RESEARCH | PESQUISA

Evaluation of the knowledge of nursing professionals in the prevention of pressure ulcer in intensive care

Avaliação do conhecimento dos profissionais de enfermagem na prevenção da lesão por pressão na terapia intensiva

Evaluación del conocimiento de los profesionales de Enfermería en la prevención de lesiones por presión en cuidados intensivos

Carla Andressa Ferreira de Araújo[1] (ID)
Sandra Regina Maciqueira Pereira[2] (ID)
Vanessa Galdino de Paula [2] (ID)
Josiana Araujo de Oliveira[3] (ID)
Karla Biancha Silva de Andrade[2] (ID)
Norma Valéria Dantas de Oliveira[2] (ID)
Dayana Feital Pimentel[4] (ID)
Vanessa Elaine Ferreira de Araújo[1] (ID)

1. Universidade do Estado do Rio de Janeiro, Programa de Residência em Enfermagem. Rio de Janeiro, RJ, Brasil.

2. Universidade do Estado do Rio de Janeiro, Departamento de Enfermagem Médico-Cirúrgica. Rio de Janeiro, RJ, Brasil.

3. Universidade do Estado do Rio de Janeiro, Programa de Pós-Graduação Stricto Sensu. Rio de Janeiro, RJ, Brasil.

4. Hospital Pró-Cardíaco. Rio de Janeiro, RJ, Brasil.

ABSTRACT

Objective: to analyze the knowledge of Nursing professionals on the assessment, prevention and classification of pressure ulcers in intensive care before and after a training course. Method: this is a comparative, before-and-after, cross-sectional, prospective study that used the Caliri-Pieper Pressure Ulcer Knowledge Test (CALIRI-PIEPER PUKT) applied before and after training with 55 and 50 nursing professionals, respectively. The acceptable mean score was above 90%. **Results:** of the total of 41 items of the instrument, 14 (34%) did not obtain an average score above 90% of correct answers, and the nursing technicians were included in this contingent. It was evident that the effect of the training on the total sample obtained, on average, a 3.5 point increase in the level of knowledge. The mean difference between the scores obtained in the pre- and post-test was statistically significant (p<0.001). **Conclusions and implications for the practice:** the participants evaluated demonstrated effective levels of knowledge and low divergence between the categories, showing that the professionals are trained and prepared, having domain in the factors related to the evaluation, prevention and classification of pressure ulcers in intensive care after training.

Keywords: In-service Training; Knowledge; Critical Care Nursing; Pressure Ulcer; Intensive Care Units.

RESUMO

Objetivo: analisar o conhecimento dos profissionais de Enfermagem sobre a avaliação, prevenção e classificação das lesões por pressão na terapia intensiva antes e após a realização de um treinamento. **Método:** trata-se de um estudo comparativo, tipo antes e depois, transversal, com delineamento prospectivo, que utilizou o instrumento Teste de Conhecimento sobre Lesão por Pressão de Caliri-Pieper (TCLP CALIRI-PIEPER) aplicado antes e após a realização de um treinamento com 55 e 50 profissionais da Enfermagem, respectivamente. A média de acerto aceitável foi de acima de 90%. **Resultados:** do total de 41 itens do instrumento, 14 (34%) não obtiveram pontuação média acima de 90% de acerto, sendo os técnicos de Enfermagem inseridos neste contingente. Evidenciou-se que o efeito do treinamento na amostra total obteve, em média, um acréscimo de 3,5 pontos no nível de conhecimento. A diferença média entre a pontuação obtida no pré e pós-teste foi estatisticamente significativa (p<0,001). **Conclusões e implicações para a prática:** os participantes avaliados demonstraram níveis de conhecimento eficaz e baixa divergência entre as categorias, evidenciando que os profissionais estão capacitados e preparados, possuindo domínio nos fatores relacionados à avaliação, prevenção e classificação das lesões por pressão na terapia intensiva após a realização de um treinamento.

Palavras-chave: Capacitação em serviço; Conhecimento; Enfermagem de Cuidados Críticos; Lesão por Pressão; Unidades de Terapia Intensiva.

