ORIGINAL ARTICLE

PRIMARY HEALTH CARE NURSES AND KNOWLEDGE ABOUT ENVIRONMENTAL HEALTH AND COVID-19

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Highlights:

(1) Nurses are familiar with the term environmental health. (2) Knowledge of the area covered is a facilitating factor. (3) Work overload was a hindering factor.

PRE-PROOF

(as accepted)

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PRIMARY HEALTH CARE NURSES
AND KNOWLEDGE ABOUT ENVIRONMENTAL HEALTH AND COVID-19

ABSTRACT

Objective: to analyze the knowledge of Primary Health Care (PHC) nurses about the relationship between environment, health, and COVID-19. **Methods:** This is a cross-sectional analytical study conducted with PHC nurses in Brazil. Data were collected from September 14, 2021, to April 15, 2022, through a self-administered questionnaire and analyzed using prevalence ratios and a Poisson regression model. **Results:** 253 nurses participated in the study. It was found that most nurses are aware of the relationship between environmental health and human health. In addition, nurses with more than 20 years of experience had, on average, a 19% higher prevalence of perceiving the difficulties that the assisted population faced in understanding measures to prevent COVID-19 infection ($p < 0.01$). **Conclusion:** Most nurses are aware of the relationship between environmental issues and COVID-19. However, despite the relevance of environmental impacts on health, there is still a lack of coordination with practical nursing activities.

Keywords: Primary Health Care; COVID-19; Nursing; Environmental Health.

INTRODUCTION

Human health is influenced by various factors, including social, cultural, economic, and environmental factors. About environmental aspects, physical, chemical, and biological factors are recognized as agents that cause emerging and reemerging diseases and directly or indirectly affect the health of the population[1].

In this context, the World Health Organization (WHO) advocates for the development of actions aimed at reducing environmental risks and their health consequences. These actions include the creation of the Global Health Security Agenda, initially composed of 44 countries and different organizations, whose objective is to prevent and control endemic or pandemic infections[1].

It is essential to note that these actions are crucial, particularly during health crises, as their origins may be linked to environmental issues. The ecological impact of degradation in

mining areas, deforestation, and air and water pollution results in a natural imbalance, contributing to the geographical displacement of pathogens and putting the population's health at risk[1-4].

Among the impacts observed on the health of the population, triggered by environmental health imbalances, are the development of neoplasms, heart disease, and respiratory diseases. In addition, those related to climate change, such as deaths from heat stress and environmental disasters, the increased incidence of waterborne diseases, the emergence of infectious diseases, and the spread of vector-borne diseases, have increased[3,4].

Regarding the spread of vector-borne diseases, the literature has highlighted that, in addition to intrinsic factors of the individual, the association of socioeconomic and environmental factors has contributed to adverse outcomes. Thus, greater access to water supply and sanitation services has resulted in a reduction in the incidence rate of COVID-19[5]. On the other hand, disparities in access and precarious conditions in healthcare facilities themselves could contribute to the spread of SARS-CoV-2, in addition to different diseases. The lack of adequate infrastructure can hinder the organization and flow of people with suspected or confirmed cases of COVID-19[6,7].

In this scenario, environmental health surveillance is an integral part of the health system, with the objective of monitoring, preventing, and controlling environmental factors that may impact the health of the population. Ecological health surveillance encompasses various areas beyond health, including the environment, urban planning, education, sanitation, transportation, and food safety. These areas must work together to create a healthier environment. Thus, collaboration between intersectoral actions and Primary Health Care (PHC) is crucial for the effectiveness of environmental health surveillance. Considered the gateway to the health system, PHC is responsible for coordinating and ensuring continuity of care, playing a vital role in managing environmental impacts on the health of the community served[8].

In this context, PHC is essential in combating COVID-19, as it identifies and tracks suspected cases of infection and manages mild cases of the disease[9]. At this level of healthcare, the work of nurses stands out, as they perform activities related to both health promotion and

the prevention and protection of individuals' health, considering the environment in which they live. Additionally, they conduct health education activities[8,9].

