KNOWLEDGE OF NURSING STUDENTS ON CARDIORESPIRATORY ARREST: A CROSS-SECTIONAL STUDY

CONHECIMENTO DE ESTUDANTES DE ENFERMAGEM SOBRE PARADA CARDIORRESPIRATÓRIA: ESTUDO TRANSVERSAL

CONOCIMIENTO DE LOS ESTUDIANTES DE ENFERMERÍA SOBRE PARADA CARDIORRESPIRATORIA: ESTUDIO TRANSVERSAL

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Objective: to evaluate the knowledge of nursing students about the care of patients in cardiorespiratory arrest. Method: cross-sectional study with quantitative approach, conducted with 136 nursing students from a higher education institution. Data were collected using a semi-structured instrument. The analysis was performed through descriptive and inferential statistics. Results: the students who positively evaluated themselves showed a good level of knowledge about the theme (r=0.29; p=0.001), as well as those who had attended the first aid course in previous periods (p=0.012). The questions they made mistakes were those regarding the routes of administration of the drug and ventilatory support in non-intubated patients. Conclusion: the nursing students demonstrated an adequate level of understanding of the protocols on the care of patients in cardiorespiratory arrest and had a theoretical framework obtained in the discipline of first aid, as well as in improvement courses.

Descriptors: Nursing. Nursing Students. Knowledge. Cardiac Arrest.

Objetivo: avaliar o conhecimento de estudantes de enfermagem sobre o atendimento ao paciente em parada cardiorrespiratória. Método: estudo transversal com abordagem quantitativa, realizado com 136 acadêmicos do curso de enfermagem de uma instituição de ensino superior. Os dados foram coletados por meio de instrumento

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semiestruturado. A análise efetivou-se por meio da estatística descritiva e inferencial. Resultados: os discentes que se autoavaliaram positivamente, mostraram um bom nível de conhecimento sobre a temática (r=0,29; p=0,001), assim como aqueles que haviam cursado a disciplina de primeiros socorros em períodos anteriores (p=0,012). As questões nas quais obtiveram erro foram aquelas a respeito das vias de administração da droga e suporte ventilatório em pacientes não intubados. Conclusão: os discentes de enfermagem demonstraram um nível adequado de compreensão dos protocolos sobre o atendimento ao paciente em parada cardiorrespiratória e possuíam arcabouço teórico obtido na disciplina de primeiros socorros, bem como em cursos de aperfeiçoamento.

Descritores: Enfermagem. Estudantes de Enfermagem. Conhecimento. Parada Cardíaca.

Objetivo: evaluar el conocimiento de los estudiantes de enfermería sobre el cuidado de los pacientes en parada cardiorrespiratoria. Método: estudio transversal con abordaje cuantitativo, realizado con 136 estudiantes de enfermería de una institución de educación superior. Los datos fueron recogidos por medio de un instrumento semiestructurado. El análisis se realizó a través de estadística descriptiva e inferencial. Resultados: los estudiantes que se evaluaron positivamente mostraron un buen nivel de conocimiento sobre el tema (r=0,29; p=0,001), así como los que habían asistido al curso de primeros auxilios en períodos anteriores (p=0,012). Las preguntas en las que obtuvieron error fueron las relativas a las vías de administración del fármaco y soporte ventilatorio en pacientes no intubados. Conclusión: los estudiantes de enfermería demostraron un adecuado nivel de comprensión de los protocolos sobre el cuidado de pacientes en parada cardiorrespiratoria y contaron con un marco teórico obtenido en la disciplina de primeros auxilios, así como en cursos de perfeccionamiento.

Descriptores: Enfermería. Estudiantes de Enfermería. Conocimiento. Paro cardiaco.

Introduction

In Brazil, there are around 200,000 cases of Cardiorespiratory Arrest (CRA) per year. Of these, 50% occur in the in-hospital context[1]. In addition, they are considered the most emergency situations treated in the pre-hospital environment. It should be considered, however, that almost 95% of patients die before arriving at the hospital[2].