RESUMEN

Objetivo: analizar los conocimientos de los profesionales de Enfermería sobre la evaluación, prevención y clasificación de las lesiones por presión en cuidados intensivos antes y después de la realización de una formación. **Método:** se trata de un estudio comparativo, antes y después, transversal con un diseño prospectivo que utilizó el instrumento Caliri-Pieper Pressure Injury Knowledge Test (CALIRI-PIEPER TCLP) aplicado antes y después del entrenamiento con 55 y 50 profesionales de Enfermería, respectivamente. La media aceptable de derecho a golpe fue superior al 90%. **Resultados:** del total de 41 ítems del instrumento, 14 (34%) no obtuvieron un puntaje promedio superior al 90% de acierto, con los técnicos de Enfermería incluidos en este contingente. Se evidenció que el efecto formación en la muestra total obtuvo, en promedio, un incremento de 3,5 puntos en el nivel de conocimientos. La diferencia promedio entre las puntuaciones previas y posteriores a la prueba fue estadísticamente significativa (p <0,001). **Conclusiones e implicaciones para la práctica:** los participantes evaluados demostraron niveles de conocimiento efectivo y baja divergencia entre las categorías, evidenciando que los profesionales están capacitados y preparados, teniendo dominio de los factores relacionados con la evaluación, prevención y clasificación de lesiones por presión en cuidados intensivos después del entrenamiento.

Palabras clave: Capacitación en Servicio; Conocimiento; Enfermería de Cuidados Críticos; Úlcera por Presión; Unidades de Cuidados Intensivos.

Corresponding author:
Carla Andressa Ferreira de Araújo.
E-mail: karllatertuliano@gmail.com

INTRODUCTION

Intensive care is a place where, in most cases, patients with chronic comorbidities are found, making this clientele susceptible to the emergence of Pressure Ulcers (PU), previously known as pressure ulcers. This susceptibility was observed in a large cross-sectional study with secondary data from 7291 patients from 18 Australian hospitals where the prevalence of pressure ulcers in Intensive Care Unit (ICU) patients was 11.5%, compared to patients in non-ICU units (3.0%), with ICU patients 3.8 times more likely to acquire this type of injury.[1]

The European Pressure Ulcer Advisory Panel, the National Pressure Injury Advisory Panel and a Pan Pacific Pressure Injury Alliance (EPUAP/NPIAP/PPPIA)[2] term PU as tissue damage resulting from prolonged pressure on the skin or associated with shear on a bony prominence or device. These injuries are evaluated in stages, indicating the extent of tissue damage, as follows: stage 1, 2, 3, 4; unclassifiable; deep tissue PU, being related to medical devices and mucous membranes.[3]

The occurrence of PU in hospital settings is a worrisome factor for both health authorities and health professionals, especially the nursing staff, who spend most of their time providing direct care to patients.

Recently, in a prospective worldwide study, data from 13,254 patients in 1117 ICUs in 90 countries on six continents were analyzed, including Brazil, noting that living in low to middle-income countries is in itself one of the factors associated with the prevalence of PU, especially because of the unavailability of human and material resources and the fact that the average percentage of gross national income spent on health is less than half (4.9%), compared to high-income countries (10.3%).[4]

It is noteworthy the extreme importance of the nursing team to achieve excellence in care directed to the prevention, evaluation and classification of lesions, for its greater proximity to the patient and for being a constant theme in the curriculum of their training, being a great ally in the prevention of PU. On the other hand, studies showed a deficit of knowledge of the healthcare team on the subject of PU.[5-6]

In this sense, we realize that it is necessary to socialize this knowledge and train the team in order to improve the performance of nursing professionals in the prevention of these injuries.

The creation of teaching strategies and initiatives that integrate the practice, the trainings and the knowledge update of nursing professionals have been gaining prominence nowadays, serving as subsidies that corroborate to establish autonomy and security in the practices performed.[7]

Several instruments are used to evaluate the knowledge and attitudes of health professionals regarding the prevention and treatment of PU,[2] However, not all of them are accessible in Portuguese. One of the validated and available instruments is the Pieper Pressure Ulcer Knowledge Test (PUKT),[8] tool that can be used to evaluate the knowledge of these professionals, implementing quality improvement programs in the prevention, evaluation and classification of PU.

The strategy to evaluate the knowledge of the nursing staff, which is proposed with this study, is part of a broad project for the implementation of multi-professional actions in the prevention of PU in the ICU.

In this perspective, this study aims to evaluate the knowledge of nursing professionals about the assessment, prevention and classification of PU in intensive care before and after a training course.

METHOD

This is a comparative, cross-sectional study, with prospective design, which used a validated instrument for the analysis of the knowledge of the nursing team regarding the prevention, assessment and classification of PU, applied before and after a specific training on the subject.

The study was conducted in an adult ICU, which has ten beds, one for isolation, located in a university hospital in the city of Rio de Janeiro. This unit serves patients with chronic pathologies and has a staff of 16 residents, 16 nurses, and 34 nursing technicians, totaling 66 professionals that make up the nursing team.

