

# Nurses of adult intensive care unit: evaluation about direct and indirect blood pressure measurement\*

ENFERMEIROS DE UNIDADE DE TERAPIA INTENSIVA ADULTO: AVALIAÇÃO SOBRE MEDIDA DIRETA E INDIRETA DA PRESSÃO ARTERIAL

ENFERMEROS DE UNIDAD DE TERAPIA INTENSIVA ADULTOS: EVALUACIÓN SOBRE MEDICIÓN DIRECTA E INDIRRECTA DE LA PRESIÓN ARTERIAL

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## ABSTRACT

This is a descriptive and cross-sectional study with the aim to evaluate and self-evaluate the knowledge of nurses from adult Intensive Care Units about direct and indirect blood pressure measurement. Fifty-four nurses from three Intensive Care Units were approached. They answered a self-administered questionnaire with 65 questions (40 related to blood pressure). Nurses had insufficient performance on the test that assessed knowledge (average score 4.6). Half of the sample felt dissatisfied with their knowledge about blood pressure. After answering the questionnaire the subjects self-rated their knowledge as regular (48.2%), bad (27.8%) and poor (9.3%) indicating they are aware of the importance for the subject to practice. The results show the need of urgent implementation of continuing education for this sample, since they are professionals who work directly with a priority vital sign on care to critical patients.

## DESCRIPTORS

Blood pressure  
Blood pressure determination  
Intensive Care Units  
Nursing care  
Knowledge  
Self-assessment

## RESUMO

Estudo descritivo e de corte transversal que teve como objetivo avaliar e autoavaliar o conhecimento de enfermeiros de Unidades de Terapia Intensiva adulto sobre medida direta e indireta da pressão arterial. Foram abordados 54 enfermeiros de três Unidades de Terapia Intensiva. Foi aplicado um questionário auto respondido com 65 questões (40 relacionadas à pressão arterial). Os enfermeiros apresentaram desempenho insuficiente no teste que avaliou conhecimento (nota média 4,6). Metade da amostra sentiu-se pouco satisfeita com relação ao que sabe sobre pressão arterial. Após responder o questionário os sujeitos autoavaliaram seu conhecimento como regular (48,2%), ruim (27,8%) e péssimo (9,3%), manifestando estarem conscientes em relação à importância do assunto para a prática. Os resultados do estudo mostram a necessidade de realização urgente de atividades de educação continuada para esta amostra, visto que são profissionais que atuam diretamente com um sinal vital prioritário no cuidado ao paciente crítico.

## DESCRITORES

Pressão arterial  
Determinação da pressão arterial  
Unidades de Terapia Intensiva  
Cuidados de enfermagem  
Conhecimento  
Autoavaliação

## RESUMEN

Estudio descriptivo y transversal que objetivó evaluar y autoevaluar el conocimiento de enfermeros de Unidades de Terapia Intensiva adultos sobre medición directa e indirecta de la presión arterial. Fueron consultados 54 enfermeros de 3 Unidades de Terapia Intensiva. Se aplicó cuestionario de auto-respuesta con 65 preguntas (40 relacionadas a presión arterial). Los enfermeros no mostraron suficiencia en el examen que evaluó el conocimiento (nota promedio 4,6). La mitad de la muestra se sintió poco satisfecha en relación a sus conocimientos sobre presión arterial. Luego de responder el cuestionario, los sujetos autoevaluaron su conocimiento como regular (48,2%), malo (27,8%) y pésimo (9,3%), manifestando ser conscientes respecto a la importancia del tema para la práctica. Los resultados expresaron la necesidad de urgentes actividades de capacitación continua para la muestra, visto que son profesionales que actúan directamente con un signo vital prioritario en el cuidado del paciente crítico.

