Esc Anna Nery 2022;26(spe):e20210504

RESEARCH | PESQUISA

www.scielo.br/EAN

Newly graduated nurses' knowledge about Specific Precautions in the pre-pandemic of COVID-19

Conhecimento dos enfermeiros recém-formados sobre Precauções Específicas na pré-pandemia da COVID-19

Conocimiento de los enfermeros recién licenciados sobre las Precauciones Específicas en la prepandemia de COVID-19

Júlia Rigolon Eichemberger[1]
Julia Yaeko Kawagoe[1]
Lívia Guimarães Andrade[1]
Andrea Gomes Costa Mohallem[1]

1. Faculdade Israelita de Ciências da Saúde Albert Einstein, Hospital Israelita Albert Einstein. São Paulo, SP, Brasil.

ABSTRACT

Objective: To assess the knowledge of newly graduated nurses about Specific Precautions/Isolation measures. **Method:** A cross-sectional descriptive-exploratory study with a quantitative approach was conducted in a private hospital in São Paulo in February 2019. The researcher approached the nurses waiting for the "Junior Nurse" position selection process to participate in the survey. The participants answered a validated instrument with 29 multiple-choice questions, divided into five thematic categories. A score of 7.0 (from zero to 10) was defined as the cut-off point. The R Core statistical package and the lme4 for generalized mixed models were used for data analysis, with a significance level of 5%. **Results:** 190 newly graduated nurses participated in the study, with an overall knowledge of Specific Precautions score of 5.82, with the highest mean (7.9) in the "Personal Protective Equipment" category. In the other four categories, the nurses scored below 7.0, with the lowest score (4.35) in the "Care for the environment". **Conclusion and Implications for the practice:** The study showed a deficiency of Specific Precautions knowledge among newly graduated nurses, with implications for the patients' and healthcare professionals' safety from graduation practice (internship) to the beginning of their professional career.

Keywords: Health Knowledge, Attitudes, Practice; Communicable Diseases Control; Nurses; Cross Infection; Patient Isolation.

RESUMO

Objetivo: Avaliar o conhecimento dos enfermeiros recém-formados sobre as medidas das Precauções Específicas (PE). **Método:** Estudo transversal descritivo-exploratório, com abordagem quantitativa, realizado em um hospital privado de São Paulo, em fevereiro de 2019. Os enfermeiros foram abordados para participar da pesquisa enquanto aguardavam o início do processo seletivo para "Enfermeiro Junior". Para avaliar o conhecimento, foi utilizado um instrumento validado, contendo 29 questões de múltipla escolha, divididas em cinco eixos temáticos, sendo definida como ponto de corte a média 7,0 (de zero a 10). Para análise dos dados, foi usado o pacote estatístico R Core, e o *lme4* para os modelos mistos generalizados, sendo adotado nível de significância de 5%. **Resultados:** Participaram do estudo 190 enfermeiros recém-formados com nota geral de 5,82, sendo a maior média (7,9) no eixo "Equipamento de Proteção Individual". Nos demais eixos, as médias foram abaixo de 7,0, tendo a menor pontuação (4,35) no eixo "Cuidados com o Ambiente". **Conclusão e Implicações para a prática:** O estudo evidenciou déficit de conhecimento sobre as PE entre os enfermeiros recém-formados, com implicações para a segurança dos pacientes e dos profissionais de saúde, desde a prática assistencial na graduação (estágios) ao início da carreira profissional.

Descritores: Conhecimentos, atitudes e práticas em saúde; Controle de Doenças Transmissíveis; Enfermeiras e Enfermeiros; Infecção Hospitalar; Isolamento de Pacientes.

RESUMEN

Objetivo: Evaluar los conocimientos de los enfermeros recién graduados sobre las medidas de Precauciones Específicas/aislamiento. **Método:** Se realizó un estudio transversal descriptivo-exploratorio con enfoque cuantitativo en un hospital privado de São Paulo en febrero/2019. El investigador abordó a los enfermeros que esperaban el proceso de selección del puesto de "Enfermero Junior" para que respondieran a la encuesta. Se utilizó un instrumento validado con 29 preguntas de opción múltiple, divididas en cinco categorías temáticas, y definió como punto de corte 7,0 (de cero a 10). Se utilizó el paquete estadístico R Core y el lme4 para modelos mixtos generalizados, y nivel de significación del 5%. **Resultados**: Participaron 190 enfermeros recién graduados con una puntuación global de 5,82, con la media más alta (7,9) en "Equipos de protección personal". En las demás categorías, las puntuaciones fueron inferiores a 7,0, siendo la más baja (4,35) la de "Cuidado del ambiente". **Conclusión e implicaciones para la práctica:** El estudio mostró una deficiencia de conocimientos sobre Precauciones Específicas entre los enfermeros recién graduados, lo que tiene implicaciones para la seguridad de los pacientes y de los profesionales de la salud desde la práctica de graduación (pasantía) hasta el inicio de la carrera profesional.