The study included the professionals who make up the critical care nursing team, including all professionals, whether hired or permanent, both day and night shift, and residents with more than six months of experience who were working in the unit at the time of the application of the instrument and who had received training on the subject.

Therefore, the sampling of the study was non-probabilistic, by convenience. Thus, of the 66 nursing professionals that make up the team, 55 took the pre-test and 50 individuals took the post-test.

The professionals who met these criteria were invited to participate in the research voluntarily, and the theme was explained, as well as its relevance in clinical practice. For the convenience of the participants and better logistics, the tests and trainings were applied by teams, held then on each day of the week, to contemplate the presence of all members. Thus, of the 66 nursing professionals that make up the team, 55 took the pre-test and 50 individuals took the post-test.

It is worth noting that all professionals who participated in the post-test were required to participate in the pre-test, but this number was reduced in the second stage due to absenteeism, relocation to other sectors, or absence during the entire week in which the data was collected.

This study was based on the PUKT questionnaire, which is an instrument that was validated into Portuguese in 2008,[8] with 41 questions about PU, and that evaluates the knowledge of the Nursing team about its prevention, assessment and classification. This questionnaire has a new, more comprehensive version, which contains 72 items; however, the validated instrument is not available.[9]

The PUKT, originally, is composed of 47 questions, 14 of which about PU assessment and classification and 33 about prevention. The items present in the instrument were based on the questionnaire of Professor Barbara Pieper, from Wayne

State University, co-author of Pieper's Pressure Ulcer Knowledge Test (PUKT).[10] This instrument enables its use in intervention studies, serving as a tool for in-service training to measure nurses' knowledge about PU, a tool that was used in this research.

The priginal study[10] judged that an average of 90% or more correct answers was acceptable for knowledge to be considered adequate, with those items with an average of less than 90% being defined as unsatisfactory. This same criterion was used in this study to analyze the data.

For data collection, the Caliri-Pieper PU Knowledge Test (CALIRI-PIEPER PUKT) was used,[11] based on the PUKT, with adjustments in the term PU, i.e., it is the same instrument, but updated, and it also has 41 items. As the available instrument does not have subdivisions related to the prevention, evaluation, and classification of the PU, we chose to subdivide it into six dimensions[2] considered essential for PU prevention, which are: risk factors and assessment; skin and tissue assessment; preventive skin care; nutritional assessment and treatment; early repositioning and mobilization; and support surfaces.

The answers were also adjusted to true and false, excluding the item I don't know. It is worth mentioning that prior authorization was obtained for the use of the instrument by the author for educational and research purposes.

Data was collected through the development of three successive phases: 1) pre-test, 2) training, and 3) post-test. The collection occurred in the period from July to October 2020 with the participants who met the selection criteria of the study.

The pre-test phase was carried out electronically, applying the Google forms tool, using the PUKT with 41 statements, with true (T) in agreement with the statement or false (F) in disagreement. This phase was carried out in the sector where each participant used a personal cell phone to answer the questionnaire simultaneously with the entire team that was on duty on the day the test was applied, being repeated on other days of the week with subsequent teams.

It is worth mentioning that the participants submitted to the test received the Free and Informed Consent Term (FICT) and were accompanied by the researcher during the completion of the online form to clarify any doubts, if necessary. Each participant had 15 minutes to take the test.

In the second phase, theoretical training was carried out, lasting 20 minutes, in the unit itself, in the morning hours, after receiving the shift with the six nursing teams participating in the study, addressing the main practices evidenced in the literature and based on the main pillars for the prevention of PU, as recommended by the EPUAP, the NPIAP and the PPPIP2. The following items were covered: risk factors and assessment; skin and tissue assessment; preventive skin care; nutritional assessment and treatment; repositioning and early mobilization and support surfaces, as well as pre-test themes.

The third phase consisted in the application of a post-test, performed right after the training with the team, composed of the same items as the pre-test with the purpose of evaluating the understanding and fixation of the theme and the training performed. In this third and last phase, an open question was also inserted in the questionnaire to identify the themes to be addressed in future training sessions, a question not included in the original instrument.

After collection, the data were transported to the Microsoft Excel 2010 program and the spreadsheets were later exported to Stata software, version 15.0, in which the statistical analyses were performed by calculating percentage frequencies for the variables referring to the pre-test and post-test.