CRA is defined as the interruption of heartbeat, gas exchange and loss of level of consciousness, and can be evidenced by the absence of carotid pulse, respiratory incursions as well as the presence of agonizing breathing. In addition, there are changes in heart rhythms, such as Asystole, Pulseless Electrical Activity (APEA), Ventricular Fibrillation (VF) and Pulseless Ventricular Tachycardia (PVT), which can generate irreversible brain damage and, in some cases, death[3].

Therefore, early recognition, through continuous surveillance of patients, seeks to quickly identify the event, allowing the correct maneuvers to be performed, according to international protocols, which reduces the mortality rate against CRA. Through cardiopulmonary resuscitation (CPR) maneuvers,

it is possible to maintain body circulation, ensuring oxygenation of vital organs. When confirming the arrest, by verifying the absence of a central pulse, the professional should immediately start the assistance, as recommended in the CPR protocol[2].

For this purpose, the adoption of international protocols should be instituted in order to increase the patient's chance of survival. Among these, there stand out guidelines proposed by the American Heart Association, in which periodic updates are based on an international process of evidence validation, involving several health reviewers from different countries. This protocol exists so that professionals have more security and support throughout the struggle for life and, thus, can guarantee more qualified care[2-4].

Before a clinical emergency, it is necessary to manage the patient correctly by a trained and prepared team. Trained professionals are crucial for resuscitation maneuvers to be performed early and effectively, seeking artificial maintenance of arterial flow to the brain and other vital organs until spontaneous circulation is recovered[5].

Therefore, nurses are fundamental to identify this occurrence, since they have the potential to

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be the main witnesses of events in the hospital environment. Therefore, they have technical, institutional and legal competence to initiate CPR procedures[6]. Moreover, during the event, they can command the stages of resuscitation, act as administrators, coordinators, educators of the training process of techniques and as bridges between multidisciplinary teams, so that the assistance is performed in an agile, synchronized and efficient way, maximizing the quality of care[7].

It is important to emphasize that the nursing professional is responsible for coordinating the actions and directing their team, acting in the most diverse functions, such as the installation of the automatic external defibrillator (AED), in the administration of medications, time counting, ventilation and compressions, besides being their competence to open paths in which their team can improve and, thus, perform services with excellence[8].

It is noteworthy that, in order to enable quality care based on updated protocols, it is essential that nurses improve their cognitive and motor skills through training based on scientific evidence, from the course of their academic training. Thus, considering the above, it is important that the nursing student face CPR maneuvers, since, as a future nurse, he/she should have the ability to identify the injuries early and reduce the mortality rates related to the event, as well as the sequelae that the patient may develop due to prolonged oxygen deprivation.

In view of the above, the question is: What is the level of knowledge of nursing students about the recognition of CRA and CPR maneuvers? To answer this question, the present study aims to evaluate the knowledge of nursing students about the care of patients in cardiorespiratory arrest.

Method

This is a cross-sectional and descriptive study, with a quantitative approach, developed with nursing students from a private higher education institution in the municipality of João Pessoa, Paraíba, Brazil. Data were collected between June and August 2020.

The study population comprised all nursing students who were attending the sixth, seventh and eighth periods, totaling 196 students. Individuals of both sexes, aged 18 years or older, who attended the discipline of first aid and/or complex units were included. Students who were absent from the course or were on medical leave during the collection of information were excluded from the study.

The determination of the sample was probabilistic, using the simple sampling technique. It was delimited, considering the following formula: $n=Z2\ PQ/d2$, being n=minimum sample size; Z=reduced variable; P=probability of finding the studied phenomenon; Q=1-P; d=desired accuracy. P=50%, adopting sampling error parameter of 5%. After the proper calculations, the minimum defined sample was composed of 130 students. During the data collection period, 150 students were approached, among whom 14 refused to participate. After clarification on the objectives of the study, those who agreed to contribute to the research received the questionnaire by e-mail. Thus, the sample consisted of 136 students.

