

Educational intervention about in-hospital cardiorespiratory arrest: knowledge of nursing professionals from medical-surgical units*

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* Derived from the Residency Conclusion Academic Work: "Effect of educational interventions on the knowledge of nursing professionals about cardiorespiratory arrest and cardiopulmonary resuscitation," presented to the Nursing Residency Program of Universidade Estadual do Oeste do Paraná.

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Received: 02/24/2016.

Accepted: 05/22/2017.

Published: 10/01/2017.

Suggest citation:

Santos RP, Hofstatter LM, Carvalho ARS, Alves SR. Educational intervention about in-hospital cardiorespiratory arrest: knowledge of nursing professionals from medical-surgical units. Rev. Eletr. Enf. [Internet]. 2017 [cited ___/___/___];19:a25. Available from: <http://dx.doi.org/10.5216/ree.v19.39945>.

ABSTRACT

The present study aimed to assess the effect of an educational intervention about cardiorespiratory arrest in the theoretical knowledge of nursing professionals in medical-surgical hospitalization units. This is a quasi-experimental study, developed with professionals working in two admission units from a public university hospital in Paraná state. As an educational intervention, we conducted theoretical-practical training. We applied a questionnaire before and after training. We considered p values <0.05 as significant. Of the 47 professionals who worked in these units, 37 (78.72%) participated in the pre-test and, 32 (68.09%) in the post-test. We identified a female prevalence, aged between 31 and 45 years, who worked in their unit and had more than five years of professional training. The scores obtained after the educational intervention (post-test) was statistically significant ($p < 0.0001$), in comparison to the pre-test. The educational intervention positively collaborated with the theoretical knowledge of nursing professionals about cardiorespiratory arrest.

Descriptors: Heart Arrest; Cardiopulmonary Resuscitation; Inservice Training; Nursing.

INTRODUCTION

Patients of advanced age, with prolonged hospitalization time, chronic diseases, as well as, those admitted due to acute situations/conditions whose clinical management was little accurate, present a higher risk to collapse in in-hospital cardiorespiratory arrest (IHCRA)⁽¹⁻³⁾. Thus, it is important to note the event occurrence related

to its outcome for the assistance offered by health professionals, within other factors⁽²⁻⁴⁾.

In a recent study developed in the United States of America (USA), researchers pointed that in the last ten years, there was a notable survival increase of patients who suffered IHCRA⁽⁵⁾. On the other hand, despite the efforts, in Brazil⁽⁶⁾ and other regions of the world⁽⁷⁻⁹⁾, post-IHCRA survival rates are still low.

It is important to highlight that the main factors associated with IHCRA and its outcome, pass through the triad “structure, process and results”, which is related to the professional assistance, as well as, to global aspects of health institutions^(3,5,10).

About the professional assistance, training of the health team influences the indicators of IHCRA outcomes for a quick and efficient event identification, as well as, the adequate approach towards the subject at the cardiopulmonary resuscitation (CPR)⁽¹⁰⁻¹¹⁾. Therefore, continuous investment in permanent professional education is necessary⁽¹⁻⁴⁾.

Entailed in this discussion, the Brazilian National Policy on Permanent Health Education (“*Política Nacional de Educação Permanente em Saúde*” - PNEPS) was instituted in 2009. Linked to the Brazilian Unified Health System (“*Sistema Único de Saúde*” - SUS), within its proposals, PNEPS incentivizes educational interventions for health workers intended to improve quality and outcomes related to assistance provided by professionals at SUS⁽¹²⁾.

About permanent education developed to target improvement of CPR professional action CPR, researchers^(3-4,10) report to be important to know the level of workers’ knowledge, as it favors the systematizing of educational actions and, the upbringing of particular training needs. Similarly, it is essential to assess the effects of interventions⁽¹³⁾, which is, of educational activities proposed to be updated.

Thus, we developed the present study guided by the question: What is the effect of educational interventions about IHCRA on the knowledge of nursing professionals?

Based on pertinent literature⁽¹³⁻¹⁵⁾ and practical experience from researchers of this study field, the hypothesis initially brought up was that the nursing team has a theoretical knowledge deficit about the theme. However, educational interventions can be useful to update them and to rescue their knowledge.

To test our hypothesis, we aimed to assess the effect of an educational intervention about IHCRA in the theoretical knowledge of nursing professionals in hospitalization units of the medical-surgical clinic at a public university hospital, in the inner state of Paraná.

METHODS

We conducted a quasi-experimental study, with a unique non-equivalent group, and a pre- post-test.

We developed the study in a public university hospital located in the inner state of Paraná, from July to December of 2015. The hospital has 195 beds, and it is a reference for trauma and general surgery. It has 25 cities in its coverage area.