The distribution of hits for the items of the instrument was subdivided into six dimensions of the instrument for better understanding and organization of the questions: factors and risk assessment (#2, 3, 7, 16, 26, 27, 40 and 41); skin and tissue assessment (#1, 6, 9, 20, 31, 33 and 38); preventive skin care (#4, 5, 8, 21, 22, 23, 25, 28, 30, 32, 34, 35, 36, 37 and 39); nutritional assessment and treatment (#10); early repositioning and mobilization (#11, 12, 15, 17, 18 and 24) and support surfaces (#13, 14, 19 and 29).

To calculate the score obtained in the pre- and post-test, one point was attributed for correct answers and zero for incorrect answers. Measures of position and dispersion (mean and standard deviation) were calculated to present the mean score obtained by the professional categories in each dimension of the instrument.

In order to evaluate the effectiveness of the intervention, the inferential analysis occurred by applying the ANOVA test (analysis of variance) at a factor (F test) to identify the existence of a statistically significant difference between the scores obtained before and after the training. The test was applied to the general sample, as well as to the variables of interest: professional category, maximum degree, and time of performance. The significance level adopted throughout the analysis was 5%.

To meet the criteria involving research ethics, the project was submitted to the institution's Research Ethics Committee (REC) and the data were collected after approval by REC No. 3,962,997, using the FICT for data collection.

RESULTS

The characteristics of the participants are presented in categories, for later analysis of the group that obtained more knowledge about the theme and better fixation to the training, followed by the post-test, as shown in Table 1.

It was evidenced the predominance of the female gender among the participants, with the prevalence of the age group between 31 and 40 years old, with a preponderance of Nursing technicians, most of them holding a specialist title and with a time of work of less than five years, also approaching the group with more than 20 years of work.

Table 2 lists the questions addressed with the scores on the pre- and post-test, dividing them according to the categories addressed in the questions.

The risk assessment items have two questions with percentage below 90% (03, 16), skin assessment (01, 06, 20, 31, 38), skin care (05, 23, 36), alternating decubitus (15, 17, 18) and support surface (14).

Table 1. Socio-demographic and professional characterization of the participants. Rio de Janeiro, RJ, Brazil, 2020.

Variables	Pre-test (n=55)		Post-test (n=50)	
	N	%	n	%
Sex				
Female	33	60.0	29	58.0
Male	22	40.0	21	42.0
Age group				
20 to 30 years old	15	27.2	16	32.0
31 to 40 years old	19	34.5	15	30.0
41 to 50 years old	12	21.8	12	24.0
More the 50 years old	7	12.7	7	14.0
Not Informed	2	3.6	0	-
Professional categories				
Nurse	16	29.1	10	20.0
Resident Nurse	10	18.2	12	24.0
Nursing Technician	29	52.7	28	56.0
Highest academic credentials				
Technical Nursing Course	17	30.9	19	20.0
Bachelor's Degree	8	14.6	10	40.0
Specialization course	27	49.1	20	2.0
PhD	1	1.8	1	38.0
Not Informed	2	3.6	0	-
Professional Experience Time				
Less than 5 years	19	34.6	18	36.0
Between 5 and 10 years	5	9.1	3	6.0
Between 11 and 15 years	7	12.7	5	10.0
Between 16 and 20 years	10	18.2	7	14.0
Over 20 years old	12	21.8	17	34.0
Not informed	2	3.6	0	-

Source: research database.

The Nursing technicians, among the other professionals, were the ones who presented, with greater frequency, indexes <90%, and this was observed in the results of questions (01, 03, 06, 14, 15, 16, 17, 18, 20, 31, 36, 38), totaling 12 items with a lower percentage in a total of 14 questions that did not reach the goal considered adequate.

The mean difference, considering the scores obtained before and after the training, was statistically significant in the variables analyzed, which corroborates the findings for the general sample. Nursing technicians showed an increase of 3.2 points and nursing residents had the highest scores in the pre- and post-test, as well as the highest increase in knowledge, with a lower standard deviation in the post-test.

Table 3 shows that the effect of the training on the total sample obtained, on average, an increase of 3.5 points in the knowledge level. The average difference between the scores obtained in the pre- and post-test was statistically significant (p<0.001).

The open question included in the questionnaire, aimed at identifying the themes to be addressed in future trainings, brought several suggestions for future topics on PU. Among the suggestions proposed, what drew attention was the consistency of the answers in which 24 participants suggested a training that addressed coverage, such as: a debate about the factors that hinder the adherence of the whole team in the prevention of PU, types of medications or coverage and their use.

The team participated actively in this training, sharing experiences and pointing out the complicating factors encountered

Table 2. Hit rates in the pre- and post-test by professional category. Rio de Janeiro, RJ, Brazil, 2020.