## DESCRIPTORES

Presión arterial  
Determinación de la presión sanguínea;  
Unidades de Cuidados Intensivos  
Atención de enfermería  
Conocimiento  
Autoevaluación

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## INTRODUCTION

The performance of the technique of Blood Pressure (BP) measurement without error is one of the essential requirements for obtaining reliable values and it constitutes a challenge<sup>(1)</sup>, primarily for the nursing team who deal with patients in critical condition<sup>(2)</sup>, because the accuracy is essential for correct diagnosis and appropriate decision making<sup>(3-4)</sup>.

Although nursing professionals are the most familiar with this type of measurement<sup>(4)</sup>, studies show the performance of the procedure incorrectly<sup>(4-6)</sup>. Errors or omission of basic care during BP measurement are documented in national and international studies for over two decades<sup>(2,4-8)</sup>. These errors may be related to unfamiliarity or outdated knowledge of <sup>(1-2,5,8)</sup> the technique of BP measurement, which, often, has been studied by the nurses for the last time at the undergraduate level<sup>(9-10)</sup>.

The nurses who work in the Intensive Care Units (ICU) need a highly qualified and differentiated knowledge of the techniques and handling of the devices available there<sup>(11-12)</sup>, so they can provide safe care, as well as train their team regarding the correct procedure. The main feature of the patient in the ICU is the severity of his health condition, requiring direct care, specialized and continuous, from the nursing team<sup>(13)</sup>.

Being the BP measurements one of the procedures carried out by nursing team in the ICU, it is the nurse, responsible for this team, knowing the basic concepts involved in the physiology of BP<sup>(14)</sup>, the devices and methods (direct and indirect) of measurement available for its measurement, and the factors that can cause measurement errors related to the patient and the environment, the technique, the devices and the observer<sup>(6,15-18)</sup>, so the nurse can then hold and guide his or her team as the importance of the correct technique for ICU.

Concerned with the number of available studies about measurement errors in BP<sup>(1,4,7)</sup>, with the gaps in the theoretical and practical knowledge of nurses on the subject<sup>(3,5,9)</sup>, and with the lack of studies in the area of adult intensive care<sup>(2,8)</sup>, we chose to perform this study, which aimed at characterizing the theoretical knowledge of nurses who work in adult ICU about methods (direct and indirect) and BP measurement, and evaluate the satisfaction of nurses regarding the knowledge they have of methods and BP measurement in adult ICU.

## METHOD

This was a quantitative, descriptive and cross-sectional study, developed in three adult Intensive Care Units of

three public and teaching hospitals in the interior of São Paulo from July to December 2010. The choice of the hospitals was given by their importance and reference for its local community and the region, in addition to they are large hospitals that meet the diverse pathologies, maintainers of professional development courses, and they have their clientele coming from the Unified Health System (SUS).

The study was conducted after approval of the institutions and board of directors of the sectors, and approval of the Ethics and Research Committee - CEP of the involved institutions (Opinion N ° 1183/2009 and No. 027/2010).

All nurses of the three ICU were invited to participate in the study, except those who were on vacation or maternity leave during the period of data collection. Thus, 64 individuals were approached, with refusal to participate by ten, which resulted in a sample of 54 nurses. All agreed to participate in the study, after signing the Free and Informed Consent Form (FICF). There were selected nurses of both sexes, from the three work shifts, independent of time of formation and performance in the ICU.

For data collection it was used a self-administered questionnaire with 65 questions, developed by the researchers and validated by five judges, about their content and appearance. The questions were distributed as follows: 19 relating to the characterization of the subject, 40 to knowledge of methods and BP measurements, which were divided into six domains D1-D6 (D1-five questions concerning the physiology of BP, D2-five related to BP measurement, D3-five related to instruments used during the measurement, D4-five about the methods of BP measuring, D5-ten questions addressing the indirect method and D6 - ten questions about the direct method) and six regarded to self evaluation. The time to respond the questionnaire, without interruptions, was approximately 30 minutes.

The subjects were approached by the researcher at the beginning of their work shift and invited to participate in the study. The author explained the study, took the consent of the subject, through the signing of FICF, and handed him an envelope containing within it a copy of the questionnaire, an instruction sheet to answer it, a blue ballpoint pen and an adhesive sticker to seal the envelope to finish it.

