(UN)KNOWLEDGE OF NURSING TEAM ABOUT NON-INVASIVE BLOOD PRESSURE MEASUREMENT

(DES)CONHECIMENTO DA EQUIPE DE ENFERMAGEM SOBRE A MEDIDA NÃO-INVASIVA DA PRESSÃO ARTERIAL

(DES)CONOCIMIENTO DEL EQUIPO DE ENFERMARÍA SOBRE LA MEDICIÓN NO INVASIVA DE LA PRESIÓN ARTERIAL

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ABSTRACT
Objective: To identify the knowledge of the nursing team on non-invasive blood pressure measurement. **Methodology:** Descriptive study with nurses and technicians from the medical and surgical clinics of a university hospital, using an instrument validated with 12 questions. The results were presented using descriptive statistics (mean, standard deviation, median, relative frequency) and inferential statistics (T-Test and Correspondence Analysis). **Results:** The total average of correct answers was 5.6 ± 1.8 (p$\leq$ 0.684). The knowledge was satisfactory ($\leq$ 60%) only in the questions related to: Customer Preparation for the measurement of Blood Pressure, Professional reading errors and Reading errors related to the device. In Correspondence Analysis, making mistakes was more significant in both professional categories. **Conclusion:** The nursing team has deficits in knowledge about the non-invasive measurement of Blood Pressure, requiring training and systematic training on the topic.
Descriptors: Blood Pressure Determination; Knowledge; Nursing, Team; Nursing Assessment.

RESUMO
Objetivo: Identificar os conhecimentos da equipe de enfermagem sobre a medida não-invasiva da Pressão Arterial. **Metodologia:** Estudo descritivo com enfermeiros e técnicos das clínicas médica e cirúrgica de um hospital universitário, utilizando instrumento validado com 12 questões. Os resultados foram apresentados mediante estatística descritiva (média, desvio padrão, mediana, frequência relativa) e inferencial (Teste-T e Análise de Correspondência).
Resultados: A média total de acertos foi 5,6 ±1,8 (p$\leq$ 0,684). O conhecimento foi satisfatório ($\leq$60%) somente nas questões relacionadas a: Preparo do Cliente para a medida da Pressão Arterial, Erros de leitura do profissional e Erros de leitura relacionados ao aparelho. Na Análise de Correspondência, errar foi mais significativo em ambas categorias profissionais. **Conclusão:** A equipe de enfermagem possui déficits no conhecimento sobre a medida não-invasiva da Pressão Arterial, sendo necessários a capacitação e treinamento sistemático sobre o tema.
Descritores: Determinação da Pressão Arterial; Conhecimento; Equipe de Enfermagem; Avaliação em Enfermagem.

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RESUMEN

Objetivo: Identificar los conocimientos del equipo de enfermería sobre la medición no invasiva de la presión arterial. **Metodología:** Estudio descriptivo con enfermeros y técnicos de las clínicas médica y quirúrgica de un hospital universitario, utilizando un instrumento validado con 12 preguntas. Los resultados se presentaron mediante estadística descriptiva (media, desviación estándar, mediana, frecuencia relativa) y estadística inferencial (prueba T y análisis de correspondencia). **Resultados:** El promedio total de aciertos fue de 5,6 ± 1,8 (p≤ 0,684). El conocimiento fue satisfactorio (≤60%) solo en las preguntas relacionadas con: Preparación del paciente para la medición de la presión arterial, errores de lectura profesional y errores de lectura relacionados con el dispositivo. En el Análisis de Correspondencia, cometer errores fue más significativo en ambas categorías profesionales. **Conclusión:** El equipo de enfermería presenta déficits en el conocimiento sobre la medición no invasiva de la Presión Arterial, necesita capacitación y entrenamiento sistemático en el tema.

Descriptores: Determinación de la Presión Arterial; Conocimiento; Equipo de Enfermería; Evaluación en Enfermería.

INTRODUCTION

The measurement of Blood Pressure (BP) aims to obtain reliable values that help to determine the patient's general health status, in addition to guaranteeing subsidies for a possible intervention, when necessary.[1]

Nursing professionals are responsible for controlling the vital signs of patients in health services, among which we highlight the non-invasive measurement of BP, being the nurse's responsibility to perform and/or supervise the measurement of BP in a standardized way with the scientific literature, detecting and intervening in cases of change in blood pressure values, especially in patients diagnosed with systemic arterial hypertension.[2]

The main sources of BP measurement errors are related to the technique adopted by the professional, the size of the cuff used and the patient's psychophysiological conditions, which interfere with BP values.[3.1]

The possible causes of errors in BP measurement may be associated with the knowledge of professionals, which is considered unsatisfactory, since the incorporation of routines on the technique of monitoring vital signs has been identified in the health service, and that neither are always in accordance with current guidelines.[4]

Assess the knowledge of health professionals about the necessary care to measure error-free BP it is essential, especially for the nursing team that is responsible for performing this procedure in the daily routine of institutions, to ensure proper treatment and care for the patient.[3-4]

In this perspective, the aim of this study is to identify the knowledge of the nursing team about the non-invasive measurement of BP.