The role of nursing in mitigating the environmental consequences on population health stems from the knowledge disseminated by Florence Nightingale, a pioneer in nursing. She introduced concepts related to environmental health into the scope of nursing through her Environmental Theory, developed in 1859. She attributed a set of external conditions and influences capable of preventing, suppressing, or contributing to the process of illness or death of individuals[10].

However, there is evidence of a simplistic or even exclusionary approach to environmental health issues by health professionals, including nurses, indicating a weakness in their academic training. That said, nurses' understanding of environmental factors as potential causes of disease is essential, given their role as health educators in the community[11].

Thus, although the causal relationship between biodiversity loss, habitat degradation, and the emergence/reemergence of zoonotic diseases in humans is well established, there are still few studies linking nursing knowledge to how environmental factors can influence the emergence and spread of zoonotic diseases. Consequently, pandemics such as COVID-19 [1-5,7,8,10,11]. Although ecological health surveillance is crucial for outbreak control, many nurses may lack the knowledge to identify and intervene in environmental issues. This can affect public health and limit their ability to take preventive action and respond effectively during pandemics such as COVID-19. Thus, the question that guides this study is “What is the knowledge of nurses in health surveillance in the context of a health crisis?”

Given this, this study aimed to analyze the knowledge of nurses working in Primary Health Care in Brazil on the relationship between the environment, health, and COVID-19.

METHOD

This is a cross-sectional analytical study[12] conducted with nurses working in PHC in Brazil. It is worth noting that the study location was chosen based on the dissemination of the research and the collection of data; specifically, the study was widely publicized through digital

channels, and data were collected via Google Forms. Another critical factor was that, at the time, university activities had not yet returned to normal, and the health emergency caused by the pandemic was still ongoing, especially in 2021. In addition, the target population of the study was overwhelmed, as they were dealing with routine demands, there were still a high number of COVID-19 cases, and they were working hard on vaccination against the disease. Thus, due to the characteristics of data collection and the health situation at the time, it was decided to use a convenience sample. Since it was not possible to obtain a sample by sampling calculation due to the restrictions at that time. Thus, nurses who had been working full-time for more than three months were included in the study, while participants on leave or vacation, i.e., during the health emergency period, were excluded.

For data collection, a self-administered questionnaire was used containing questions related to professional training and experience (length of academic training; length of professional experience and at the health facility; whether they had specialization in public health, collective health, and/or family health) and questions about the relationship between the environment, health, and COVID-19 (concept of environmental health; environmental impacts on health; factors that hindered and facilitated the identification of environmental impacts on health; ecological effects on the transmission of COVID-19; measures adopted to prevent the spread of COVID-19; factors that hindered the management of COVID-19; and household and environmental aspects that interfere with the transmission of the disease).

The data collection instrument was developed by researchers from the Interdisciplinary Health and Environmental Health Surveillance Research Group (GIVISA), belonging to the University of São Paulo and the Federal University of São Carlos. No validated instrument was found in the literature. It is essential to highlight the period during which research was conducted, which began in 2021, a critical moment in the COVID-19 pandemic, when studies were being carried out. At that time, there was no validated instrument on the subject, and no specific documents existed on the environment, health, and COVID-19. Therefore, documents from the Ministry of Health and WHO[13,14] were used to construct the instrument. The instrument was developed using Google Forms, which included questions to identify the

professional (length of academic training, length of professional experience, length of experience at the establishment, and specialization around practice), as well as 10 closed and open-ended questions about the relationship between the environment, health, and COVID-19.

Data collection took place between September 14, 2021, and April 15, 2022, justified by the fact that the critical phase of the pandemic had entered remission, allowing professionals to have some time available to participate in the survey. On the other hand, the fatigue and exhaustion of professionals may have interfered with their ability to participate in the survey, necessitating a more extended collection period. Initially, the link containing the study was disseminated to members of the National Council of Health Secretaries (CONASS, acronym in Portuguese) and the National Council of Municipal Health Secretaries (CONASEMS, acronym in Portuguese). These members, through their supporters, forwarded the link to health departments in municipalities throughout Brazil.