Nurses, nursing assistants, and technicians participated in this investigation. They performed their work in two units of medical-surgical clinic hospitalization that attend a considerable number of IHCRA.

Twenty-five beds compose one of the units, and the professionals assist clinical and surgical patients from neurology, orthopedics, and vascular medicine. The other unit has 28 beds, and they provide care to clinical and surgical patients from medical clinics, general surgery, and cardiology (clinical and surgical). It is important to highlight that the two units have an effective nursing team of 59 professionals.

We established the following inclusion criteria: to be a member of the nursing team from the units selected for the study; to be working in these units for a time equal or longer than six months; to have a working relationship with the institution; to participate in the educational intervention answering to the assessment instrument for IHCRAs theoretical knowledge. We excluded from the sample those participants who were on leave due to recess, vacation, medical leave or other.

We performed the training in a multi-professional room in the institution, in one of the study units. It was exclusively designed for didactic-pedagogic practices.

There are five work shifts in the studied institution and professionals participated in the intervention during their shift. Nevertheless, those who were not able to attend during their work time could take part in the training during other shifts.

The educational intervention was constituted of theoretical-practical meetings, totalizing five sessions, that is, one session for each work shift aimed to meet the needs of each group. There was a minimum of three and a maximum of 10 participants in each group. The training sessions were two hours long, and they were the same for all groups. The only difference was the time when it was conducted, according to participant's availability.

For the training, we presented the theoretical content in an expositive-dialogue class using multimedia slides. Besides, we performed realistic simulations in which participants had access to dolls to revise their needed abilities to attend IHCRAs.

We applied the intervention following a guide previously elaborated by researchers, based on the 2010 Guidelines from the American Heart Association (AHA) for CPR, the Emergency Cardiovascular Care (ECC)⁽¹⁶⁾, and the CPR and ECC Guideline from the Brazilian Cardiology Society (SBC)⁽¹⁷⁾. During the period of training, the updated AHA Guidelines from 2015 had not yet been published.

Additionally to the educational intervention, participants received a printed theoretical guide as a manual containing the same topics worked during the sessions. Participants did not consult this material to answer the questionnaire. We gave this guide in the measure that they were finishing to respond the questionnaire, as the intention was for the guide to contain a summary of reliable scientific information about IHCRAs/CPR to be consulted in their daily work, according to their individual needs.

We conducted the data collection during September of 2015 using a validated tool (appearance and content), which was a self-reported and semi-structured questionnaire composed of two parts: one to characterize the sample, and the other to assess their IHCRAs/CPR knowledge.

To validate the questionnaire, five judges with a degree in Nursing, with a minimum title of Specialist analyzed it. They were knowledgeable about specific theory and practice about attention to patients in

emergency rooms, hospital emergency, and intensive care units.

The instrument was considered valid with an agreement percentage calculation between judges higher than 90%, and the index for content validation greater than 0.90 points, as proposed in the literature⁽¹⁸⁾.

The first part of the questionnaire characterized the studied sample, and the following variables composed it: age; working time in the unit; training time in their job function; academic training (exception of the minimal time required to perform their job); participation in continuing education (especially of Basic Life Support – BLS – and/or Advanced Cardiovascular Life Support – ACLS); action frequency in IHCRA situation (in their working unit).

In the second part was composed of questions aimed to assess theoretical knowledge of professionals about IHCRA, consisting of 14 multiple choice questions (A, B, C, and D), being seven about BLS and seven about ACLS (Chart 1), and participants should sign the one they considered correct. Few questions had more than one right answer. Thus, we guided them to answer more than one item if they judged necessary/pertinent.

Chart 1: Theme of the questions applied to professionals. Cascavel-PR, Brazil, 2015.

Group of questions related to BLS:	Group of questions related to ACLS:
Q1. How to detect CPA	Q8. Positioning of ED pads
Q2. First action after identifying CPA	Q9. Minimal electrical charge for ED
Q3. Hands position in ECM	Q10. Maximal electrical charge for ED
Q4. Body position for ECM	Q11. Drug administration pathways
Q5. Patient's ventilation with AA	Q12. Drugs to revert CPA
Q6. Patient's ventilation without AA	Q13. Main drug actions
Q7. BLS sequence for adults	Q15. SAVC sequence for adults

BLS = basic life support; SAVC = advanced cardiovascular life support; Q = question; CPA = cardiopulmonary arrest; ECM = external cardiac massage; AA = advanced airway; ED = external defibrillation.

We invited participants to fill the full questionnaire in two moments: pre-intervention and, immediately after training (post-intervention). To mask the similarity of the pre- and post-intervention questionnaire, we changed the order of the questions in the post-test.