Data collection was through a questionnaire built on the Google Forms platform and disseminated online through apps and social networks. The instrument used was created and validated by Bellan and Araujo[9], following the protocol of the American Heart Association (AHA) of 2005. Due to the updates on the theme published over the years, the alternatives proposed in the original instrument were adapted according to the highlights of the AHA released between the years 2015 and 2018. Therefore, it was composed of 29 questions, divided into two parts: the first constituted the sociodemographic profile, with subjective and objective questions. The second was about the knowledge presented by the students in relation to CRA, according to a validated instrument[9].

The objective questions presented one or more correct answers, with different weights, according to the number of correct alternatives. Thus, the questions were considered correct, as all minimum information was indicated; partially correct, when one or more contents have not

been highlighted; and incorrect, when none of the contents were signed. In questions where there was only one correct alternative, the interviewee received the value of one point. Among those who presented more than one correct alternative, the value 1 was divided by the number of alternatives, thus determining the weight of each question, according to the authors' guidelines. Therefore, the estimate of correct answers was obtained by summing up all the correct alternatives.

The data were encoded and stored in the Statistical Package for the Social Sciences (SPSS) computer system, version 20.0. Data analysis was performed by quantitative approach and descriptive statistics of univariate nature for all variables, including frequency, position and dispersion measurements. To verify the normality of the data, the Kolmogorov Smirnov test was used, which demonstrated that the dependent variable, mean of the right questions, presented normal distribution.

Therefore, Pearson's Correlation Coefficient was applied to identify the correlation between the variables. In order to measure the degree of correlation, it was considered that "r" varied from +1/-1, for positive or negative correlations. When the value of r=0 was evidenced, the correlation was considered null. To verify the correlation strength: 0 – absence of correlation; 0 to 0.30 – weak correlation; 0.30 to 0.70 – moderate correlation; >0.70 – strong correlation. In all tests, a significance level of 5% was considered[10]. In order to understand the correlation between the mean number of correct answers and the questions in which the highest knowledge was obtained, this test was performed.

It is noteworthy that, throughout the research process, especially in the phase of empirical information collection, the ethical aspects that guide research involving human beings were observed, as set out in Resolution n. 466/2012 of the National Health Council, especially the confidentiality of the information[11]. The research was approved by the Research Ethics Committee of the Centro Universitário de João Pessoa, under Opinion n. 3.668.695/19.

Results

Of the 136 nursing students who participated in the study, 89.7% (n=122) were female, 85.3% (n=116) were single and 45.6% (n=62) were in the seventh period. Age ranged from 20 to 41 years, with a mean of 23.79 years (SD±4.52). Regarding previous knowledge on the subject, 62.5% (n=85) stated that they had not attended the first aid course, 100% (n=136) attended the discipline of complex units, 66.2% (n=90) did not perform training in Basic Life Support (BLS), while 83.8% (n=114) had no improvement in Advanced Life Support (ALS), as observed in Table 1.

Table 1 – Distribution of sociodemographic and academic characteristics of nursing students. João Pessoa, Paraíba, Brazil – 2020. (n=136)   (continued)

Variables	n	%
Sex		
Female	122	89.7
Male	14	10.3
Marital status		
Single	116	85.3
Married	19	14.0
Divorced	1	0.7
Academic period		
Sixth	40	29.4
Seventh	62	45.6
Eighth	34	25.0
Attended first aid discpline		
No	85	62.5
Yes	51	37.5

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Table 1 – Distribution of sociodemographic and academic characteristics of nursing students. João Pessoa, Paraíba, Brazil – 2020. (n=136) (conclusion)

Variables	n	%
Attended complex units discipline		
No	–	–
Yes	136	100
Attended improvement in Basic Life Support (BLS)		
No	90	66.2
Yes	46	33.8
Attended improvement in Advanced Life Support (ALS)		
No	114	83.8
Yes	22	16.2

Source: Created by the authors.

Note: Conventional signal used:
- Numerical data equal to zero not resulting from rounding up.

The students were asked about the level of knowledge about basic and advanced life support protocols through a numerical scale, in which zero would denoted lack of knowledge and ten, the maximum score. Therefore, it was observed that the students had a minimum score of three and maximum ten in this item, with an average of 7.74 (SD±1.41). When verifying the questions that had the highest number of errors, a deficiency was identified in the questions regarding the drug administration routes, among which the majority of the interviewees listed the intratracheal routes (n=111; 81.6%) and intraosseously (n=112; 82.4%) as the best choice, to the detriment of peripheral intravenous pathways (n=107; 78.7%) and central venous access (n=45; 33.1%).