Subsequently, the health departments sent the survey link to those responsible for PHC in their respective municipalities, inviting PHC nurses to participate (via the institutional email address of the health service, not personal email addresses). These nurses, considered the initial key participants, could also send the survey invitation to other nurses they knew who worked in the same area, in other words, those belonging to APS.

In addition, the survey was disseminated among postgraduate nursing programs in Brazil through digital media, specifically on the researchers' Facebook and Instagram accounts, allowing the study to reach the broadest possible audience. Thus, key participants had access to the form through digital media or received emails promoting the survey in PHC services.

Subsequently, the database was created using Microsoft Excel®, where data tabulation and descriptive analysis were performed using absolute and percentage frequencies (qualitative variables). To estimate the Prevalence Ratio (PR) of the variables of training, specialization in public health, collective health, and/or family health, and those that addressed knowledge of environmental health, the Poisson regression model with robust multiple variances was used, with a significant level of 5% ($p < 0.05$), using the *Statistical Analysis Systems* 9.4 *software*.

The research project followed all ethical guidelines recommended by Resolution 466/2012 of the National Health Council. It was approved by the Research Ethics Committee (CEP, acronym in Portuguese) of the Federal University of São Carlos, obtaining the Certificate of Ethical Review (CAAE, acronym in Portuguese) No. 28666820.9.0000.5504. Participants also received the Free and Informed Consent Form when they received the invitation to participate in the research.

RESULTS

A total of 253 nurses working in PHC participated in the study. Of these, only 221 professionals responded to the region to which they belonged. Thus, 38.6% (86) were from the Southeast region, 25.7% (57) from the South region, 21.2% (47) from the Northeast, 12.6% (28) from the Midwest, and 1.3% (3) from the North (Table 1).

Regarding the length of academic training, 46.4% (13) of nurses in the Central-West region, 66.7% (2) in the North, and 53.2% (25) in the Northeast reported having less than 10 years of training; in the Southeast, 54.7% (47) and in the South, 49.2% (28) of nurses reported having 11 to 20 years of training (Table 1).

Regarding professional experience, 57.1% (16) of nurses in the Central-West region had less than 10 years of experience and fewer than 5 years of work experience in their current establishment. As for specialization in public health, collective health, and/or family health, more than 60% of respondents across all regions reported having it (Table 1).

Table 1 - Characterization of Primary Health Care nurses in Brazil in terms of length of training, practice, and specialization, Brazil, 2023

Variables	Midwest	Northeast	North	Southeast	South
Length of academic training					
Less than 10 years	13 (46.4%)	25 (53.2%)	2 (66.7%)	24 (27.9%)	22 (38.6%)
From 11 to 20 years	13 (46.4%)	19 (40.4%)	0 (0%)	47 (54.7%)	28 (49.2%)
More than 20 years	2 (7.1%)	3 (6.3%)	1 (33.3%)	15 (17.4%)	7 (12.2%)
Total	28 (100.0%)	47 (100.0%)	3 (100.0%)	86 (100.0%)	57 (100.0%)
Length of professional career					
Less than 10 years	16 (57.1%)	28 (59.5%)	2 (66.6%)	30 (34.8%)	24 (42.1%)
From 11 to 20 years	9 (32.1%)	17 (36.1%)	0 (0%)	41 (47.6%)	26 (45.6%)
More than 20 years	3 (10.7%)	2 (4.2%)	1 (33.3%)	15 (17.4%)	7 (12.2%)
Total	28 (100.0%)	47 (100.0%)	3 (100.0%)	86 (100.0%)	57 (100.0%)
Length of time working in the establishment					
Less than 5 years	16 (57.1%)	29 (61.7%)	1 (33.3%)	34 (39.5%)	30 (52.6%)
From 5 to 15 years	8 (28.5%)	14 (29.7%)	2 (66.6%)	35 (40.7%)	20 (35.0%)
More than 15 years	4 (14.2%)	4 (8.5%)	0 (0%)	17 (19.7%)	7 (12.2%)
Total	28 (100.0%)	47 (100.0%)	3 (100.0%)	86 (100.0%)	57 (100.00%)
Specialization in public health, collective health, and/or family health					
No	11 (39.2%)	15 (31.9%)	0 (0%)	27 (31.4%)	18 (31.5%)
Yes	17 (60.7%)	32 (68.0%)	3 (100.0%)	59 (68.6%)	39 (68.4%)
Total	28 (100.0%)	47 (100.0%)	3 (100.0%)	86 (100.0%)	57 (100.0%)

