, with a time frame in the period between 2015 and 2020, full texts available online, by authors from different areas. The exclusion criteria were bibliographic study of different types and documents retrieved repeatedly in different databases.

The Portal of the Virtual Health Library (VHL) was the platform chosen for the search for scientific productions. Thus, articles indexed in different databases were retrieved, such as: Latin American and Caribbean Literature on Health Sciences (LILACS), Medical Literature Analysis and Retrieval

System Online (MEDLINE) and Nursing Database (BDENF – Nursing).

The following Health Sciences Descriptors (DECs) were used: Professional training; Nursing Students; Teaching; Virology; and Microbiology. As well as the Medical Subject Headings (MeSH) descriptors: Professional training; Students, nursing; Virology, and Microbiology. Boolean operators “AND” and “OR” were used in the search strategies, which allowed the initial identification of 267,195 articles (Figure 1).

In the search filter, the following items were applied: national and international collection; topics on management, education, and participation in health; core subjects of nursing education, competency-based education, curriculum, and higher education; publications from countries such as Brazil and the continents of Europe and North America, which narrowed the finding to 145 articles.

Figure 1. Search strategy result. Rio de Janeiro, RJ, Brazil, 2020

<b>Initial search strategy, later using filters and careful selection (Portuguese)</b>
Capacitação profissional OR estudantes de enfermagem 6.548 -> 9
Capacitação profissional OR estudantes de enfermagem OR ensino 46.017 -> 28
Capacitação profissional OR estudantes de enfermagem OR ensino OR virologia OR microbiologia 46.017 ->28
Capacitação profissional AND estudantes de enfermagem 309 -> 2
Capacitação profissional AND estudantes de enfermagem AND ensino 253-> 2
Capacitação profissional AND estudantes de enfermagem AND ensino OR virologia OR microbiologia 309-> 2
<b>Total 99,453 articles, refining the search = 71</b>
<b>Initial search strategy, later using filters and careful selection (English)</b>
Professional training OR students, nursing 13.469-> 9
Professional training OR students, nursing OR teaching 75.606 -> 25
Professional training OR students, nursing OR teaching OR virology OR microbiology 75.606 ->25
Professional training AND students, nursing 1.181 -> 6
Professional training AND students, nursing AND teaching 699 -> 3
Professional training AND students, nursing AND teaching OR virology OR microbiology 1.181 -> 6
<b>Total 167,742 articles, refining the search = 74</b>

Subsequently, a questionnaire with closed and open questions was created to assist in the article selection process. These questions dealt with the themes of professional training and qualification; teaching the Virology curriculum component; undergraduate course in Nursing; and Pandemic. The questionnaire data were listed in a document file in Microsoft Word software.

The appraisal stage was processed through an analytical reading of the selected scientific productions, to

verify adherence to the proposed theme. Then, a rigorous interpretation of the results was performed. After that, there was a presentation of the review of the studies, from which nine articles were chosen, which originated from the combination of Total 1 and Total 2 (Figure 2). This shows that the final result of the search fully met the proposed methodological rigor.

Figure 2. Final search result. Rio de Janeiro, RJ, Brazil, 2020

<b>Initial search strategy, later using filters and careful selection (Portuguese)</b>
Capacitação profissional OR estudantes de enfermagem 9 -> 0
Capacitação profissional OR estudantes de enfermagem OR ensino 28 -> 2
Capacitação profissional OR estudantes de enfermagem OR ensino OR virologia OR microbiologia 28 -> 2
Capacitação profissional AND estudantes de enfermagem 2 -> 0
Capacitação profissional AND estudantes de enfermagem AND ensino 2 -> 0
Capacitação profissional AND estudantes de enfermagem AND ensino OR virologia OR microbiologia 2 -> 0
<b>Total 1 = 71 articles, refining the search = 4 and removing duplicates = 2 = Total 2</b>
<b>Initial search strategy, later using filters and careful selection (English)</b>
Professional training OR students, nursing 9 -> 5
Professional training OR students, nursing OR teaching 25 -> 6
Professional training OR students, nursing OR teaching OR virology OR microbiology 25 -> 6
Professional training AND students, nursing 6 -> 5
Professional training AND students, nursing AND teaching 3 -> 2
Professional training AND students, nursing AND teaching OR virology OR microbiology 6 -> 5
<b>Total 2 = 74 articles, refining the search = 14 and removing duplicates = 7 = Total 7</b>

In this context, the treatment of data was carried out through content analysis, with emphasis on messages and communications from which the thematic category emerged: the relevance of teaching Virology in nursing education, when considering the construction of the

competence of this professional for the performance during the times of the Pandemic, which aims to have the patient as the protagonist of the care. Next, the nine scientific productions chosen to carry out the analysis are identified (Chart 1).