We entered the collected data in a Microsoft Excel[®] spreadsheet, version 2010, and later, we exported the data to R statistical software⁽¹⁹⁾. To analyze the data obtained through the first part of the questionnaire, we conducted simple statistical analyses using relative and absolute frequencies. In this same direction, to analyze the data from the second part, we used analytical statistics. For this purpose, we attributed one point for each question, and we divided the point into equal parts between alternatives in the case when questions had more than one correct answer. Therefore, the complete questionnaire presented a score varying from 0 to 14 points. The higher the participant's scoring, the better the theoretical knowledge about the theme.

To assess the effect of the educational intervention on theoretical knowledge of professionals, we conducted paired comparisons between scores obtained before (pre-test) and after (post-test) the training (educational intervention), using the parametric Student's t-test. We used the Shapiro-Wilk test to check for normality assumption and the F test to check homoscedasticity. In situations where these two assumptions were not met, we applied the non-parametric test of Wilcoxon. We considered *p* values lower than (<) 0.05

as statistically significant.

To conduct the study, we obtained prior approval from the Ethics in Research with Human Beings Committee from the institution which the researchers were connected. We received a favorable statement for its execution under the nº 1.124.574 and the Certificate of Presentation for Ethical Appreciation nº 46193115.5.0000.0107. All participants signed two copies of the Free and Informed Consent Term, one for the participant and the other for the researcher, according to the Resolution nº 466/2012 from the Brazilian National Health Council⁽²⁰⁾.

RESULTS

Of the 59 nursing professionals from the studied units, 12 (20.33%) were not working in any of the five moments when the educational intervention was conducted. Thus, of the 47 professionals present, 37 (78.72%) participated in the study pre-intervention. From those, 10 were nurses, and 27 were nursing technicians/assistants.

During the post-intervention phase, 32 (68.09%) professionals filled the data collection instrument, being five nurses, and 27 technicians/assistants. Ten (21.28%) professionals refused to fill the pre-test and 15 (31.91%) the post-test.

Within the participants, we identified a female prevalence (28; 87.5%), aged between 31 and 45 years (23; 71.88%), who worked in their unit and having more than five years of professional training.

About their academic training, 80%(n=8) nurses had at least one graduate degree (*latu sensu and/or strictu sensu*) related to health. Among the technicians/assistants, 37%(n=10) had a bachelor's degree (health-related or not), and 29.7% (n=8) had the nursing academic title.

When questioned about their BLS/ACLS continuing education, 60% (n=6) of nurses and 48.1% (n=13) of technicians/assistants affirmed to had done it more than four years ago. On the other hand, all professionals mentioned to have had acted in CPA situation in the assistance unit where they work, and 90% (n=9) of the nurses and 88.9% (n=24) of the technicians/assistants acted on at least four occasions.

About the knowledge assessment, nurses presented statistically significant increments in their mean of points obtained in the post-test for seven (50%) of the 14 questions. We observed the major difference in the "Q1" (p -value = 0.035) and "Q11" (p -value=0.008). On the other hand, nursing assistants and technicians obtained statistical differences in 12 (85.71%) questions. For this subcategory, only the means for "Q9" (p -value = 0.146) and "Q14" (p -value = 0.65) did not present statistically significant differences.

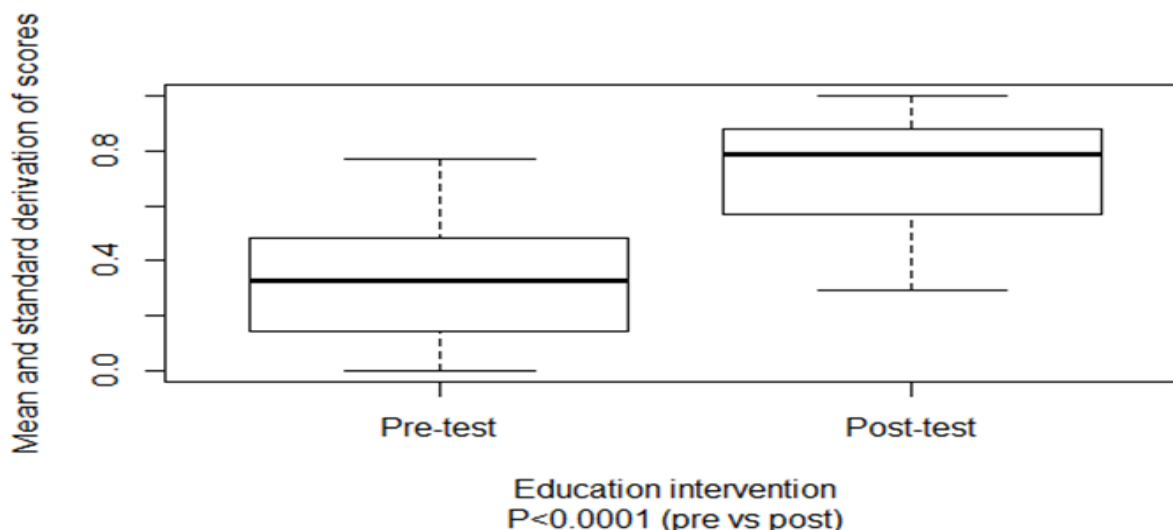
In the assessment of mean scores per group of questions, nurses, as well as, assistants and technicians, had a significant increase in scores obtained post-intervention, as it is possible to see in Table 1.