METHODS

This is a descriptive study, carried out with nurses and nursing technicians, from the medical and surgical clinics of a university hospital of reference in professional training, located in the city of Manaus-AM, from February to June 2016.

The target population of the study consisted of 97 nursing professionals who worked in both clinics of the health service.

The sample was by convenience, consisting of 58 professionals who agreed to participate in the study. Of these, 16 are nurses and 42 are nursing technicians.

For data collection, we carried out a prior survey of professionals in their respective shifts, with the institution's nursing division. After the invitation and signing of the Informed Consent Form (FICF), the participants were sent to a quiet environment, in which the researcher remained distant, allowing them to respond freely and with attention to the 12 questions of the validated instrument. 5-6

To meet the demand for knowledge assessment, the content validation of the instrument used was performed, submitted to the evaluation of 27 judges, professors in the discipline of semiology and/or semiotechnics, with at least one year of experience in this area, consisting of 12 questions . To verify the level of agreement and consistency, the Kappa Index (K) and Content Validity (CVI) were used, whose values were respectively 0.94 and 0.97, considered an optimal level of agreement between the judges. The study showed that the knowledge assessment questionnaire on BP measurement is valid in terms of its content, featuring an objective and clear tool for the assessment both with students and with health professionals.[5-6]

All participants were informed that each question in the instrument had only one correct alternative and were related to the actions that the professional must perform before, during and after the BP measurement.

To measure the performance obtained by the professionals, each answer was evaluated as right or wrong, being considered a satisfactory level of knowledge to have got at least 60% of the 12 questions right. This percentage was adopted based on the assessments carried out in Brazilian universities, which adopt approval levels between 50 and 70%.

The data collected for this study were organized, described and analyzed in the statistical program *Statistical Package for Social Sciences* (SPSS) version 21.Categorical variables were expressed as relative frequency. For numerical variables, normality and type of distribution were tested using the Kolmogorov-Smirnov method. In non-normal distribution variables (training and service time), the results were expressed in relation to the median, first and third quartiles. For the numerical variables of normal distribution (age, total hits overall and by category) there was a comparison by means of the T-Test analysis and the results were expressed as mean and Standard Deviation (SD) and discussed, considering a $p < 0.05$. In the exploratory analysis of the answers to the questions, Correspondence Analysis was applied.

This study was approved by the Research Ethics Committee of the Federal University of Amazonas (UFAM) on December 14, 2015, with number CAEE51303115.6.0000.5020 and opinion 1.366.478. The research was conducted according to the required ethical standards.

RESULTS

The highest percentage of professionals in the study were nursing technicians (72.4%). Two-thirds of the participants were female and 58.6% worked in the institution's Medical Clinic. The mean age of the sample was 38.2 ± 9.0 years. The average training time of professionals was 11.8 ± 7.4 years, with length of service at the clinic 7.1 ± 8.5 years.

The total mean of correct answers for both professional categories in the instrument was 5.6 (±1.8) points. In the analysis by professional category, it was found that nurses had a mean score similar to that of nursing technicians, with 6.2 (±1.5) and 5.4 (±1.8), respectively, with no significant difference between them (p≤ 0.684).

Table 1 shows the percentage of correct answers of nursing professionals in each question, regarding the theoretical knowledge of the BP measurement they have.

Table 1 -Percentage distribution of correct answers by the nursing staff of a university hospital regarding knowledge about the non-invasive measurement of blood pressure. Manaus, Amazonas, Brazil, 2016.

| QUESTIONS	CORRECT ANSWERS (%) N=58
Customer Preparation for Blood Pressure Measurement	81.0
Professional reading errors	79.3
Device-related reading errors (sphygmomanometer and stethoscope)	62.1
Arteries Used During Blood Pressure Measurement	53.4
Definition of Blood Pressure	51.7
Nursing Record	50.0
Korotkoff Sound Characteristics	44.8
Blood Pressure Overestimation Factors	32.8
Estimation of Blood Pressure by Palpatory Method	32.8
Width and length of the cuff bag	29.3
Care during the Auscultatory Method	24.1
Materials needed to measure Blood Pressure	22.4

Source: Authors' Data

With regard to correct answers, the nursing team had satisfactory knowledge (≥ 60%) only in the questions related to: Customer Preparation for Blood Pressure Measurement, Professional Reading Errors ee Device-related reading errors (sphygmomanometer and stethoscope).