Chart 1. Scientific productions selected by authors and database. Rio de Janeiro, RJ, Brazil, 2020

Scientific Production (SP)	Article Title	Authors	Data base
SP1	Interprofessional health education: the experience of the Federal University of Sao Paulo, Baixada Santista campus, Santos, Brazil	Batista, Nildo Alves; Rossit, Rosana Aparecida Salvador; Batista, Sylvia Helena Souza da Silva; Silva, Carla Cilene Baptista da; Uchôa-Figueiredo, Lúcia da Rocha; Poletto, Patricia Rios.	LILACS
SP2	Factors associated with student learning processes in primary health care units: A questionnaire study	Elisabeth Bos, Hassan Alinaghizadeh, Mikko Saarikoski, Päivi Kaila	MEDLINE
SP3	Percepções de profissionais sobre o aprendizado de estudantes de graduação na atenção básica	Codato, Lucimar Aparecida Britto; Garanhani, Mara Lúcia; González, Alberto Durán.	LILACS
SP4	Formação acadêmica para o SUS x competência pedagógica do formador: algumas considerações para o debate	Damiance, Patrícia Ribeiro Mattar; Panes, Vanessa Bertassi Clivelaro; Caldana, Magali de Lourdes; Bastos, José Roberto de Magalhães.	LILACS
SP5	PET-Health as inducer of professional education to Unified Health System	Farias-Santos, Bárbara Cássia de Santana; Noro, Luiz Roberto Augusto.	MEDLINE
SP6	Teaching-service-community integration in practice scenarios of interdisciplinary Health Education: an experience of the Work Education for Health Program (PET-Health) in Southern Bahia	Faria, Lina; Quaresma, Márcia Alves; Patiño, Rafael Andrés; Siqueira, Raquel; Lamego, Gabriela.	LILACS
SP7	Nursing training and their approximation to the assumptions of the National Curriculum Guidelines and Primary Health Care	Magnago, Carinne; Pierantoni, Celia Regina.	LILACS
SP8	Nursing training and professional practice: an integrative review of literature	Bianca Joana Mattia, Maria Elisabeth Kleba, Marta Lenise do Prado	MEDLINE
SP9	Health education: learning from professional practice	Daniela Martinez Fayer Nalom, Joyce Fernanda Soares Albino Ghezzi, Elza de Fátima Ribeiro Higa, Cássia Regina Fernandes Biffe Peres, Maria José Sanches Marin	MEDLINE

## Results and Discussion

To present the results and carry out the discussions, firstly, the professional training of nurses is addressed, which is based on the DCNs and on the normative acts that are instituted by the CNE, which regulate education. Thus, the undergraduate Nursing course must envision the teaching of Virology with a view to COVID-19, considering that teaching is directed with the SUS as the focus and articulation between its guiding principles<sup>2,8,9</sup>.

Thus, it is intended to establish the teaching-learning process by teachers and that the graduate, throughout their career, act efficiently, effectively, with scientific rigor and social commitment. With this, it is established, regardless of the chosen area, that everyone will have the same goals and will have the patient as the protagonist of all care<sup>2,8,9</sup>.

Through this thought, it is observed that in April 2004 Law No. 10,861 was instituted, which created the National Higher Education Assessment System (SINAES), which has the National Student Performance Examination (ENADE) as an assessment tool. The purpose of this law was to provide parameters, ranging from one to five, to measure the quality of education provided, of teachers, students, and institutions. In this way, it is possible to carry out comparative rankings between different courses and verify the knowledge acquired by the undergraduate during their

training<sup>10</sup>. However, there is still a need to intertwine the teaching of Virology with pandemics.