Palabras clave: Conocimientos, Actitudes y Práctica en Salud; Control de Enfermedades Transmisibles; Enfermeras y Enfermeros; Infección Hospitalaria; Aislamiento de Pacientes.

Corresponding Author:
Júlia Rigolon Eichemberger.
E-mail: juh.rigeich@hotmail.com

Submitted on 02/17/2022.
Accepted on 04/27/2022.

DOI:https://doi.org/10.1590/2177-9465-EAN-2021-0504en

INTRODUCTION

We characterize the Infections Related to Health Assistance (IRHA) as an adverse event acquired in any type of service that involves health care, which infection was not present or in incubation at the moment of the assistance paid to the patient.[1]

The IRHA, including the hospital infection, is one of the main worldly concerns, is directly related to the security of the health care, and affects the institution's quality of the service.[2]

We can prove the relevance of the theme during the COVID-19 (Coronavirus Disease 2019) pandemic when health services needed to implement protocols to guide the necessary measures in the patients' care with suspicion and/or diagnosed with the infection, aiming to prevent the transmission of SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2).[3]

The IRHA can be preventive when avoiding the transmission of microorganisms, in other words, interrupting the transmission chain of the etiologic agent. One of the ways to prevent and control infections is the application of the Standard Precautions (SP) and the Transmission-Based Precautions (TBP).[1]

The SP are basic recommended measures in the care of every patient, independently of diagnosis or presumed infectious condition, and the TBP are indicated to the isolation of patients when they are on suspicion or confirmation of an infectious agent of high transmissibility or high epidemiological importance. The TBP is also denominated as Isolation Precautions or Transmission-based Precautions and considers the microbial transmissions: contact, droplet, and airborne transmission.[1,4,5]

Hence, the droplets, airborne, and contact precautions are types of TBP, and we can combine them according to the transmission modes. For instance, the main transmission modes of SARS-CoV-2, the responsible agent for COVID-19, occur through the droplet, contact, and also through airborne in situations of aerosol generation procedures.[6]

We destined the precautions for droplet transmission for the prevention of transmissions of pathogens that propagate through droplets, greater than 5µm, as in the cases of influenza, meningitis, mumps, rubella, and COVID-19. As part of the precaution is the use of a surgical mask while entering the room and by the patient, while in transportation, private room, hands hygiene (HH), and cough etiquette.[1]

We destined the precautions for airborne to pathologies of airborne transmission through droplet nuclei, with size smaller than 5µm, that reach greater distances and stay suspended in the air for a longer period. Patients with measles, varicella, disseminated or localized herpes zoster in immunosuppressed patients, and tuberculosis need a private room with a system of air with negative pressure, N95 or FFP2 mask usage (Type 2 Filtering Facepiece) by the professional and surgical mask by the patient while in transportation.[1]

We apply the precautions through contact in pathologies in which transmission may occur by indirect or direct contact and are instituted to patients with diarrhea by *Clostridium difficile*, rotavirus, or norovirus and infection or colonization by multidrug-resistant bacteria of exuding wounds with uncontained drainage. Allocating the patient in a private or shared room with other patients with the same infectious agent or colonizing, besides HH, apron, and gloves usage by the professional is part of the precaution.[1,7]

Nurses provide direct and indirect assistance to the patients, as well as other health professionals, are exposed to the contamination by microorganisms, and can favor their transmission if the measures of Infection Prevention and Control (IPC) are not applied.[8] We can observe this scenario during the pandemic of COVID-19 when many health professionals got infected by SARS-CoV-2. Data from the Federal Council of Nursing (COFEN) showed that from the beginning of the pandemic until the beginning of December 2021, 59.386 cases of infected nursing professionals and 871 death registers were reported due to COVID-19.[9]

Newly graduated students experienced a different scenario from what they expected when entering professional practice. This first contact with the work environment demands that the professionals adapt themselves to the difference between what they learned in the academic environment and the complex reality of the health service environment. This scenario can lead to different emotions, doubts, stress, and anxiety and can affect their development in their new role that demands greater responsibilities but with limited experiences.[10-12]

In this context, the application of the TBP demands microbiology knowledge, infectious diseases, and microbial transmission chain, besides clinical and epidemiological reasoning in the decision-making regarding a patient on suspicion or diagnosis of infection. Considering the importance of health knowledge, attitudes, and practices for the decision-making and adoption of correct measures of TBP, this study evaluated the knowledge of newly graduated about specific precautions.

METHOD

Cross-sectional and descriptive-exploratory study with the quantitative approach in a large private general hospital located in São Paulo city during the month of February 2019.