Source: Elaborated by the authors (2023).

Regarding knowledge of the term 'environmental health,' 87.4% (221) of nurses stated that they were familiar with it. 91.6% (230) of nurses indicated that they perceived environmental impacts on the health of the population they cared for. Among the main environmental effects on health perceived, nurses pointed to poor sanitary conditions 29.5% (44), increased demand related to mental health (26.9%, or 40), increased respiratory diseases (14.8%, or 22), zoonoses (12.1%, or 18), and environmental pollution (10.7%, or 16) (Table 2).

Table 2 - Analysis of the knowledge of Primary Health Care nurses in Brazil about the concepts and practice of environmental health, Brazil, 2023

Variables	Frequency	Percentual
Knowledge of the meaning of the term environmental health		
No	32	12.7
Yes	221	87.4
Total respondents	253	100.0
The perception of environmental impacts on the health of the population informed the work routine.		
No	21	8.4
Yes	230	91.6
Total respondents	251	100.0
What are the environmental impacts on the health of the population associated with the work routine?		
Pandemia	12	8.1
Increase in respiratory diseases	22	14.8
Increase in chronic diseases	8	5.4
Increased demand related to mental health	40	26.9
Lack of sanitary conditions	44	29.5
Improper disposal of garbage/waste	12	8.1
Environmental pollution	16	10.7
Zoonoses	18	12.1
Increased cases of diarrhea	3	2.0
Vitamin deficiency	1	0.7
Dehydration	1	0.7
Seasonal illnesses	3	2.0
Community infections	1	0.7
Pesticide poisoning	6	4.0
Social isolation	2	1.3
Total respondents	149	

Source: Elaborated by the authors (2023).

For 30.7% (57) and 14.5% (27) of participants, respectively, the lack of information among the population and professional/work overload made it challenging to identify environmental impacts on the health of the population served. Meanwhile, 26.8% (26), 22.7% (22), and 18.6% (18) of nurses, respectively, reported that understanding the coverage area, good reception, and the work of community health agents facilitated the identification of environmental impacts on the health of the assisted population (Table 3).

Table 3 – The perception of Primary Health Care nurses on hindering and facilitating factors in the identification of environmental impacts on the assisted population, Brazil, 2023

Variables	Frequency	Percentual
The perception of factors that hinder the identification of environmental impacts on the health of the population assisted in its establishment.		
No	31	12.3
Yes	221	87.7
Total respondents	252	100.0
What factors hinder the identification of environmental impacts on the health of the population assisted in the establishment?		
Environmental issues in the territory	12	6.5
Failure to recognize environmental impacts on health	7	3.8
Lack of epidemiological data	21	11.3
Lack of information among the population	57	30.7
Lack of human resources	13	7.0
Lack of training for the team	15	8.1
Professional/work overload	27	14.5
Lack of dialogue between the patient and the healthcare team	12	6.5
Access difficulties	17	9.1
Lack of public support	15	8.1
Social distancing	3	1.6
Lack of service organization	1	0.5
Lack of a suitable place to serve the population	2	1.1
Total respondents	186	
The perception of factors that facilitate the identification of environmental impacts on the health of the population assisted in establishing this.		
No	54	21.4

Yes	198	78.6
Total respondents	252	100.0
What factors facilitate the identification of environmental impacts on the health of the population assisted in the establishment?		
Understanding the catchment area	26	26.8
The work of community health agents with home visits	18	18.6
Joint work	8	8.3
Communication with the population	8	8.3
Good reception	22	22.7
Good teamwork	6	6.2
Training professionals	5	5.2
Qualified listening	4	4.1
Habits of the population	3	3.1
Unit organization	5	5.2
Total respondents	105	

Source: Elaborated by the authors (2023).