In September 2008, Law No. 11,788 was enacted with the aim of regularizing internships, which may vary in terms of education level, but have the fundamental basis of preparing students for the professional cycle. The Education through Work for Health Program (PET-Saúde) is an initiative of the Ministry of Health, which aims to articulate the work of health professionals with undergraduate students. A positive relationship between students who participated in the program and took ENADE is also demonstrated. With this, the importance of the practical part along with theory is evident, especially when facing COVID-19, which influences the student's education<sup>11-14</sup>.

The curriculum of the Nursing undergraduate course at Aurora de Afonso Costa Nursing School (EEAAC) of the Fluminense Federal University (UFF) has a duration of five years, the period is full and the student, at the end of their training, will be considered a bachelor. in Nursing. The referential matrix is based on the French school, which has a constructivist perspective associated with the critical-emancipatory matrix<sup>15</sup>.

The course is divided into two cycles, the basic and the professional. Regarding the basic cycle, the subjects are included in the various health courses and the professional



cycle contains the specificity of the profession. It is essential that there is a relationship between both parties, configuring in the curriculum the integration between theory and practice<sup>15</sup>.

It is also necessary that graduation is not only linked to individual issues, but to sociocultural and historical aspects, since it is necessary to approach the demands demanded by society. For this, it is crucial that the articulation between the teaching of Virology and the facts and grievances that the population experiences with the Pandemic is seen. As well as providing the adequate means for the student's teaching to make him the protagonist of his learning process. It is essential that the old methodology where knowledge is only transmitted by the teacher, unidirectional, is discarded and that teaching is based on sharing and construction between the subjects<sup>15,16</sup>.

It is still crucial that the student possesses skills, which vary from general to specific, acquired and built during training, as stated by sociologist Philippe Perrenoud. Thus, the teacher must show countless possibilities for the student, establishing an effective relationship and helping him whenever necessary, since the teacher has the role of educator in a classroom and a reference for the student. At the expense of this, the motivation to study was based on this fact, in addition to also stimulating continuing education, so that future nurses continue to invest in the pursuit of knowledge after graduation, and that such practice is present in the professional's daily life<sup>6,17-19</sup>.

Thus, it should be noted that in this graduation, the offer of knowledge that occurs in the discipline of Virology is of paramount importance to be taught during the fourth period of the UFF nursing course, with a workload of 50 hours, 40 of theory and 10 practice. Classes are articulated with supervised technical visits to laboratories and routine follow-up through various techniques, in addition to seminars on different contents and various activities. In this way, it is possible for an effective integration to occur, making the student be encouraged to understand abstract concepts, which cannot be visualized with the naked eyes and which, through practice, it is possible to understand more clearly and objectively<sup>20</sup>.

The objectives of the course are to deepen the empirical knowledge acquired throughout the student's life and trajectory, both individually and collectively, in addition to new content. This has a scientific character to ensure that the subject taught in the classroom is within the necessary standards and that the knowledge to be shared broadens the student's vision. The aim is for the student to be able to assimilate concepts that will be relevant to practice their profession, using different methods for this<sup>20</sup>.

Thus, the menu includes supervised technical visits, laboratory routine monitoring, seminars and understanding theoretical content, allowing the student to have contact with content that is not restricted to the classroom, resulting in a teaching process. more dynamic learning. It becomes evident that, in this way, both the teacher and the student are agents of education, in addition to encouraging teamwork among classmates. Knowledge starts to be built throughout the course, with the ultimate purpose that the

student carries with them some fundamental concepts that will guide their trajectory<sup>20</sup>.

There are numerous types of viruses, and they carry out several mutations over time, a fact that increases their genetic variability and the probability of successful dissemination. Thus, in the classroom, it is necessary to establish parameters to select the main topics that will be addressed by the teacher, so that teaching is dynamic and not tiring. It is necessary to address the general characteristics of each type of virus, different classes, methods of viral replication, vaccines, how the immune system responds, infection control mechanisms, among other issues<sup>4</sup>.