The researcher remained in the sector/institution throughout the shift on duty to remove the doubts of the subject, if there were any. The subjects answered to the questionnaire during their routine work and delivered the instrument in a sealed envelope to the researcher as soon as they finished answering it or by the end of their shifts, regardless of having answered it or not. There were held 25 visits, during the period of data collection, in order to recruit as many subjects as possible in the three institu-

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tions. Due to the fact that the researcher attended the same site data collection more than once, the subjects were told in the initial approach to not comment about the contents of the instrument with other colleagues, since the variable assessed was about precise knowledge of a particular subject.

Data were entered in a spreadsheet and analyzed using SAS software version 9.1.3. Descriptive analysis was performed through measurements of position and dispersion, and it was used the tests: Student's t-test, Bhapkar and the Spearman coefficient. It was considered the statistical significance level of 5% or  $p < 0.05$ .

## RESULTS

### *Socio-demographic characteristics, formation and professional performance of the studied population*

The study included 54 intensive care nurses. Of these, 47 (87.0%) were female. The subjects' age ranged from 23 to 55 years with an average of 35.9.

Regarding formation, 20 (37.0%) subjects had auxiliary or technician nurse course. Twenty-four subjects (44.4%) obtained their formation at public institutions and 30 (55.6%) in private institutions. The performance as a nurse ranged from four months to 30 years (mean =  $127.6 \pm 97.4$  months) and time since they finished the graduation course from six months to 30 years (mean =  $132.1 \pm 97.0$  months). It was not found any association between duration of formation ( $r = -0.25$ ,  $p = 0.064$ ), time of performance ( $r = -0.26$ ,  $p = 0.052$ ) and performance in the test.

Concerning training in postgraduate (PG) - lato sensu, stricto sensu and improvement, 40 (74.1%) subjects have specialization course, seven (13.0%) masters degree, six (11.1%) perfecting course, six (11.1%) residence and three (5.6%) doctorate. Only 15 of them (27.5%) had information about BP measurement during the course of PG.

The professional practice of the subjects in the studied institutions varied greatly. The performance in hospitals in

the study ranged from one month to 27 years. The performance time in both ICUs generally as current ICU ranged from one month to 23 years and seven months. As for the type of work of the nurses, 47 (87.0%) were assistance.

### *Sources of knowledge of the subjects about BP before answer the questionnaire*

The first contact with the procedure of BP measurement occurred with 34 (63.0%) subjects in the graduation course and 20 (37.0%) in the technical course. As for the guidance received in the work sector about BP measurement, only 12 (22.2%) subjects received them, with emphasis on the handling of monitors and monitoring system of invasive BP.

As the sources of obtaining knowledge of BP, it was given important emphasis to the undergraduate, cited by 50 (92.6%) subjects, followed by readings (68.5%), professional practice (50.0%), technical course (33.3%), specialization (27.8%), events (20.04%), other non-nurse professionals (18.5%), courses about the subject (11.1%), and doctorate (1.9 %).

### *Self-assessment of knowledge before answering the questionnaire*

The subjects were asked about their self-concept (excellent/good/regular/poor/very poor) in relation to their theoretical and practical knowledge of BP. Most subjects conceptualized themselves as good both in theory (74.1%) as in practice (70.4%), two (3.7%) as excellent in theory, and seven (13.0%) in practice, 12 (22.2%) considered themselves regular in theory and seven (13.0%) regular/poor in practice. No subject is self-conceptualized as poor or very poor in theory and none of them are self-conceptualized as very poor in practice. Two subjects (3.7%) do not self-conceptualized in practice.

### *Questionnaire about methods and measurement of Blood Pressure*

After application of questionnaire, it was observed the results shown in Table 1.

**Table 1** - Percentage and number of correct answers in the test of knowledge of methods and measurement of blood pressure by the domains of the questionnaire - Campinas, 2010.