Still in relation to medication, 126 (92.6%) participants reported adrenaline as a drug to be used in cases of cardiorespiratory arrest; 97 (71.3%), amiodarone; and 32 (27.9%) have been dealing with lidocaine. Moreover, despite heart rhythms, 108 (79.4%) indicated that the PVT is considered an arrest rate, 92 (67.6%) indicated ventricular fibrillation, 86 (63.2%) identified APEA and 85 (62.2%), asystole.

Data on the students' theoretical knowledge on CRA and CPR are presented in Table 2.

Table 2 – Distribution of the answers of the students on theoretical knowledge in cardiorespiratory parade/cardiopulmonary resuscitation. João Pessoa, Paraíba, Brazil – 2020. (n=136) (continued)

Variable	Answers					
	Right Answers		Partially right		Incorrect	
	n	%	n	%	n	%
Definition of cardiorespiratory arrest (CRA)	133	97.8	–	–	3	2.2
CRA Recognition	46	33.8	90	66.2	–	–
Immediate conduct	3	2.2	71	52.2	62	45.6
Cardiac rhythms of PCR	67	49.3	63	46.3	6	4.4
Shockable cardiac rhythms	79	58.1	16	11.8	41	30.1
In which it consists basic life support (BLS)	17	12.5	118	86.8	1	0.7
In which it consists of advanced life support (ALS)	22	16.2	111	81.6	3	2.2
Ventilate patient intubated	62	45.6	–	–	74	54.4
Ventilate patient not intubated	117	86.9	–	–	19	14.0
Posture for external thoracic compressions (ETC)	30	22.1	95	69.9	11	8.1
Depth of compressions	16	11.8	81	59.6	39	28.7
Automatic external defibrillator (AED)	99	72.8	–	–	37	27.2
Maximum load	92	67.6	–	–	44	32.4

Table 2 – Distribution of the answers of the students on theoretical knowledge in cardiorespiratory parade/cardiopulmonary resuscitation. João Pessoa, Paraíba, Brazil – 2020. (n=136)   (conclusion)

Variable	Answers					
	Right Answers		Partially right		Incorrect	
	n	%	n	%	n	%
Drug Administration	20	14.7	75	55.1	41	30.1
Drugs used	34	25.0	99	72.8	3	2.2
CRA composition	99	72.8	–	–	37	27.2

Source: Created by the authors.

Note: Conventional signal Used:
    - Numerical data equal to zero not resulting from rounding up.

After performing the Pearson Correlation test, a statistically significant, positive and weak correlation was observed (r=0.29; p=0.001) between the mean of correct answers and the level of self-reported knowledge. There was also a positive and statistically significant correlation between the total mean of correct answers and the means of correct answers in the following variables: identification of chocable rhythms, determination of the characteristics that determine the differences between BLS and ALS, ventilatory support in non-intubated patients, as well as the routes of drug administration (Table 3).

Table 3 – Mean correlation of correct answers and means of correct answers in different variables through the Pearson Correlation Test. João Pessoa, Paraíba, Brazil – 2020. (n=136)

Variable	Mean of correct answers	
	Pearson Correlation Coefficient (r)	p-value
Identification of rhythms	0.17	0.004
In which it consists of basic life support (BLS)	0.28	0.011
In which it consists of the advanced life support (ALS)	0.22	0.012
Ventilation in non-intubated patients	0.28	0.001
Route of drug administration	0.34	0.001

Source: Created by the authors.

When analyzing the mean number of correct answers, it was identified that men had a higher rate of correct answers when compared to women (p=0.005). Regarding the knowledge, it was evidenced that the mean number of correct answers among the students who attended the first aid course was higher (p=0.012), while the performance of extracurricular courses did not significantly impact among the participants of the present study (Table 4).