In this context, in these times of Pandemic, where there is a massive frequency of false news, it is essential that nurses, as educators, empower themselves in this role and disseminate correct information. The perspective is to make the population receive knowledge in a simple, objective, and true way. It is also important that learning about protection measures and abstract concepts about what would be a virus, quarantine, restrictive measures etc. is disseminated. In this way, there is a society that understands the seriousness of the situation and has adequate knowledge, making it easier and more assertive to act in the prevention and eradication of a disease that is caused by viruses.

Thus, the teaching of Virology is relevant to the training of nurses, considering the construction of the competence of this professional to work during the Pandemic period, which needs to have the patient as the protagonist of care.

Sociologist Philippe Perrenoud states that skills and abilities are built throughout training. Thus, when studying Virology, the future nurse will be able to act effectively in their profession, with the association of different contents that were taught and that are intertwined with each other. One must also understand the need to be always vigilant, taking the necessary precautionary measures, the functionalities and importance of Personal Protective Equipment (PPE), hand hygiene, sterilization, among other aspects. In addition to bringing countless benefits not only to you, but to society as a whole<sup>6</sup>.

It should be noted here that, in times of the COVID-19 pandemic, health professionals work on the front lines and are constantly exposed to the virus, particularly nursing professionals, who spend more time with each patient. Thus, with the learning and instruction acquired during graduation, the professional will have the necessary expertise to take the necessary precautions, taking due care with themselves and with each other. In addition, he will be able to instruct family, friends and patients on what measures are correct, what should be avoided and help where necessary.

This fact has shown the real importance of these professionals to society, since many sectors are still able to perform their activities at home, nurses need to go out every day to take care of patients and, at the same time, put themselves at risk. This is evident when checking the number of health professionals who died and were contaminated with the disease.





The Pandemic has changed everyone's lives, with variation only in the degree of impact and its effects, which may be prolonged. Currently, in Brazil, more than half a million people have died because of COVID-19. According to data provided by the Ministry of Health, the pandemic claimed the lives of 500,800 Brazilians, with 2,301 deaths and 82,288 new confirmed cases in 24 hours, in addition to 1,199,101 occurrences that are being monitored<sup>21</sup>.

This indicator can be related to a few factors, such as the high rate of virus contamination and the failure to take the necessary measures by the health authorities and the population itself. Unfortunately, the country is going through two crises that contribute to the increase in the number of new cases: that of the virus and that of ignorance. It appears that "this dangerous combination exposes more people to the risk of contagion and makes disease prevention strategies even more difficult" and, therefore, there is a "(...) high occupancy of ICU beds and scarcity of medicines for intubation, which further increases the pressure on health workers"<sup>21:2</sup>.

In addition, the country faces great difficulties to contain the virus and prevent its spread, which is not yet controlled through vaccination. It should be noted that, so far, "115.135 million doses of vaccines have been sent to states and municipalities. Of this total, 85,390 million doses were applied, 61,270 million from the first dose and 24,120 from the second dose"<sup>21:2</sup>.

It is evident, therefore, that the SARS-COV-2 pandemic brought a great challenge to professional training in the health area. Bringing to light the relevance of Virology to daily professional life, as the year 2020 will remain in the history of education of these professionals as the year in

which it was possible to establish a clear intertwining between Virology, which is taught in academia and that of reality.

### Final Considerations

According to the objectives established for the study, it was possible to understand the interrelationship between the theoretical teaching of Virology and the reality of professional life. Evidencing the occurrence of greater contact with the daily life of their future profession allows the student to better understand the discipline and create more effective connections between theory and practice. The teacher has a crucial role in the student's academic life to build knowledge in synchrony with reality, based on the student as the main subject of the teaching-learning process.

The importance of the Virology discipline in the graduation of the future nurse was also clarified, as several concepts and practices associated with care will be necessary in their professional performance. Certainly, skills and abilities will be developed over the time of experience, enabling nurses to fully perform their role, to serve society with excellence and to continue making efforts in other courses, considering that knowledge is dynamic.

Furthermore, in times of Pandemic, impacts are measured on a global scale and there is a need for advances, care, and constant vigilance. It is essential that health professionals work as a team, always seeking the best for the work group and for patients and families. For this, all necessary resources must be used and the promotion of the population's empowerment with effective and educational information.

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