Percentage of hit by domains (D1-D6*)	D1 Physiology of BP n=54	D2 Measurement of BP n=53	D3 Used devices n=53	D4 Methods of BP measurement n=52	D5 Indirect methods n=51	D6 Direct method n=52
%	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
00	-	05(9.4)	03(5.7)	-	-	-
10	-	-	-	-	08(15.7)	-
20	04(7.4)	14(26.4)	20(37.7)	06(11.5)	11(21.6)	01(1.9)
30	-	-	-	-	15(29.4)	01(1.9)
40	16(29.7)	18(34.0)	15(28.3)	13(25.0)	07(13.7)	06(11.5)
50	-	-	-	-	06(11.8)	05(9.6)
60	20(37.0)	09(17.0)	12(22.6)	20(38.5)	04(7.8)	14(26.9)
70	-	-	-	-	-	12(23.1)
80	10(18.5)	04(7.5)	03(5.7)	13(25.0)	-	07(13.5)
90	-	-	-	-	-	04(7.7)
100	04(7.4)	03(5.7)	-	-	-	02(3.9)
SI**	-	01	01	02	03	02

\*D1-D6 – domains 01 to 06; \*\*SI – No information; Note: n=54

As for the scores assigned in areas D1 to D4, which had five questions, each correct answer received 20%. In areas D5 and D6, with ten questions, it was awarded 10% per correct answer. The average number of correct answers (questions) per domain was 2.9 to D1, 2.0 questions to D2, 1.8 to D3, 2.8 to D4, 3.0 questions to D5, and 6.4 to D6.

The cardiac physiology, the first domain evaluated (D1), is one of the important points to the work of nurses in this area. In this domain, 62.9% of the sample had a score higher than 60%.

There was a significant deficit in the knowledge of these subjects in relation to instruments used (D3) at the time of BP measurement, since only 28.3% of them had recovery of 60% or more. The presented questions were related to instrument calibration, frequency of auscultation

sounds, the better part of the stethoscope to perform auscultation and proper cuff width.

Methods of BP measurement (D4) - 63.5% of the sample showed performance superior to 60%. The maximum score achieved in an indirect measuring method (D5) was 60% from only four individuals (7.8%) and more frequent were 30%, from fifteen subjects (29.4%). The domain direct method (D6) showed the best performance, accounting 75.1% of the correct answers above 50%.

Most subjects showed discontent regarding their knowledge of the subject matter, when delivering the questionnaire, even before the test was corrected. The table 2, among other parameters, shows the self-assessment of the subjects after answer the questionnaire.

**Table 2** - Theoretical and practical marks assigned to the nurses after answer the questionnaire, marks of the importance of the subject in ICU and performance marks of answering the questionnaire about the methods and measure of BP - Campinas, 2010

Marks	Average (SD)	Med	1st Q	3rd Q	Min	Max
Theory	4.50 (2.20)	5.00	4.00	6.00	0.00	8.00
Practice	5.50 (2.50)	6.00	4.00	7.00	0.00	8.50
Importance	8.20 (3.30)	10.00	8.00	10.00	0.00	10.00
Questionnaire*	4.60 (1.30)	4.60	4.00	5.40	0.75	7.25

\* It was assigned 0.25 to each question: Number of hits X 0.25=MARK; Note: n=54

### Self-evaluation after answer the questionnaire

After answering the questionnaire, the subjects answered a questionnaire with Likert scale type questions regarding their satisfaction with their knowledge about BP measurement, with the following endpoints: totally dissatisfied and totally satisfied. No subject felt totally satisfied, four (7.4%) considered themselves satisfied about what they know about BP, 27 subjects (50%) were some-

what satisfied, 14 (26%) dissatisfied and six (11. 1%) completely dissatisfied. Three subjects (5.5%) did not answer this question.

Also in the subject self-evaluation after answering the questionnaire, they were able to self assign notes and evaluation. These data are presented in Table 3 and show that the self-concepts pre and post test were radically altered.