The cross-sectional study occurs during a short and determined period, its descriptive nature occurs when the researcher classifies, explains, and interprets the facts; the exploratory investigation provides information about the topic. The quantitative study utilizes statistical instruments to translate in numbers the data and knowledge collected by the researcher.[13]

The population of the study were nurses enrolled in the selective process for the vacancy of "Junior Nurse" in a health institution. The non-probability sampling, which inclusion criteria were being a graduated nurse in less than one year. The exclusion criteria were not completing the instrument "Health professional knowledge about Specific Precautions."

For the data collection, we utilized the validated instrument entitled "Health professional knowledge about Specific Precautions," which consists of a questionnaire of 29 questions grouped in 5 thematic axes: Personal protection equipment (5 items), the epidemiological chain of transmission of microorganisms (10 items), accommodation and structure (8 items), care for the

environment (3 items), and communication (3 items).[14] The author responsible for its elaboration and validation authorized its usage.

We also applied a sociodemographic questionnaire with 6 questions containing information related to the characteristics of the curriculum of the nurse graduation course and questions regarding the experience in the health area.

After the approval of the research by the Research Project Management System (SGPP), opinion number 3646-18, approved on February 25th, 2019, and the Research Ethics Committee (REC), CAAE 06644919.0.0000.0071 we initiated the data collection. The research received financial support from the National Council for Scientific and Technological Development (*CNPq*), process number: 163323/2018-6.

Health professionals gathered for the selective process of the institution to participate in the interview. We guided them about the study, and those who accepted participation answered both questionnaires (sociodemographic and instrument "Health professional knowledge about Transmission-based precaution") before carrying out the test for the Junior Nurse vacancy of the cited hospital.

We analyzed and described the data collected as mean and standard deviation (SD) for the quantitative variables. We described the qualitative variables by absolute frequency and percentage.[15] We utilized the R Code statistical package for the analysis, besides de package lme4, for generalized mixed models. We adopted a level of significance of 5%.[16,17]

We determined a mean score equal to or lower to seven to establish if the newly graduated Nurse presented or not the knowledge about a determined item of the instrument.[18]

RESULTS

We approached 206 newly graduated nurses, of which 16 refused to participate in the research, resulting in 190 participants.

Of the 190 participants, 102 (53.7%) were older than 31 years old, and 189 (99.5%) graduated from private institutions. The majority (122; 64.2%) had also taken a nursing technical course, in which 113 (92.6%) pursued the role of the nursing technician for more than three years. During the nursing undergraduation course, about a third (63; 33.2%) pursued extracurricular internships, the majority 39 (63.9%) by a period from six months to a year of internship. Most of the participants (129/189; 68.3%) took the discipline of infectology, and less than half of them (76/187; 40.6%) took an internship in this discipline, according to Table 1.

In the analysis of the generalized mixed model of the binomial family, there was no evidence of an association between the knowledge of TBP (mean, SD) and the following variables: to attend (5.74; 3.38) or not the nursing technical course (5.69; 3.37), p=0,986; take (6.06; 3.30) or not an extracurricular internship (5.53; 3.39) p=0.861; to attend (5.75; 3.33) or not (5.65; 3.45) the infectology discipline, p=0,976; to take (5.92; 3.32) or not the internship in infectology (5.57; 3.38), p=0,899.

Figure 1 presents the mean and SD of the score that newly graduated Nurse obtained in the 5 thematic axes. The minimum score was 0 and the maximum 10 considering all the axes. The axis 1 regarding the "Personal protective equipment" presented the highest mean (SD): 7.91 (2.31), and the axis 4, referring the "Care for the environment," the lower average (SD): 4.35 (3.65). The mean score among participants was 5.82 (SD: 1.4).

Table 1. Newly graduated nurses characterization. February 2019. São Paulo. Brazil.

Variables	Total N (%)
Age (years) N=190	
20 to 23 years old	25 (13.2)
24 to 27 years old	36 (18.9)
28 to 31 years old	27 (14.2)
Over 31 years old	102 (53.7)
Public or private institution N=190	
Public	1 (0.5)
Private	189 (99.5)
Took a nursing technical course N=190	
No	68 (35.8)
Yes	122 (64.2)
Time working as a nursing technician N=122	
Less than 3 years	9 (7.4)
More than 3 years	113 (92.6)
Took an extracurricular internship N=190	
No	127 (66.8)
Yes	63 (33.2)
Took the infectology discipline during the graduation N=189	
No	60 (31.7)
Yes	129 (68.3)
Took an internship in infectology during the graduation N=187	
No	111 (59.4)
Yes	76 (40.6)

Source: Elaborated by the authors, 2022.
*** N: number.**

Table 2 presents the percentage of correct answers, errors, and non-response questions corresponding to the three axes with the lower average.

In the "Thematic Axis 3: Accommodation and Structure," we highlight that in the fourth question, 123 of the newly graduated nurse got it wrong (64.7%). This question explores the care to be adopted in the transportation of a patient in contact precaution.