In the exploratory data analysis, the instrument's questions were individualized through Correspondence Analysis, considering the errors and successes noted by the participants, as shown in Figure 1. This analysis allowed us to identify that there was a greater association with the questions, whose percentage of error was higher, regardless of the professional category. While for the correct answers, there was only association in the first three questions, also in both categories.

Figure 1 -Correspondence Analysis of Errors and Successes of the Nurse and Nursing Technician categories. Manaus, AM, Brazil, 2018.
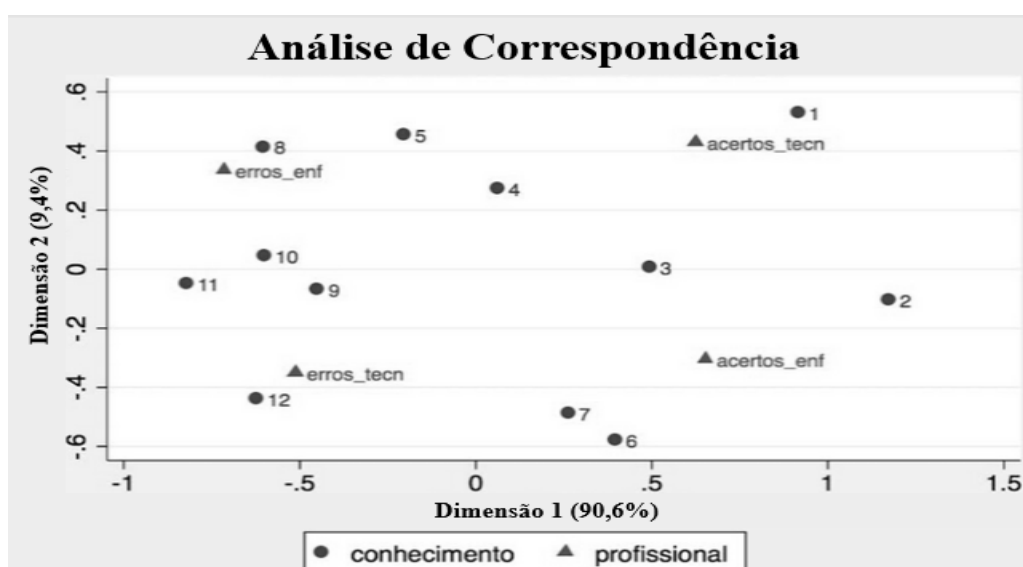
Source: Authors' data.

DISCUSSION

Although this study was carried out with the nursing staff of a teaching hospital, the identified knowledge weaknesses indicate the need for constant training and qualification of the nursing staff. Procedures must be performed in a standardized manner, based on the best scientific evidence, even if they are routine and simple to perform, as is the case with the BP measurement.

We noted that the percentage of men was significant when compared to other studies carried out with nursing professionals. When considering the average age, we can affirm that the participants involved were young adults, with long training time, but recently hired at the institution.

With regard to performance, we found that the professionals' knowledge gaps about the correct BP measurement might be the result of weaknesses in professional training. In this sense, the implementation of

the Standard Operating Procedure (SOP) in the service, with systematic training, can positively affect the knowledge and skills of professionals to perform the BP measurement properly.

In the investigated group, we observed that the professional category does not seem to have influenced the knowledge about the BP measurement, even though the difference in training time of undergraduate nursing courses with that of nursing technicians, have different workloads, being, respectively 3500 and 1800 hours.[7-8]

In this perspective, a study aimed at characterizing the theoretical-methodological approaches regarding the process of training nurses, showed a strong influence on professional practice, directly influencing the quality of health care provided by it. [9] Another, carried out with nurses from the interior of São Paulo, pointed out that 73% of respondents claim that the profile of nursing technicians did not meet the institution's care demands,

identifying, among other deficiencies, in the nursing care indicated to the basic needs of the patient. 10

The theme of BP measurement is included in the syllabus of specific disciplines, since the first periods of the undergraduate nursing course, allowing for the improvement of the technique in different contexts of learning. Although the procedure is relatively simple and is part of the daily life of health units, it is important that the student develop not only technical skills, but just as important, improve their competence in evaluating the purpose of each step of the procedure, interpreting blood pressure values together with other vital signs, in order to ensure an adequate assessment of the patient's clinical conditions.[11]

Regarding the weaknesses observed during BP measurement, a recently published study with nursing students pointed out that 40 (100%) of them did not guide the patient about the procedure and the values obtained, nor did they use the palpatory method to estimate the pressure. systolic; 38.8 (97%) did not previously certify the patient's condition in the last 30 minutes; 37.2 (93%) did not measure arm circumference; and 35.2 (88%) did not perform hand hygiene, before and after the measurement.[12]

With regard to performance related to daily practice, we found that professionals have a lack of knowledge regarding BP measurement. Despite this, they recognize that knowledge gaps contribute to misinterpretation of blood pressure values,

given the high percentage of correct answers in the question about "Factors related to the observer that contribute to reading errors".