**Table 3** - Comparison of initial theoretical self-evaluation with the theoretical self-evaluation after answering the questionnaire - Campinas, 2010

Concept	Initial theoretical self-evaluation		Final theoretical self-evaluation	
	N	%	N	%
Excellent	02	3.7	01	1.9
Good	<b>40</b>	<b>74.1</b>	<b>04</b>	<b>7.4</b>
Regular	12	22.2	26	48.2
Poor	-	-	15	27.8
Very poor	-	-	05	9.3
NR*	-	-	03	5.6

\*NR - Did not respond ;Note: n=54

Regarding theoretical notes and evaluations auto assigned by subjects after the test, it was created a scale of correspondence between both variables, after the analysis of the authors. The auto assigned marks were compared to the evaluations auto assigned by subjects, yielding the following ranges of grades: excellent (8.0 to 10.0), good (7.0 to 7.9), regular (5.0 to 6.9), poor (3.0 to 4.9) and very poor (0.0 to 2.9).

Regarding the marks of test performance, it was added the number of correct answers and multiplied by 0.25. The score of each subject was compared to the self-reported evaluation and to the developed scale, obtaining the average of the marks of each concept (excellent-very poor), presented in Table 4.

**Table 4** - Tracks of marks of the auto assigned evaluation and performance on the test of knowledge about BP measurement - Campinas, 2010

Evaluation (range)	n (%)	Average Hits	Note Average	Note Minimum	Note Maximum
Excellent (8,0-10,0)	01 (1.9)	27.00	6.75	-	-
Good (7,0-7,9)	04 (7.4)	21.50	5.37	4.50	6.50
Regular (5,0-6,9)	26 (48.2)	18.50	<b>4.61</b>	2.75	7.00
Poor (3,0-4,9)	15 (27.8)	19.80	4.95	3.75	7.25
Very poor (0,0-2,9)	05 (9.3)	17.60	4.40	3.50	4.75
NA*	03 (5.6)	4.50	1.12	0.75	2.25

\*. NA = not answered - not assigned evaluation after the test; Note: n=54

Despite the consciousness of some subjects, the results are still troubling, since there are nurses caring for critically ill patients who conceptualize themselves as good and they answered correctly an average of 21.5

questions (of a total of 40) on a specific test for their area of operation. The changing of pre-and post-test evaluation (Table 5) put the sample in a position even worse than the initial one.

**Table 5** - Comparison of evaluations self-attributed to the theoretical and practical knowledge of BP measurement in pre-and post-test - Campinas, 2010

Pre	Post			
	Good/Excellent	Regular	Poor/Very Poor	Did not answer
<b>THEORETICAL</b>				
Good/Excellent	05 (11.9)	20 (47.6)	15 (35.7)	02 (4.8)
Regular	-	06 (50.0)	05 (41.7)	01 (8.3)
<b>PRACTICAL</b>				
Good/Excellent	18(40.0)	21 (46.7)	05 (11.1)	01 (2.2)
Regular	-	04 (57.1)	02 (28.6)	01 (14.3)

p<0,0001 (Bhapkar Test);Mark: n=54

The subjects demonstrated interest in actualizing in relation of their need of training about BP measurement, with the greatest needs being related to the physiology of BP (46.3%), measurement methods (40.7%), indirect methods (37.0%) and all domains, cited by 33.3% of the sample. Among the causes for the need to conduct training in the sector, those that were highlighted were: subject not covered adequately in undergraduate course (9.3%), aspects approached in the questionnaire interfere in the correct measurement (11.1%), improvement of scientific practice (14.8%) and improvement of their knowledge and review the theory (20.3%).

## DISCUSSION

As in other studies realized with nurses, most of the subjects were female and worked directly in patient care. The fact that nurses possess formation in public or private institutions did not interfere with their performance in the test ( $p = 0.240$ ). This may mean that universities are teaching the BP measurement with similar methodology,

which needs to be reviewed, once it was in the undergraduate level that most subjects (63%) had their first contact with this procedure as well as reporting the undergraduate level to be their main source of information (92.6%), and that both nurses recently graduated as well as the most experienced had similar performances.