In the "Thematic Axis 4: Care for the environment," the first question obtained the highest percentage of errors (78; 41.1%) among participants. This question explores what should be the

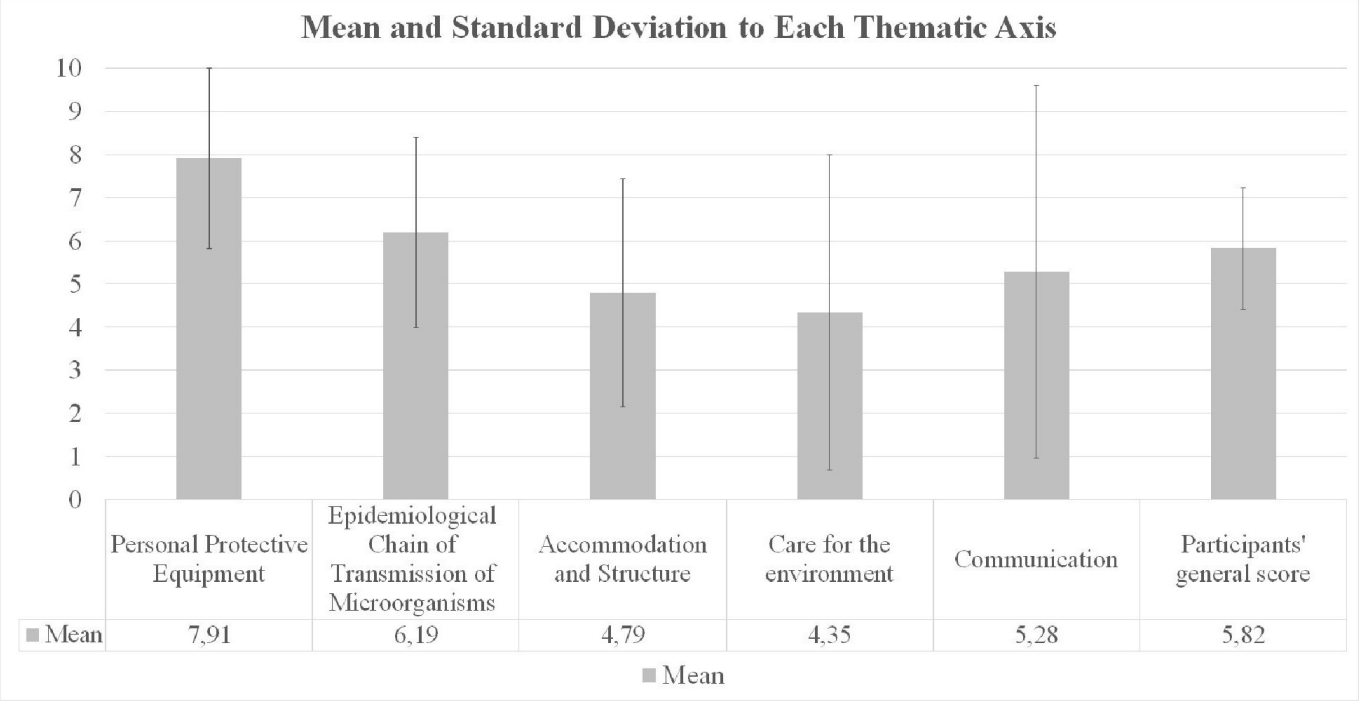

Figure 1. Mean (columns) and 95% Confidence interval (vertical lines) of the score of the thematic axis; and general score (last column) and 95% confidence interval (vertical line) of the newly graduated Nurse knowledge about TBP. Elaborated by the authors. February. 2019. São Paulo. Brazil.

procedures with the environment (cleaning and disinfection of environment surfaces) in the patients' rooms in contact precautions.

The Thematic Axis 5: "Communication," in which the question obtained the highest error percentage (54; 28.4%) and the highest proportion of non-response. Question 2 approaches the recommendations of patients, family-related, and visitors regarding TBP.

DISCUSSION

In this study, we considered the MEAN score equal to or higher than seven to establish if the newly graduated nurse presented or not the knowledge about a particular item of the instrument. This definition was necessary because the author of the "Health professional knowledge about Transmission-based Precautions" instrument did not establish a cut-off score to characterize or not the knowledge of the health professional. Besides that, another study that aimed to evaluate the knowledge of nursing professionals concerning the prevention measures of infections considered a percentage higher or equal to 70% as satisfactory.[18]

Based on this parameter, most of the nurses did not demonstrate knowledge regarding the TBP, which average note was 5.82. Only the mean (7.91) of the thematic axis "Personal Protective Equipment" had superior performance.