Table 4 – Features of the sample according to the mean knowledge about the conduct facing a cardiorespiratory stop through the T-Student. João Pessoa, Paraíba, Brazil – 2020. (n=136)   (continued)

Variable	Mean	Standard Deviation	p-value
Sex			0.005*
Female	10.93	±2.50	
Male	11.35	±1.35	
Attended the first aid discipline			0.012*
Yes	11.81	±2.23	
No	10.72	±2.54	

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Table 4 – Features of the sample according to the mean knowledge about the conduct facing a cardiorespiratory stop through the T-Student. João Pessoa, Paraíba, Brazil – 2020. (n=136) (conclusion)

Variable	Mean	Standard Deviation	p-value
Attended the Basic Life Support (BLS) course			0.072
Yes	11.65	±2.61	
No	10.88	±2.32	
Attended the Advanced Life Support (ALS) course			0.849
Yes	11.24	±2.78	
No	11.11	±2.43	

Source: Created by the authors.

* Statistically significant result.

Discussion

The effectiveness in the care of CRA victims is directly associated with early recognition and prompt performance of cardiopulmonary resuscitation maneuvers. It is noteworthy that the survival rate of an assisted cardiopulmonary arrest is approximately 49%, depending on heart rate and early rescue maneuvers. Therefore, knowledge about rhythms, drugs that can be administered, as well as routes of administration strengthen the health team and increase the chances of the procedure being successful[12].

Regarding the sociodemographic data, most students attended the seventh period and wre women, aged between 20 and 41 years. Historically, care practices are associated with the female gender, as evidenced in a study conducted with nursing students from a private university in the region of Florianópolis (SC), where most were women, aged between 22 and 49 years, matriculated in the last period of the undergraduate course[13].

On CRA recognition, according to the AHA protocol[14], when observing an immovable individual, it is necessary to check the responsiveness, observe if there is no breathing or just gasping and also check if there is no carotid pulse. The results of the research indicate that there were no incorrect answers to the signs found in the arrest, but 66.2% responded partially correctly, failing to mark the absence of consciousness as one of the signs of cardiac arrest.

It is recognized that unconsciousness can be caused by several distinct clinical situations, such as arrhythmias and obstruction of the coronary or pulmonary arteries. Such conditions interfere in hematosis, culminate in decreased oxygen in the bloodstream and later contribute to cellular hypoxia. The reduction of oxygen intake in brain tissue may cause lowering of the level of consciousness and episodes of fainting[15].

Along with cardiac compressions, respiratory tract management is an important intervention for the maintenance of the individual's life in CRA. Regarding the advanced airway, the research shows that 54.4% responded incorrectly, when they marked the option that the appropriate conduct to be performed in patients with advanced airway would be to keep them connected to the mechanical ventilator and increase FiO2 (inspired fraction of oxygen) to 100%, offering as much oxygen as possible during CPR.

According to the Brazilian Society of Cardiology[16], during CPR in patients with advanced airway, ventilation should be administered using the valve mask bag (VMB), in an asynchronous manner with chest compressions. For this purpose, it is recommended to increase FiO2 to 100% in order to ensure the increase of arterial oxyhemoglobin and oxygen supply. Therefore, according to the protocols, it is recommended

to administer a ventilation every six seconds, totaling 10 ventilations per minute.

The importance of early defibrillation in maintaining the survival link is indisputable. In the present study, it was observed that most participants correctly answered what the initial load would be offered to the patient on CRA, while 32.4% did not know the maximum load, in joules that should be administered. The defibrillator consists of an equipment that provides electrical charges and can be used to reverse some arrhythmias, such as PVT and VF, both evidenced in cardiorespiratory arrest. The initial load offered is 120 joules and the maximum is 200 joules in biphasic apparatus. In single-phase, the minimum load is 200 joules and the maximum load is 360 joules, and may vary according to the manufacturer's specifications[17].

When analyzing the level of knowledge of the students about the protocols of BLS and ALS, 55.1% answered partially correctly the questions related to the administration of drugs, especially in the recognition of central venous access as a route of administration of drugs. It should be noted that the first routes of choice are peripheral and central intravenous. If, by any hypothesis, vascular accesses are not achieved, it is possible to opt for the intraosseous or endotracqueal route (administering liposoluble drugs), in which twice the amount of medication will be used[16].