Regarding the relationship between environmental health and COVID-19, 92.5% (234) of nurses stated that the environment impacts disease transmission, with 43.5% (63) and 31.7% (46) of participants, respectively, believing that crowded environments and sanitary conditions are primarily responsible (Table 4).

In addition, 87.8% (222) of participants reported perceiving difficulties among the population in understanding measures to prevent COVID-19 infection, and 87.1% (175) reported that the population had trouble following protocols. For 61.5% (40) of nurses, the primary challenge was encouraging the population to adhere to preventive measures to prevent COVID-19 infection (Table 4).

Table 4 - Perception of Primary Health Care nurses in Brazil about the relationship between environmental health and COVID-19, Brazil, 2023

Variables	Frequency	Percentual
The environment has an impact on the transmission of COVID-19.		
No	19	7.5
Yes	234	92.5
Total respondents	253	100.0
How the environment impacts the transmission of COVID-19		
Sanitary conditions	46	31.7
Hygiene habits	28	19.3
Crowded environments	63	43.5
Unhealthy environments with poor ventilation	29	20.0
Climate/environmental issues	13	9.0
Total respondents	145	
Perceived difficulties of the assisted population in understanding the measures to avoid contagion by COVID-19		
No	31	12.3
Yes	222	87.8
Total respondents	253	100.0
How difficult is it for the population to understand the measures to prevent COVID-19 infection?		
Belief in fake news	29	14.4
Difficulty following protocols	175	87.1
Non-adherence to vaccination	5	2.5
Total respondents	201	
Difficulties in informing the population about measures to prevent COVID-19 infection?		
No	155	61.3
Yes	98	38.7
Total respondents	253	100.0
What are the difficulties in advising the assisted population on measures to prevent COVID-19 infection?		
Difficulties in accessing vulnerable people	3	4.6
Difficulties in encouraging adherence to the measures	40	61.5
Difficulties in encouraging vaccination	1	1.5

Difficulties due to ideological issues	6	9.2
Lack of technical knowledge about the disease	11	16.9
Lack of time for reception	2	3.1
Hostility from the population	2	3.1
Total respondents	65	

Source: Elaborated by the authors (2023).

The study compared the length of academic training and whether or not nurses had specialization in their field of practice and found that nurses who did not have specialization had a 21% higher prevalence ratio with the perception of factors that facilitate the identification of environmental impacts on the health of the population served when compared to nurses with specialization in their field of practice (PR 1.21, 95% CI: 1.06–1.38, $p<0.01$). In addition, it was found that nurses with more than 20 years of training, when compared to nurses with less than 10 years of training, had a 19% higher prevalence ratio with the perception of difficulties of the population assisted in understanding measures to prevent Covid-19 infection (PR 1.19, 95% CI: 1.06 – 1.34, $p<0.01$).

DISCUSSION

This study revealed that many nurses reported knowing environmental health concepts; however, with the COVID-19 pandemic, these professionals noted that the population they assist has difficulties understanding and adhering to measures to prevent the disease.

It is noteworthy that no relationship was found between nurses having specialization in the field of PHC and a greater perception of the factors that facilitate the identification of environmental impacts on the population's health. On the other hand, longer academic training of nurses, i.e., experience, was associated with identifying the population's difficulties in understanding COVID-19 prevention measures.

At all levels of practice, nurses should adopt a broad view of the environment and its relationship with the health-disease process in the performance of health promotion and protection activities, as well as disease prevention[8-10,15]. In this analysis, most nurses reported familiarity with the term related to environmental health. They perceived that poor sanitary

conditions, zoonoses, and environmental pollution are among the primary ecological health impacts. Furthermore, nurses noted that one of the key facilitators in identifying ecological factors with health implications was understanding the scope and work of community health agents.