Concerning the axis "Communication," with a mean 5.28, we questioned the patient room identification in TBP, communication, and guidance among teams about the indications and maintenance of TBP, visit restrictions, and patient circulation outside the room. We highlight that this axis explores an important competence of the nurse related to the continuous education of health professionals and patients.[1,19]

The axis with a lower average was: "Accommodation and Structure" (4.79) and "Care for the environment" (4.35). The axis "Accommodation and Structure" addresses the necessary care in the room of the patients with transmissible infectious diseases such as: private rooms, and negative pressure, besides the care during the transportation of a patient in TBP.

Os eixos com menores médias foram: "Acomodação e Estrutura" (4,79) e "Cuidados com o Ambiente" (4,35). O eixo "Acomodação e estrutura" abordou os cuidados necessários com os quartos dos pacientes portadores de doenças infecciosas transmissíveis tais como: quartos privativos e pressão negativa, além do cuidado durante o transporte de um paciente em PE.

On the other hand, the "Care for the environment" axis with the greatest deficit of knowledge covers the care with cleaning, disinfection of environment surfaces, and care with the material and equipment during and after the hospital discharge of the patient.

The current pandemic of COVID-19, unleashed by the dissemination of SARS-CoV-2 on the various continents, exemplifies the importance of environment care. The evidence that this pathogen remains viable and infectious during hours or

Table 2. Error percentage and non-answered questions for the Thematic Axes: 3- Accommodation and Structure; 4- Care for the environment, and 5- Communication. February 2019. São Paulo. Brazil.

Axis	Question (P)	Question topic	Results N (%)		
			accuracy	errors	No response
Axis 3 Accommodation and Structure Average score: 4.79	Q1	Patient accommodation in aerosol precautions.	133 (70.0)	37 (19.5)	20 (10.5)
	Q2	Patient transportation care in aerosol precautions.	109 (57.4)	55 (28.9)	26 (13.7)
	Q3	Patient transportation care in droplets precautions.	111 (58.4)	55 (28.9)	24 (12.6)
	Q4	Patient transportation care in contact precautions.	32 (16.8)	**123 (64.7)**	35 (18.4)
	Q5	Environment air care in aerosol precautions.	100 (52.6)	52 (27.4)	38 (20.0)
	Q6	Clinical contraindications for the children to attend Toy library.	115 (60.5)	38 (20.0)	37 (19.5)
	Q7	Behavior in case of not having a private room to institute contact precautions.	30 (15.8)	111 (58.4)	49 (25.8)
	Q8	General behavior in the patient's exit of the room in SP.	98 (51.6)	40 (21.1)	52 (27.4)
Axis 4 Care for the environment Average score: 4.35	Q1	Environment hygiene care in the room of contact precaution.	59 (31.1)	**78 (41.1)**	53 (27.9)
	Q2	Care with the patient and environment in the suspension of the contact precaution.	93 (48.9)	37 (19.5)	60 (31.6)
	Q3	General care with materials and equipment, and environment in SP.	96 (50.5)	32 (16.8)	62 (32.6)
Axis 5 Communication Average score: 5.28	Q1	Identification of the patient in SP.	119 (62.6)	13 (6.8)	58 (30.5)
	Q2	Guidance to the patients, family-related and visitors regarding the SP.	75 (39.5)	**54 (28.4)**	61 (32.1)
	Q3	General care during the transport and communication referring to the SP.	107 (56.3)	20 (10.5)	63 (33.2)

Source: Elaborated by the authors, 2022.
* N: number; SP: Specific Precautions; Q: Question.

days on determined surfaces reinforces the importance of correct environment cleaning and disinfection with the right product.[20]

Nursing professionals on the front line of confrontation to the pandemic of COVID-19 are more exposed to the SARS-CoV-2, with an increased risk of acquiring the virus and developing the disease than the population in general. This created concerns related to the fear of contamination, incorrect use of PPE, and transmission to their families among health professionals.[21]

In a study carried out with newly graduated Nurse from South Korea that explored the essence and the meaning of the experience of taking care of patients with COVID-19, nurses reported fear of getting the infection; they felt overloaded with the workload, and inexperience with new clinical procedures in the care of these patients. The authors suggested, as part of the preparation for other epidemics and pandemics, that faculties carried out previous practical training with nursing students and that health institutions developed strategies of regular education to assure the transition from new nurses to highly qualified professionals.[22]

Hence, the knowledge about the microbial transmission chain, indication, PPE usage, accommodation and structure of the TBP, Care for the environment, and communication (TBP components of this research) are essential for safer security for the involved ones during or after the graduation.