Another relevant aspect is attributed to the questions that sought to assess the knowledge of professionals regarding the measurement of BP itself, whose percentage of errors was high, for example, recognizing: the characteristics of the sounds of Korotkoff, the BP overestimation factors, the dimensions of the cuff pocket and the need to estimate the systolic pressure through the Palpatory Method, as well as to measure the arm circumference to choose the cuff.

In a research aimed at characterizing the theoretical knowledge of intensive care nurses about BP measurement, it showed that their best performance was related to questions related to cardiac physiology, with a percentage of correct answers higher than 60%. Regarding the weaknesses, this study showed that the questions about: the proper calibration of the device, the frequency of the sounds heard, the best part of the stethoscope for the auscultation of sounds and the adequate width of the cuff, were the answers that presented a percentage of unsatisfactory hit.[13]

In an emergency coronary care unit, it was pointed out that the theoretical level of nursing professionals on the steps of BP measurement was far from that recommended by the Brazilian Guidelines on Hypertension in force at the time. The study showed that the main deficits of the team were: the client's position during the measurement, periodic calibration of the devices, choice of the cuff according to the

brachial size, information in the medical record about which member the BP was measured, as well as the recording of values pressure without rounding.[14]

When comparing the results found in our study, we found that the weaknesses were similar, indicating that the lack of knowledge about this essential technique for the qualification of care is repeated in various hospital environments, from those whose patients require minimal and intermediate care, to those requiring semi-intensive and intensive care.

In correspondence analysis, we can see that there was a greater association between both professional categories and the questions with the highest percentage of error. The reason for the observer's failures are related to the observer's lack of knowledge and doubts about the theoretical-practical and anatomical-physiological aspects that involve the BP measurement.[4]

The lack of knowledge about the BP measurement compromises the quality of care, as all the steps are essential for the reliability of the results. It also implies in the precarious favoring of blood control, in the inadequate classification of BP, in the issue of erroneous diagnoses of arterial hypertension and in unnecessary drug treatment.[1,15-16]

In this logic, we understand that evaluating knowledge about procedures and techniques adopted in daily life provides professionals with a better reflection on their practices, questioning whether these are based on scientific evidence or merely influenced by the routine conditions present in the work environment.

Another relevant point in our study was the similarity in the performance of nurses and nursing technicians, when answering the instrument's questions, indicating that the educational approach to discussing the weaknesses of knowledge, as well as technical improvement, can be the same for both professional categories.

In order to avoid errors in reading and interpreting blood pressure values during health care, the scientific community suggests alternatives that positively impact the performance of professionals, namely: development of initiatives aimed at continuing education every six months on execution BP measurement, with discussion of clinical practice; supply of devices recommended by the literature for professional practice; standardization of the technique, as recommended by the current national guideline; and welcoming new hires with specific guidelines regarding the PA measure.[15,17-18]

In the field of professional training, undergraduate and nursing technician courses need to promote constant articulation between theory and practice, in order to facilitate the development of skills and competences to measure BP and ensure greater precision in blood pressure values.[10-11] Another proposal is the use of active methodologies, which can improve the technical-scientific knowledge of AP, since the professional's profile, as well as the quality of their care, are directly or indirectly

influenced on the way in which the teaching-learning process took place.[9,12]

CONCLUSION

The nursing staff in units that require minimal and intermediate care, such as the medical and surgical clinics, showed deficits in knowledge about the correct measurement of non-invasive blood pressure, as well as in intensive and semi-intensive care units.

In this perspective, we highlight the importance of systematic training and qualification activities for the entire nursing team on the subject. In addition to the establishment of SOP that can contribute to the non-invasive measurement of BP based on theoretical assumptions recognized by the scientific community.

The low percentages of nurses' participation were limitations of this study, preventing an assessment by professional category. This suggests the need to understand Nursing Assessment in health services, in its formative and essential nature for planning, rather than bureaucratic or punitive.

Future studies on the subject are needed from a diagnostic perspective, expanding to other health environments and in educational institutions, involving the knowledge of students from nursing courses at both the secondary/technical and undergraduate levels, should be encouraged, with the intention to reveal the effectiveness of the teaching methods about the BP measurement procedure applied in disciplines such as semiology and semiotechnics.

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