Most patients have some type of PG, showing interest in improving to practice, but not necessarily for BP measurement. These courses are very specific and only 27.5% of the sample reported having discussed this at PG.

It was observed that most of the nurses considered their knowledge of measure of BP good, both in theory as in practice, before answering the questionnaire. It is assumed that this perception may be related to the fact that nurses routinely perform this procedure on day-to-day operations in their ICU, feeling secure in the realization of the same. A study that evaluated the technique of BP measurement of auxiliary and technicians of nursing in the hospital environment showed that the practical knowledge exceeded the theoretical, although both are insufficient<sup>(1)</sup>.

Despite the studied professionals perform BP measurements in their day-to-day and quite often, it is observed that even their theoretical knowledge about the topic is scarce since only 30.2% of the subjects obtained scores greater than 60%. Evaluation studies of BP measurement in practice<sup>(1,4,6-8,10)</sup> confirm this deficit, since many professionals failed to perform critical steps to obtain accurate values at the time of BP measurement. The highest number of correct answers on the questions occurred in the domain that approaches the BP measurement with the direct method. This performance can be related to the fact that this method is specific of ICU.

The domains chosen to compose the questionnaire (D1-D6) were considered relevant when compared with other studies that also administered questionnaires<sup>(2,5,9-10,19)</sup> to evaluate knowledge about BP measurement. Many cardiovascular diseases are present on the day-to-day of ICU patients, as well as the BP measurement. It is assumed that a score of correct answers in D1 can be related to a better knowledge of human physiology and the need to act on pathologies and with the BP measurement, there is a greater interest in the subject by these professionals.

Regarding the instruments used, the main sources of errors in obtaining reliable values of BP<sup>(15)</sup>, similar results of this lack of knowledge on the part of professionals has also been found in other studies<sup>(4,6)</sup>. Many professionals do not pay attention to important aspects when the BP is measured, from the appropriate cuff size to the arm circumference, to aspects related to the own observer as inadequate choice of instruments to be used.

The domain indirect methods was the point where were expected a better knowledge of studied professionals, since they are the most used in all levels of care and more focused during formation at undergraduate courses, where 63.0% of this sample had his first contact with the BP measurement. However, it was the domain in which the professionals had the worst performance. Considering the execution of this measurement with different specific methods to this environment, this knowledge is insufficient, once nurses are involved in a daily continuing education process together with their team and other professionals found there. Therefore, this knowledge should be higher. This lack of knowledge about indirect measurement can be attributed to an automated way<sup>(3,8)</sup> which the professionals have been performing the procedure for measuring BP, without giving importance to the sources of errors involved in the procedure<sup>(8)</sup>.

Regarding the direct measurement, considered more complex than other methods of BP measurement in the ICU, it was observed that there are still gaps in the knowledge of nurses, agreeing with a study conducted in Seattle<sup>(2)</sup>. This can be a serious problem for the nurse practice, since the ICU is the place where the reliability of the measurement is even more important considering the clinical conditions of the patients who are hospitalized there. However this *improved* performance when compared to

other areas may be related to the information received during the admission in the sector, related to the handling of monitors and the invasive monitoring system of BP.

The methods of BP measurement (direct and indirect) are available in sectors that care for critically ill patients. Previous studies<sup>(1,4,7,9-10,19)</sup> were concerned only in evaluating the professionals as to indirect methods of measuring BP, specifically the auscultatory method, and even one that was conducted in ICU<sup>(7)</sup> did not address the oscillometric method and the direct method, so present in this environment. In Brazil, this study is a pioneer in studying other methods of BP measurement, including the direct method.

The results of the Self-evaluation before responding to the questionnaire indicate that the BP measurement is considered simple by most nurses, since 83.4% of the sample considers themselves good or excellent in its execution. It is believed that greater attention is being given to other procedures considered more complex. This fact should not occur, because the infusion of vasoactive amines depends on accurate values of BP for dose adjustments.