A series of recommendations were published to guide professionals regarding patient care during this pandemic. Among these recommendations are the measures of contact and droplet precautions or aerosols precautions (in cases of procedures that generate aerosols).[23]

However, studies demonstrate that the shortage and the inadequate use of PPE constituted as factor risks to health professionals contamination by COVID-19 highlighting the importance of an adequate structure and that it is indispensable the training of the adequate use of protective equipment, its insertion and removal.[24,25]

Regarding the deficit of knowledge in the thematic axes, the questions with higher indexes of error corresponded to Contact Precautions. In addition, although the axis "Personal Protection Equipment" had a higher score, the question with the higher error regarded Contact Precaution. Research carried out in a hospital in Belo Horizonte evaluated health professionals' knowledge about IRHA precautionary measures and differed from this study because they evidenced that professionals presented adequate knowledge regarding SP and Contact Precautions, and the accuracy varied from 73% to 99%.[18]

Besides that, an integrative review regarding the adherence of nursing professionals concerning the contact precautions focusing on glove usage demonstrated that there is a disagreement between their knowledge and practice, once the knowledge can be present, but there is an inadequacy in the behavior of adherence to the precaution measures.[26]

It is important to highlight that the participants of the research, newly graduated nurses, have a degree and, hence, we expected the acquisition of basic competencies about the TBP. A transversal study evaluating 349 undergraduate students in the last year of nursing at six Australian universities showed deficiencies in knowledge of IRHA and TBP. The general knowledge was 59.8%, with higher accuracy in questions relating to SP (88.9%) than TBP (27.2%) ($p < 0.001$), being this score smaller than the present in this research.[27]

In this study, there was not a correlation between the knowledge of the professional with having experience as a nursing technician, taking or not an internship, and taking or not the infectology discipline with an internship. Nevertheless, studies demonstrate that internships help students in practice and in the exercise of the profession. Besides, they are the base to prepare current apprentices but not enough so that they acquire all the necessary experience and competence. The educational institutions need to apply active and reflexive learning methodologies and need to evaluate the results of their theoretical and practical methods.[28,29]

Another study evaluated the failures in the practice of TBP in two hospitals and identified active errors in the use of the PPE and the TBP (violation, procedure errors, and unintentional mistakes) with the risk of self-contamination. Based on the contributing factors for the failures, the author suggested strategies - behavioral, organizational, and environment - to reduce the risk of microbial transmission during the care in the hospitals, which reinforces the importance of the role of the health institutions in which newly graduated nurses, will be inserted.[30]

We identified a few articles that approached the knowledge about the TBP among newly graduated nurses, which hampered the comparison with the present research.

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

This research evidenced a deficit of health knowledge, attitudes, and practices from Newly Graduated Nurses regarding the TBP: on four of the five thematic axes, the mean obtained was lower to seven, as well as the overall average.

The knowledge and the adherence to TBP measures are fundamental for the prevention of transmissible diseases and the IRHA control. It is the health team's responsibility, particularly the nurse, to know and execute the precautionary measures correctly, providing security to their team and the patients.

The educational institutions need to evaluate the content and the workload destined to the hospital infection theme, including specific precautions. We suggest an investment in the teaching by exploring the theme of this study in the curriculum through active learning methods, as well as effective evaluation of students' health knowledge, attitudes, and practices.

We recommend to newly graduated nurses the investment in their self-development by seeking scientific evidence. To health institutions, we suggest the investment in structure and organization, continuing education, and training through simulations, study cases, e-learning, or short-term courses, aiming to increase the knowledge and apply it to patient assistance.

As a limitation of the study, we highlight the homogeneity of the sample that only portrays the knowledge of newly graduated nurse egresses of private educational institutions, not being able to generalize the results. As potential future research, we recommend applying the instrument "Health professional knowledge about Transmission-based Precautions" between academics in the nurse graduation course, including for the formative evaluation.

FINANCIAL SUPPORT

The National Council for Scientific and Technological Development (CNPq) supported this research. The research entitled Newly Graduated Nurses' Knowledge about Transmission-based Precautions, obtained a grant of the type scientific initiation, Process nº 163.323/2018-6.

AUTHOR'S CONTRIBUTIONS

Study design. Júlia Rigolon Eichemberger. Andrea Gomes Costa Mohallem.

Data collection. Júlia Rigolon Eichemberger.

Data analysis. Júlia Rigolon Eichemberger. Lívia Guimarães Andrade. Julia Yaeko Kawagoe.

Results interpretation. Júlia Rigolon Eichemberger.Lívia Guimarães Andrade. Julia Yaeko Kawagoe. Andrea Gomes Costa Mohallem.

Writing and critical review of the manuscript. Júlia Rigolon Eichemberger. Julia Yaeko Kawagoe. Lívia Guimarães Andrade. Andrea Gomes Costa Mohallem.

Approval of the final version of the article. Júlia Rigolon Eichemberger. Julia Yaeko Kawagoe. Lívia Guimarães Andrade. Andrea Gomes Costa Mohallem.

Responsibility for all aspects of the content and the integrity of the published article. Júlia Rigolon Eichemberger. Julia Yaeko Kawagoe. Lívia Guimarães Andrade. Andrea Gomes Costa Mohallem.