In addition to the routes of administration, the students responded partially correctly about the medications that should be adopted in a CRA, since few students pointed to lidocaine as an alternative drug, a drug recommended by the AHA in 2018. It should be noted that two types of drugs are used: the vasopressor epinephrine, which will serve to increase coronary perfusion pressure during CRA; and antiarrhythmics, such as amiodarone or lidocaine[16].

However, the administration of these drugs requires knowledge about heart rhythms that precede a CRA, such as PVT, VF, APEA and asystole[17]. In this study, almost half of the participants answered this question correctly, with only 4.4% of incorrect answers. This result is in line with a similar study, in which only 2.1% correctly answered the heart rhythms evidenced in a cardiorespiratory arrest[18].

Knowledge about heart rhythms is essential for understanding the conducts that must be established. In the face of the PVT and VF, called chocable rhythms, epinephrine, amiodarone or lidocaine can be administered, while, in the presence of APEA and asystole, antiarrhythmics are not indicated[17]. In the present study, 58.1% responded correctly, differently from what occurred in a similar study, in which only 27.3% of the students recognized the difference between heart rhythms[19].

First aid are techniques used to assist victims who need immediate help, in order to avoid fatal consequences, due to lack of assistance, and to maintain vital signs until the arrival of the specialized health team. In this sense, a person who obtains training about the procedures can help family, friends, co-workers or even strangers, if there is a problem that is affecting him/her at the moment. Therefore, acquiring basic knowledge in first aid can save lives[20].

Theoretical knowledge is important to recognize the needs of the victim, however, the development of practical skills is fundamental to acquire confidence in oneself and gain autonomy[21]. Moreover, it is of paramount importance to keep up to date, to perform safety techniques in an appropriate way and ensure efficiency in the care of victims. A study[22] developed in Portugal on the knowledge of the population about BLS corroborates this assertion. This research showed that there is a need for training of lay people to reduce the mortality and morbidity rate in situations of accidents and sudden diseases in an extra-hospital setting, since victims who received assistance from some citizen with training had four times more chance of surviving.

Therefore, according to the study[23], continuing education in first aid tends to be relevant in view of the increase in the occurrence of urgency/emergency, also showing the need for this issue to be in the public domain, considering that it requires immediate and qualified actions. Therefore, it is necessary to show the population

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the importance of this subject and the need for improvement on the subject.

Nursing students should have a theoretical and practical domain about cardiopulmonary resuscitation maneuvers, since the nurse, in addition to assisting the patient in emergency conditions, is an educating agent, acting in the offer of training to the population. In addition, by keeping knowledge always updated in his/her area of expertise, he/she can provide better service and well-being to his/her client.

As a limitation of the study, it is noteworthy that, as it was carried out virtually due to the new coronavirus pandemic, some students had contact only with the theoretical content, thus observing the need and importance of practicing the administered theme. Considering this, it is of paramount importance that students improve themselves on the protocols established before a CRA. It is also important for professors to create strategies or methodologies that facilitate the learning of this subject, involving all stages, due to its importance. Moreover, it would be equally important if educational institutions could promote events, short courses, conversation wheels, among other resources, in order to strengthen the training of future nurses.

Conclusion

The research revealed that, in general, the students who had a good level of understanding in relation to the protocols related to the care of patients in cardiorespiratory arrest were those who attended first aid discipline. However, it is appropriate to highlight that they presented difficulties to follow the updates of basic and advanced life support protocols related to cardiorespiratory arrest.

Collaborations:

1 – conception, design, analysis and interpretation of data: Felipe Pereira Nunes and Keylla Talitha Fernandes Barbosa;

2 – writing of the article and relevant critical review of the intellectual content: Felipe Pereira Nunes, Keylla Talitha Fernandes Barbosa,

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3 – final approval of the version to be published: Fabiana Maria Rodrigues Lopes de Oliveira and Natalia Pessoa da Rocha Leal.

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