No./ Question	Nurses		Resident Nurses		Nursing technicians	
	Pre-test n(%)	Post-test n(%)	Pre-test n(%)	Post-test n(%)	Pre-test n(%)	Post-test n(%)
Questions about risk factors and risk assessment						
2 - The risk factors for developing PU are: immobility, incontinence, inadequate nutrition, and altered level of consciousness (T)	15 (93.7)	9 (90)	9 (90)	12 (100)	27 (93.1)	28 (100)
3 - All patients at risk for PU should have systematic skin inspection at least once a week (F)	12 (75)	7 (70)	6 (60)	11 (91.6)	13 (44.8)	22 (78.5)
7 - All patients should be assessed on admission to the hospital for risk of developing PU (T)	15 (93.7)	9 (90)	10 (100)	12 (100)	29 (100)	28 (100)
16 - In the patient with the presence or risk of PU, the head end of the bed should not be raised more than 30 degrees if there is no medical contraindication (T)	8 (50)	4 (40)	6 (60)	1 (8.3)	11 (37.9)	10 (35.7)
26 - Every patient who does not ambulate should be submitted to risk assessment for the development of PU (T)	16 (100)	10 (100)	10 (100)	12 (100)	28 (96.5)	28 (100)
27 - Patients and families should be educated about the causes and risk factors for developing PU (T)	16 (100)	10 (100)	10 (100)	12 (100)	28 (96.5)	27 (96.4)
40 - The development of educational programs in the institution can reduce the incidence of PU (T)	15 (93.7)	10 (100)	10 (100)	12 (100)	28 (96.5)	28 (100)
41 - Hospitalized patients need to be assessed for the risk of PU only once during their hospitalization (F)	14 (87.5)	10 (100)	10 (100)	12 (100)	27 (93.1)	28 (100)
Skin and tissue assessment questions						
1 - PU stage/category 1 is defined as intact skin with hyperemia of a localized area, which does not show visible whitening or the color differs from the surrounding area (T)	15 (93.7)	10 (100)	10 (100)	12 (100)	25 (86.2)	23 (82.1)
6 - A stage 3 PU is partial skin loss, involving the epidermis (F)	14 (87.5)	9 (90)	7 (70)	12 (100)	20 (68.9)	22 (78.5)
9 - Stage/category 4 PUs have full thickness skin loss and tissue loss with exposure or direct palpation of fascia, muscle, tendon, ligament, cartilage, or bone (T)	16 (100)	10 (100)	10 (100)	12 (100)	29 (100)	27 (96.4)
20 - Stage 2 PUs have full thickness skin loss (F)	9 (56.2)	6 (60)	8 (80)	11 (91.6)	15 (53.5)	16 (57.1)
31 - PUs are sterile wounds (F)	15 (93.7)	9 (90)	6 (60)	12 (100)	21 (72.4)	24 (85.7)

Source: research database.

Table 2. Continued...

No./ Question	Nurses		Resident Nurses		Nursing technicians	
	Pre-test n(%)	Post-test n(%)	Pre-test n(%)	Post-test n(%)	Pre-test n(%)	Post-test n(%)
33 - A blister in the calcaneal region should not be a cause for concern (F)	15 (93.7)	9 (90)	10 (100)	12 (100)	26 (89.6)	27 (96.4)
38 - Stage 2 PUs can be extremely painful as a result of exposure of the nerve endings (T)	7 (43.7)	10 (100)	3 (30)	11 (91.6)	17 (58.6)	20 (71.4)
Preventive Skin Care Questions						
4 - The use of hot water and soap can dry out the skin and increase the risk for PU (T)	12 (75)	9 (90)	5 (50)	11 (91.6)	20 (68.9)	26 (92.8)
5 - It is important to massage the regions of bony prominences if they are hyperemic (F)	14 (87.5)	8 (80)	8 (80)	12 (100)	16 (55.1)	26 (92.8)
8 - Creams, transparent dressings, and extra-thin hydrocolloid dressings help protect the skin from the effects of friction (T)	15 (93.7)	10 (100)	9 (90)	12 (100)	27 (93.1)	27 (96.4)
21 - The skin of the patient at risk for PU must remain clean and moisture-free (T)	16 (100)	9 (90)	10 (100)	12 (100)	27 (93.1)	28 (100)
22 - Measures to prevent new lesions do not need to be taken continuously when the patient already has PU (F)	16 (100)	9 (90)	10 (100)	12 (100)	28 (96.5)	27 (96.4)
23 - Movable sheets or liners should be used to transfer or move patients who cannot move themselves (T)	14 (87.5)	8 (80)	10 (100)	12 (100)	27 (93.1)	28 (100)
25 - In the patient with a chronic condition who cannot move by himself, rehabilitation should be started including orientation on the prevention and treatment of PU (T)	15 (93.7)	10 (100)	10 (100)	12 (100)	29 (100)	28 (100)
28 - The regions of bony prominences can be in direct contact with each other (F)	15 (93.7)	10 (100)	10 (100)	12 (100)	28 (96.5)	28 (100)
30 - The skin, when macerated by moisture, is more easily damaged (T)	16 (100)	10 (100)	10 (100)	12 (100)	28 (96.5)	28 (100)
32 - A skin region with PU scarring may be damaged more quickly than healthy skin (T)	14 (87.5)	9 (90)	9 (90)	11 (91.6)	29 (100)	26 (92.8)
34 - A good way to decrease the pressure in the heel area is to keep them elevated off the bed (T)	16 (100)	9 (90)	10 (100)	12 (100)	26 (89.6)	27 (96.4)
35 - Every care to prevent or treat PU does not need to be recorded (F)	14 (87.5)	9 (90)	9 (90)	9 (75)	27 (93.1)	28 (100)
36 - Shear is the force that occurs when the skin adheres to a surface and the body slides (T)	14 (87.5)	9 (90)	8 (80)	11 (91.6)	28 (96.5)	25 (89.2)