ASSOCIATED EDITOR

Maria Catarina Salvador da Motta

SCIENTIFIC EDITOR

Ivone Evangelista Cabral

REFERENCES

1. Siegel JD, Rhinehart E, Jackson M, Chiarello L, Healthcare Infection Control Practices Advisory Committee. Guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings [Internet]. Atlanta: Centers for Disease Control and Prevention; 2007 [citado 2021 nov 1]. Disponível em: https://www.cdc.gov/infectioncontrol/pdf/guidelines/isolation-guidelines-H.pdf
2. de Miranda Costa MM, Santana HT, Saturno Hernandez PJ, Carvalho AA, da Silva Gama ZA. Results of a national system-wide quality improvement initiative for the implementation of evidence-based infection prevention practices in Brazilian hospitals. J Hosp Infect. 2020;105(1):24-34. http://dx.doi.org/10.1016/j.jhin.2020.03.005. PMid:32151673.
3. Frost DW, Shah R, Melvin L, de Juana MG, MacMillan TE, Abdelhalim T et al. Principles for clinical care of patients with COVID-19 on medical units. CMAJ. 2020;192(26):E720-6. http://dx.doi.org/10.1503/cmaj.200855. PMid:32493744.
4. Sako MP, Felix AM, Kawagoe JY, Padoveze MC, Ferreira SA, Zem-Mascarenhas SH et al. Conhecimento sobre precauções na Atenção Primária à Saúde: validação de instrumento. Rev Bras Enferm. 2018;71(suppl 4):1683-9. http://dx.doi.org/10.1590/0034-7167-2017-0886. PMid:30088628.
5. Ferreira LA, Peixoto CA, Paiva L, da Silva QC, Rezende MP, Barbosa MH. Adesão às precauções padrão em um hospital de ensino. Rev Bras Enferm. 2017;70(1):96-103. http://dx.doi.org/10.1590/0034-7167-2016-0138. PMid:28226047.
6. World Health Organization. Transmission of SARS-CoV-2: implications for infection prevention precautions: scientific brief [Internet]. Geneva: WHO; 2020 [citado 2021 nov 29]. Disponível em: https://apps.who.int/iris/handle/10665/333114
7. Jesus JB. Precauções específicas: vivências de pacientes internados [dissertação]. São Carlos: Centro de Ciências Biológicas e da Saúde, Universidade Federal de São Carlos; 2018 [citado 2021 nov 29]. Disponível em: https://repositorio.ufscar.br/handle/ufscar/9504
8. Pajel A. Using PPE correctly and safely. Kai Tiaki Nursing New Zealand [Internet]. 2020; [citado 2021 nov 29];26(9):26-8. Disponível em: https://www.nzohna.org.nz/assets/Uploads/bulk-email-uploads/PPE-use-article-for-Kai-Tiaki-Nursing-2.pdf
9. Conselho Federal de Enfermagem. Observatório da Enfermagem [Internet]. Brasília (DF): COFEN; 2021. [citado 2021 nov 29]. Disponível em: http://observatoriodaenfermagem.cofen.gov.br/
10. Baumann A, Crea-Arsenio M, Hunsberger M, Fleming-Carroll B, Keatings M. Work readiness, transition, and integration: the challenge of specialty practice. J Adv Nurs. 2019;75(4):823-33. http://dx.doi.org/10.1111/jan.13918. PMid:30478920.
11. Kim EY, Yeo JH. Effects of pre-graduation characteristics and working environments on transition shock of newly graduated nurses: a longitudinal study. Nurse Educ Today. 2019;78:32-6. http://dx.doi.org/10.1016/j.nedt.2019.04.002. PMid:31029956.
12. Labrague LJ, McEnroe-Pettite D, Leocadio MC. Transition experiences of newly graduated Filipino nurses in a resource-scarce rural health care setting: a qualitative study. Nurs Forum. 2019;54(2):298-306. http://dx.doi.org/10.1111/nuf.12330. PMid:30775787.
13. Prodanov CC, Freitas EC. Metodologia: método científico. In: Prodanov CC, Freitas EC. Metodologia do trabalho científico: métodos e técnicas da pesquisa e do trabalho acadêmico. 2a ed. Novo Hamburgo: Universidade Feevale; 2013 [citado 2021 set 18]. Cap. 2, p. 13-40. Disponível em: https://www.feevale.br/Comum/midias/0163c988-1f5d-496f-b118-a6e009a7a2f9/E-book%20Metodologia%20do%20Trabalho%20Cientifico.pdf
14. Gonçalves P. Conhecimento dos profissionais de saúde sobre precauções específicas: construção e validação de instrumento [dissertação]. São Paulo: Faculdade Israelita de Ciências da Saúde Albert Einstein; 2015.
15. Bussab WO, Morettin PA. Estatística básica. 6a ed. São Paulo: Saraiva; 2010.
16. R Core Team. R: a language and environment for statistical computing [Internet]. Vienna: R Foundation for Statistical Computing; 2017 [citado 2022 jan 21]. Disponível em: https://www.r-project.org/
17. Bates D, Mächler M, Bolker B, Walker S. Fitting linear mixed-effects models using lme4. J Stat Softw. 2015;67(1):1-48. http://dx.doi.org/10.18637/jss.v067.i01.
18. Alvim AL, Gazzinelli A. Conhecimento dos profissionais de enfermagem em relação às medidas de prevenção das infecções. Rev Enferm UFPE. 2017;11(1):18-23. https://doi.org/10.5205/1981-8963-v11i1a11873p18-23-2017.
19. Carrico RM, Garrett H, Balcom D, Glowicz JB. Infection prevention and control core practices: a roadmap for nursing practice. Nursing. 2018;48(8):22-8. http://dx.doi.org/10.1097/01.NURSE.0000541385.06363.73. PMid:29965825.
20. Oliveira AC, Lucas TC, Iquiapaza RA. O que a pandemia da Covid-19 tem nos ensinado sobre adoção de medidas de precaução? Texto Contexto Enferm. 2020;29:e20200106. http://dx.doi.org/10.1590/1980-265X-TCE-2020-0106.
21. Rathore P, Kumar S, Choudhary N, Sarma R, Singh N, Haokip N et al. Concerns of health-care professionals managing COVID patients under institutional isolation during COVID-19 pandemic in India: a descriptive cross-sectional study. Indian J Palliat Care. 2020;26(Suppl 1):S90-4. http://dx.doi.org/10.4103/IJPC.IJPC_172_20. PMid:33088096.
22. Ji EJ, Lee YH. New Nurses' Experience of Caring for COVID-19 patients in South Korea. Int J Environ Res Public Health. 2021;18(18):9471. http://dx.doi.org/10.3390/ijerph18189471. PMid:34574393.