However, the literature has highlighted a gap in nurses' academic training regarding the environmental health approach in healthcare services. An analysis revealed that, although nurses recognize the close relationship between the environment and the health-disease process, many reported having no contact with this topic during their undergraduate studies. Other professionals mentioned that they only encountered the topic in extension courses or graduate school[11].

The lack of an environmental health approach in undergraduate nursing education may compromise the identification of environmental risks to human health. Thus, it is essential to effectively incorporate these topics into health courses, enabling professionals to provide comprehensive care, considering social issues and vulnerabilities related to environmental impacts in the territory[9-16].

Furthermore, although this study did not indicate that specialization in public health, collective health, or family health can contribute to the identification of environmental risks to health, the literature suggests that such specialization can contribute to the incorporation of critical thinking in response to the demands of the population and the environment in which they live, resulting in professional practice geared toward the needs of users. In this sense, the theoretical foundations of nursing are acquired in undergraduate education. Still, they are also deepened in practice, based on empirical knowledge gained through experience and observation of the environment and people, developing actions that contribute to the well-being of the population.

This analysis also revealed that nurses with more extended training periods had a greater understanding of the difficulties faced by the population they cared for, including measures to prevent COVID-19 infection. In this context, in addition to specialization, the length of service in the establishment, that is, professional experience, can also contribute to nurses paying

attention to issues surrounding the population. In the context of PHC, a nurse who has been known to the registered population for a long time has a stronger bond, making it possible to identify patterns of symptoms and diseases and establish whether these conditions are related to the environment[10,11,18].

Nurses' knowledge of the relationship between environmental health and human health is crucial, and the COVID-19 pandemic has underscored the importance of understanding how environmental factors can impact people's health. Given that the emergence of COVID-19 has been attributed to interaction between humans and wild animals, one of the main concerns at the beginning of the pandemic was to identify transmission and how the environment interacts with this disease. Subsequently, it was observed that the virus was spread by respiratory droplets, requiring contact and aerosol precautions, as well as attention to how the environment, whether indoor or outdoor, impacts transmission[19].

The nurses in this study reported that they perceived crowded environments and sanitary conditions to be among the main factors explaining how the environment impacts the transmission of COVID-19. Thus, when asked how the environment influences the transmission of COVID-19, it is expected that among the first responses of professionals will be indoor conditions, such as crowded, unsanitary, and poorly ventilated environments. However, it is essential to consider that outdoor conditions, such as climate and lack of basic sanitation, also contribute to the increased transmissibility of disease[2-6,20].

In this scenario, PHC plays a central role in health surveillance by identifying, tracking, and monitoring suspected and confirmed cases of COVID-19, in addition to providing data to municipalities that enable analysis of the epidemiological situation in the regions, assisting decision-making by managers at the local and national levels[7,21].

In a scenario where socioeconomic and environmental factors can influence the population's understanding of and adherence to specific preventive measures, the literature has indicated that low educational attainment may be associated with higher rates of COVID-19 incidence. Furthermore, an association has been described between areas with slums and cases of COVID-19, highlighting that residential areas with poor housing quality, high population

density, and inadequate sanitation typically characterize slums. However, an adequate water supply is essential to ensure care, and hand hygiene is one of the main recommendations for preventing the virus.[22]

Given this, health indicators are essential for environmental health surveillance, as they enable the development of actions that provide knowledge and detection of any changes in the determining and conditioning factors of the environment that interfere with human health, in addition to determining measures for the prevention and control of environmental risk factors[7,18,22].

Thus, to minimize environmental impacts on health, Law No. 14,026 of July 2020 updated the legal framework for basic sanitation, adopting targets for universal access to basic sanitation services, including 99% coverage of the drinking water supply and 90% sewage collection and treatment by 2033. It should be noted that, currently, access to treated water and sewage disposal is unevenly distributed across the country[23].