Source: research database.

Table 2. Continued...

No./ Question	Nurses		Resident Nurses		Nursing technicians	
	Pre-test n(%)	Post-test n(%)	Pre-test n(%)	Post-test n(%)	Pre-test n(%)	Post-test n(%)
37 - Friction can occur when moving the patient on the bed (T)	16 (100)	9 (90)	10 (100)	12 (100)	27 (93.1)	28 (100)
39 - In the incontinent patient, the skin should be cleaned at the time of elimination and at routine intervals (T)	16 (100)	9 (90)	10 (100)	12 (100)	28 (96.5)	28 (100)
Question about nutritional assessment and treatment						
10 - An adequate dietary intake of protein and calories should be maintained during illness/hospitalization (T)	16 (100)	10 (100)	10 (100)	12 (100)	28 (96.5)	27 (96.4)
Questions about repositioning and early mobilization						
11 - Patients who are confined to bed must be repositioned every three hours (F)	15 (93.7)	9 (90)	7 (70)	12 (100)	21 (71.4)	26 (92.8)
12 - A timed bed change schedule should be used for each patient with or at risk for PU (T)	16 (100)	9 (90)	10 (100)	12 (100)	28 (96.5)	27 (96.4)
15 - In the lateral decubitus position, the patient with or at risk for PU should be at a 30-degree angle to the bed mattress (T)	14 (87.5)	8 (80)	9 (90)	11 (91.6)	23 (79.3)	24 (85.7)
17 - The patient who does not move by himself must be repositioned every two hours when sitting in a chair (F)	6 (37.5)	7 (70)	6 (60)	9 (75)	8 (27.5)	17 (60.7)
18 - The patient with limited mobility and who can change body position without help should be instructed to perform pressure relief every 15 minutes while sitting in the chair (T)	11(68.7)	10 (100)	7 (70)	11 (91.6)	17 (58.6)	24 (85.7)
24 - Mobilization and transfer of patients who cannot move by themselves should always be performed by two or more people (T)	15 (93.7)	9 (90)	10 (100)	12 (100)	29 (100)	28 (100)
Support surface questions						
13 - Water or air gloves relieve the pressure on the heels (F)	12 (75)	9 (90)	7 (70)	12 (100)	15 (51.7)	27 (96.4)
14 - Water-wheel or air-wheel cushions help prevent PU (F)	11 (68.7)	9 (90)	6 (60)	11 (91.6)	12 (41.3)	22 (78.5)
19 - The patient with limited mobility and who can remain in the chair should have a seat cushion for the protection of the region of the bony prominences (T)	9 (56.2)	8 (80)	8 (80)	11 (91.6)	28 (96.5)	27 (96.4)
29 - Every patient at risk for developing PU should have a mattress that redistributes pressure (T)	15 (93.7)	10 (100)	10 (100)	12 (100)	28 (96.5)	26 (92.8)

Source: research database.

Table 3. Mean differences between scores obtained in the pre- and post-test by professional variables. Rio de Janeiro, RJ, Brazil, 2020.