23. Agência Nacional de Vigilância Sanitária. Nota técnica GVIMS/GGTES/ANVISA Nº 04/2020 orientações para serviços de saúde: medidas de prevenção e controle que devem ser adotadas durante a assistência aos casos suspeitos ou confirmados de infecção pelo novo coronavírus (SARS-CoV-2) [Internet]. Brasília: ANVISA; 2021 [citado 2021 nov 1]. Disponível em: https://www.gov.br/anvisa/pt-br/centraisdeconteudo/publicacoes/servicosdesaude/notas-tecnicas/nota-tecnica-gvims_ggtes_anvisa-04_2020-25-02-para-o-site.pdf
24. Sant'Ana G, Imoto AM, Amorim FF, Taminato M, Peccin MS, Santana LA et al. Infecção e óbitos de profissionais da saúde por COVID-19: revisão sistemática. Acta Paul Enferm. 2020;33:eAPE20200107. http://dx.doi.org/10.37689/acta-ape/2020AO0107.
25. Soares SSS, Souza NVDO, Carvalho EC, Varella TCMML, Andrade KBS, Pereira SRM et al. De cuidador a paciente: na pandemia da Covid-19, quem defende e cuida da enfermagem brasileira? Esc Anna Nery. 2020;24(spe):e20200161. http://dx.doi.org/10.1590/2177-9465-ean-2020-0161.
26. Padilha JM, Sá SP, Silvino ZR. Gloves and nursing professionals' adherence to contact precautions: an integrating review. J Nurs UFPE on line. [Internet]. 2017; [citado 2021 nov 1];11(2):667-74. Disponível em: https://periodicos.ufpe.br/revistas/revistaenfermagem/article/view/11986
27. Mitchell BG, Say R, Wells A, Wilson F, Cloete L, Matheson L. Australian graduating nurses' knowledge, intentions and beliefs on infection prevention and control: a cross-sectional study. BMC Nurs. 2014;13(1):43. http://dx.doi.org/10.1186/s12912-014-0043-9. PMid:25516721.
28. Galindo IS. O enfermeiro recém-formado em unidade de terapia intensiva adulto: entre desafios teóricos e práticos da profissão [dissertação]. Florianópolis: Universidade Federal de Santa Catarina; 2018 [citado 2021 nov 1]. Disponível em: https://repositorio.ufsc.br/handle/123456789/190638
29. Moreira LR, Siqueira AT, Santos PT, Ladislau VN. Percepção do enfermeiro acerca da formação acadêmica para o exercício profissional. Enferm Rev.[Internet]. 2018; [citado 2021 nov 1];21(1);34-50. Disponível em: http://periodicos.pucminas.br/index.php/enfermagemrevista/article/view/17896/13349
30. Krein SL, Mayer J, Harrod M, Weston LE, Gregory L, Petersen L et al. Identification and characterization of failures in infectious agent transmission precaution practices in hospitals: a qualitative study. JAMA Intern Med. 2018;178(8):1016-57. http://dx.doi.org/10.1001/jamainternmed.2018.1898. PMid:29889934.