After the health emergency resulting from the COVID-19 pandemic and the endemic nature of the disease, there was an increase in the number of people with respiratory symptoms attending PHC services. In this context, the lack of infrastructure in the PHC to organize the flow of users stands out. In addition, measures to protect against COVID-19 were adopted in a manner that was out of context with the precarious conditions in which a large portion of the Brazilian population lives. Related to the lack of basic sanitation, low income, and precarious work, many live in housing that makes physical isolation impossible. Thus, factors such as poverty and social vulnerability are social, political, and economic impediments that affect the health of the population and make it difficult to comply with health measures[18,19,24].

In this study, nurses reported observing difficulties among the population in understanding the measures and following protocols to prevent COVID-19 infection. In this context, understanding the vulnerabilities of the population allows PHC, with an emphasis on nurses, to implement health education actions for disease prevention, including measures to prevent the spread of the SARS-CoV-2 virus[8-11,25]. In another dimension, nurses can play a crucial role in combating misinformation about COVID-19, as one factor that hinders

compliance with measures to prevent the spread of the virus, as well as adherence to vaccination, is the spread of fake news. As fast as the virus, phony news spread not only in Brazil but also worldwide, promoting miracle cures, teas that prevented contagion, and conspiracy theories. This situation contributed to the population becoming resistant to measures aimed at mitigating the spread of the disease and to vaccination adherence[26].

Although the nurses in this study reported familiarity with the term related to environmental health, the professionals identified work overload as a hindrance to recognizing these impacts in the assisted territory. It is worth noting that during the pandemic, PHC nurses faced a heavy workload due to increased demand and the restructuring of healthcare services. In addition to their usual activities, they had to assume new roles, including monitoring COVID-19 cases, conducting screenings and tests, and providing guidance to the community. Rapid adaptation to new protocols, a lack of psychological support, and shortages of personal protective equipment, especially during critical periods, intensified the challenges, with many professionals facing a fear of contamination and the psychological impact of the crisis[27,28].

COVID-19 still poses a challenge, despite the WHO's declaration of the end of the health emergency. The disease remains a part of the daily routine of health services, requiring these services to continue contributing to disease control through educational activities in the territory on the environmental impacts on health, the identification and monitoring of suspected cases of COVID-19, as well as coordination with municipal health surveillance[21,29].

Therefore, in addition to nurses acting to guide measures to prevent the SARS-CoV-2 virus, it is essential to develop collective and individual health education actions in PHC to mitigate environmental impacts. Among these health actions, we emphasize the need to address environmental factors that can contribute to the health-disease process, in addition to guiding the importance of vaccination for disease prevention, whether individually or collectively[8-11,18-22].

Finally, this study demonstrated that environmental health faces complex challenges, and there is an emerging need to incorporate the discussion of the relationship between environmental issues and human health more effectively into higher education courses in the

health field. For nursing, this knowledge is essential for advancing scientific knowledge while also providing comprehensive care to users, considering environmental factors and social determinants. Furthermore, in light of the recent humanitarian crisis triggered by the COVID-19 pandemic in 2020, health surveillance and public management must work in tandem, paying attention to emerging issues that impact the lives of the population. The limitation of the study was the difficulty in reaching nursing professionals in different regions of the country and motivating them to respond to the research questionnaire. However, it was considered an essential and consistent sample, highlighting discrepancies in access and participation in research between different regions of the country.

CONCLUSION

This survey revealed that most nurses were aware of the connection between environmental health and COVID-19. However, while knowledge of the scope and role of community health workers was described as one of the factors facilitating the identification of environmental impacts on the population served, work overload was identified as a hindering factor. Furthermore, nurses reported a perceived lack of understanding of virus prevention measures among the population and found it challenging to encourage adherence to preventive measures.

Thus, the study contributes to reflection on the topic and draws attention to environmental issues, highlighting the urgency of incorporating ecological health concepts into the daily lives of nursing professionals, as this topic is integral to public health.

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