Variables	Pre-test score		Post-test score		Mean difference	P Value[‡]
	Mean	SD	Mean	SD		
	34.3	2.5	37.8	2.9	3.5	<0.001
Professional category						
Nurse	34.4	2.4	36.9	4.8	2.5	<0.001
Resident Nurse	34.6	2.4	39.5	1.5	4.9	
Nursing Technician	34.1	2.6	37.3	2.2	3.2	
Highest academic credentials						
Technical Nursing Course	33.8	3.3	37.3	2.3	3.5	
Bachelor's Degree	34.6	2.1	37.8	5.1	3.2	<0.001
Specialization	34.5	1.6	38.4	1.8	3.9	
Doctorate	33	-	34	-	1	
Professional Experience Time						
Less than 5 years	34.1	3	38.3	3.9	4.2	
Between 5 and 10 anos	34.4	1.1	34.6	4.5	0.2	
Between 11 and 15 years	35.5	1.7	38.6	0.5	3.1	<0.001
Between 16 and 20 years	34.7	1.3	38.7	1.1	4	
Acima de 20 years	33.3	2.2	37.1	2	3.8	

‡ One-way ANOVA (F Test); Source: research database.

in practice, also providing more information about the items that had the most errors in the answers in the pre-test in order to remedy the deficiencies presented by the nursing team.

When following the analysis of the answers, other relevant ideas were suggested, such as: leadership involvement; legislation on PU; practical training at the bedside; staging of injuries; correct repositioning of the patient in bed and change of decubitus; motivation of the team for the development of care; survey of the difficulties for the implementation of the PU scales and evaluation of the pH of the PUs.

All participants were instructed to take the post-test only after taking the pre-test, but the questionnaire did not identify the participants by name, i.e., it was not possible to check if those who answered the post-test, in fact, answered the pre-test. Another justification for the difference in the number of participants in the two tests in some categories may be due to errors in filling out the data by some of the participants, since some of them initially had difficulties in handling the instrument by the devices, difficulties that were demonstrated by the group that corresponded to the age range over 50 years.

DISCUSSION

The knowledge about the prevention measures for PU is a basic factor to avoid its appearance, and it is essential that the nursing professionals are updated on the preventive measures and recommendations recommended.[9] The evaluated nursing staff demonstrated satisfactory results in knowledge, with the mean difference between the scores obtained in the pre- and post-test being statistically significant.

The category of residents was the one that obtained the highest mean difference and lowest standard deviation in the post-test, and this fact may be related to the different number of participants in this category, ten in the pre-test and 12 in the post-test. There was also a variation of correct answers between the group with less time of professional experience and those with an average time of professional experience, showing that there is conformity in the knowledge of professionals with little and a lot of experience.

When stratifying the participants' profile, it was noticed that there was a favorable average difference in the group with less time of professional activity, as well as the group with average time of professional activity also had a considerable average and lower standard deviation, showing that there was agreement in the answers between the participants, even those who did not have much experience, unlike another study conducted with nursing professionals in a private hospital, which pointed out a lack of knowledge.[12]

The predominance of the female gender in Nursing is still very present, referring to the historical and cultural factor, in which it is evident that this category is a profession exercised, in its great majority, by the female gender. However, this fact has

been changing over time due to the increase and insertion of the male gender in this professional category.[13]

When observing the data from the questionnaire, 23 questions presented 90% or more correct answers in all categories, with satisfactory results in the other items as well. When making an analogy between this study and previous studies that used the PUKT, it was seen that the study that originated the instrument showed 19 items with more than 90% of correct answers.[10]

Another quantitative study, conducted with 102 nurses, showed that 70% of the participants got less than 70% of the questions right, indicating a deficit of knowledge in the area.[5] On the other hand, a descriptive survey, recently conducted with 26 nurses, pointed out that 74% of the nurses got between 80 and 90% right, demonstrating appropriate knowledge about PUs.[12]

Item number 3, about the frequency of skin assessment, generated many doubts among the professionals, reaching an average of 90% only by the category of residents in the post-test. This fact may be related to the routine that is performed in the sector in which the general skin inspection is performed once a week. However, a study developed with 158 nurses, 49 technicians and 450 nursing assistants showed unsatisfactory levels of answers regarding this item.[9]

Questions 6, 20 and 30, which address the classification of the PUs, presented values below 90% by the evaluated categories, as well as by the professionals in another study[14] which showed that knowledge about the classification and staging of PU is still quite deficient.[15]

Item 16 generated many doubts among the participants, resulting in errors both in the pre and post-test. It is believed that these doubts may be related to the wording of the question, since its negative content induces to error, according to the participants' reports, a fact also mentioned in other studies.[5,9,15]