The data presented in Table 2 show that subjects, after answering the questionnaire, became aware that their knowledge about BP measurement is unprofitable for their practice. It is observed that the average mark of the theoretical self-evaluation is very close to performance score on the questionnaire. The importance attached to the issue in the workplace is high and it presents a very homogeneous distribution. Despite of this, little has been done to change this reality, neither by the subject itself nor by the studied institutions. Data already reported in item Characteristics of knowledge of the subjects about BP before answering the questionnaire allow this reasoning, once guidance about the matter were provided only to 22.2% of the sample over time of activity of subjects (four months to 20 years), and, even then, the guidelines were directed only to handling devices to measure the direct measurement of BP at the time of admission. Moreover, only six subjects (11.1%) reported having received guidance about this subject in external courses and eleven (20.4%) in events.

Regarding the performance on the test, the number of correct answers ranged from 03 (three subjects) to 27 (only one subject), and the average marks was 4.6 (around 18 to 19 hits in 40 questions). According to the evaluations in Brazilian universities and nursing courses, which have as approval levels around 50 to 70%, this sample would not have satisfactory concept, and therefore considered insufficient the knowledge about BP.

The data presented in Table 3 show dissatisfaction reported by subjects after responding to a Likert scale. The subjects who considered themselves good or excellent before the test (77.8%) now consider themselves regular/poor/very poor (85.3%) and only five (9.3%) maintained their initial concepts.

Important fact observed in this analysis is the self-assertion of the subjects considering themselves dissatisfied with their knowledge after the test, clearly demonstrated by the change in their perception of prior self-evaluation (Table 3), confirmed by the data in Table 4, whereas subjects who self-evaluated as good and gave marks in the range from 7.0 to 7.9 have performed below this range (average 5.37). Furthermore, the average score obtained for this sample was 4.6, coinciding with the average and with the marks of subjects that attributed regular concept. These, however, according to the self-evaluation should remain in the range of 5.0 to 6.9.

The data show a consciousness of the subjects in admitting that their knowledge is insufficient for performance in practice: 48.2% of the sample obtained marks that classify them as poor. Other subjects are judged with poor evaluation and obtained 29 correct answers (72.5%), which may show that, in their perception, a grade below 8.0 shows insufficient knowledge of this matter on a day-to-day life in an ICU. This mark, in turn, coincided with the mark given by the subjects on the importance of this subject in the field of practical performance (Table 2).

The subjects are aware of the scarcity of theoretical knowledge for practice, which was an observation made based on the importance the subject assigned to practice by this sample and the results were presented in Table 2. The mark for the test (table 4) is 57.5% in the sample even worse than auto assigned evaluation.

## CONCLUSION

The results demonstrate the gaps in nurses' knowledge in all domains. These can interfere on the ability of nurses

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and security of the binomial nurse/patient, which is quite serious, since these professionals have a responsibility to make quick decisions on critical patient. The subjects themselves perceived how precarious is the knowledge of BP, since most considered themselves as good previously (before answering the questionnaire), with radical change in the opinion for poor, regular and very poor after answering the questionnaire. However, neither they nor the institutions have implemented strategies to update.

It is a remarkable affirmation of the subjects of the three studied institutions regarding the need for training about the theme. The results of this study indicate an urgent need of improvement for this sample, once the most affected ones by this knowledge deficit are the patients who are critically ill, unstable, requiring diagnoses, conduct and fast and accurate treatments to improve their clinical condition.

It will be required the development of specific strategies for the regular monitoring of nurses regarding the technique of BP measurement (theoretical/practical), in order to avoid outdated of their knowledge about the subject. These strategies should take into account the characteristics of each service, such as team turnover and absence.

It is also necessary to evaluate the practical implementation of the procedure of BP measurement with the available methods. The results of all these evaluations should be socialized, avoiding the punitive character usually associated with negative evaluations.

After completion of the study and obtaining this result, it was held a workshop with the aim at carrying out knowledge update of BP measurement for this sample, but just this action is not enough, since permanent education must be focused on the day-to-day of the team, where new technologies are embedded in the daily work of nurses, especially in relation to blood pressure measurement.

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