A descriptive study carried out in a Brazilian intensive care unit indicated that, although the nursing team has knowledge about prevention, staging and risk factors related to the appearance of PU, the size of the staff, material inputs and unhealthy workplaces are factors that hinder the eradication of PU, even with the presence of trained professionals.[16]

Another cross-sectional study, which evaluated public hospitals in the Wollega areas, analyzed the nurses' knowledge, determining the difficulties related to the prevention of PU, and showed a deficit in knowledge, making this the main complicating factor in the prevention process.[17]

Inadequate knowledge about PUs is considered to be one of the main factors resulting in detrimental effects on the methods employed for preventive care. This knowledge, combined with the daily practice of these professionals, should be seen as an important tool for change to be used.[18]

Regarding the various suggestions for future training by the team on the use of dressings, what can be observed, with this requested demand, is that the nurses' view related to PU is still focused on the treatment and management of these lesions, not aiming primarily at prevention and knowledge related to them, which is worrisome, since prevention should be the guiding pillar

of actions in order to avoid, or even eradicate, the appearance of PU.[19]

This can be, then, a guideline for future trainings, having as a theme the awareness of the Nursing team in knowing and prioritizing the PU prevention strategies as a priority factor in combating these damages.

CONCLUSION AND IMPLICATIONS FOR PRACTICE

The knowledge of the nursing staff is of utmost importance for the reduction or even eradication of PU in intensive care environments; the participants evaluated demonstrated effective levels of knowledge and low divergence between the categories, showing that the professionals are trained and prepared, with mastery of the factors related to the assessment, prevention and classification of PU in intensive care before and after training.

The item that allowed the participants to expose their suggestions lists important starting points for setting goals to solve this problem, such as conducting practical training, motivating the team and inserting the leadership and managers in prevention, and these are valid topics that can be used to create further work and tools for change in the fight against PU.

The adherence of the team to participate in the questionnaire and training was adequate; however, future research that addresses bedside practices, merging knowledge, may guide satisfactory outcomes. It is suggested that further research be conducted with this aspect, in addition to the assessment of nurses' knowledge about the prevention of PU.

As limitations of the study, the number of participants included only the ICU nursing team of a single hospital institution and there was no multi-professional approach. It was also not possible to maintain numerical equivalence in the pre- and post-test, which may have contributed to the difference in the final averages in some categories. Another factor was the impossibility of analyzing the incidence of PU before and after training, which could demonstrate the real impact of the approach in the clinical field. As for the test used, it was easy to apply; however, the quantity of 41 questions was something commented as a negative point, because it was considered extensive and tiring to answer.

AUTHOR'S CONTRIBUTIONS

Study design. Carla Andressa Ferreira de Araújo. Sandra Regina Maciqueira Pereira.

Data acquisition. Carla Andressa Ferreira de Araújo. Sandra Regina Maciqueira Pereira.

Data analysis and interpretation of results. Carla Andressa Ferreira de Araújo. Sandra Regina Maciqueira Pereira. Vanessa Galdino de Paula. Josiana Araujo de Oliveira. Karla Biancha Silva de Andrade. Norma Valéria Dantas de Oliveira. Dayana Feital Pimentel. Vanessa Elaine Ferreira de Araújo.

Writing and critical revision of the manuscript. Carla Andressa Ferreira de Araújo. Sandra Regina Maciqueira Pereira. Vanessa Galdino de Paula. Josiana Araujo de Oliveira. Karla Biancha Silva

Knowledge of pressure ulcer prevention
Araújo CAF, Pereira SRM, Paula VG, Oliveira JA, Andrade KBS, Oliveira NVD, Pimentel DF, Araújo VEF

de Andrade. Norma Valéria Dantas de Oliveira. Dayana Feital Pimentel. Vanessa Elaine Ferreira de Araújo.

Approval of the final version of the article. Carla Andressa Ferreira de Araújo. Sandra Regina Maciqueira Pereira. Vanessa Galdino de Paula. Josiana Araujo de Oliveira. Karla Biancha Silva de Andrade. Norma Valéria Dantas de Oliveira. Dayana Feital Pimentel. Vanessa Elaine Ferreira de Araújo.

Responsibility for all aspects of the content and integrity of the published article. Carla Andressa Ferreira de Araújo. Sandra Regina Maciqueira Pereira. Vanessa Galdino de Paula. Josiana Araujo de Oliveira. Karla Biancha Silva de Andrade. Norma Valéria Dantas de Oliveira. Dayana Feital Pimentel. Vanessa Elaine Ferreira de Araújo.

ASSOCIATED EDITOR

Cristina Rosa Soares Lavareda Baixinho

SCIENTIFIC EDITOR

Marcelle Miranda da Silva

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