We present the result obtained from professionals in the general assessment, without classifying them per subcategory in Figure 1.

Table 1: Mean and standard deviation of nurses, assistants, and technicians collected at pre- and post-test, according to question and group of questions. Cascavel, PR, Brazil, 2015.

Question	Nurses			Technicians and assistants		
	Pre-test (n=10)	Post-test (n=5)	* <i>p</i>	Pre-test (n=27)	Post-test (n=27)	* <i>p</i>
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Q1	0.00 (0.00)	1.00 (0.00)	0.018 [†]	0.37 (0.19)	0.77 (0.42)	<0.0001
Q2	0.20 (0.44)	0.80 (0.44)	0.035	0.25 (0.44)	0.70 (0.46)	0.001
Q3	0.80 (0.44)	0.80 (0.44)	0.500	0.62 (0.49)	0.88 (0.32)	0.025
Q4	0.40 (0.54)	0.80 (0.44)	0.088	0.48 (0.50)	0.81 (0.39)	0.004
Q5	0.40 (0.22)	0.60 (0.22)	0.088	0.48 (0.16)	0.57 (0.22)	0.048
Q6	0.80 (0.44)	1.00 (0.00)	0.187	0.77 (0.42)	0.92 (0.26)	0.021
Q7	0.40 (0.54)	1.00 (0.00)	0.035	0.29 (0.46)	0.85 (0.36)	<0.0001
Mean BLS Group	0.42 (0.29)	0.85 (0.15)	0.007	0.46 (0.18)	0.78 (0.11)	0.001
Q8	0.20 (0.44)	0.40 (0.54)	0.310	0.00 (0.00)	0.29 (0.46)	0.001
Q9	0.40 (0.54)	0.80 (0.44)	0.187	0.40 (0.50)	0.55 (0.50)	0.146
Q10	0.20 (0.44)	0.80 (0.44)	0.035	0.14 (0.36)	0.92 (0.26)	<0.0001
Q11	0.00 (0.00)	0.80 (0.44)	0.008	0.00 (0.00)	1.00 (0.00)	<0.0001 [†]
Q12	0.20 (0.44)	0.80 (0.44)	0.035	0.07 (0.26)	0.88 (0.32)	<0.0001
Q13	0.00 (0.00)	0.60 (0.54)	0.035	0.22 (0.42)	0.59 (0.50)	0.002
Q14	0.10 (0.13)	0.40 (0.37)	0.088	0.36 (0.28)	0.48 (0.31)	0.065
Mean ACLS Group	0.15 (0.13)	0.65 (0.19)	0.0003	0.17 (0.16)	0.67 (0.26)	0.004

SD = standard deviation. * Student's t-test; [†] Wilcoxon's test.

**Figure 1:** Effect of the educational intervention on theoretical knowledge of nursing professionals (nurses, assistants and technicians). Cascavel, PR, Brazil, 2015.

DISCUSSION

The results obtained in this study meet those presented in the robust sense called “Nursing Profile in Brazil”, conducted by the Brazilian Federal Nursing Council (COFEN) in partnership with the Oswaldo Cruz Foundation (Fiocruz). It was pointed that nursing is predominantly female, and of higher education than the minimum required to perform their work⁽²¹⁾. These characteristics are the same of the ones from participants of a study developed in a public school hospital in the inner state of São Paulo⁽¹³⁾.

The frequency of the nursing professional action in IHCRA surpassed researchers' expectations, maybe because the units where professionals worked had a large number of patients classified as semi-intensive and intensive care⁽²²⁾.

We noted that participants did not know theoretical basis to detect CPA, and most nurses, technicians, and assistants affirmed to need prescribed procedures, which were not part of the recommendations from the AHA 2010 Guidelines⁽¹⁶⁾ and, SBC Guidelines⁽¹⁶⁾. For example, the case of the procedure “see, listen and feel if there is breathing”.

A unique descriptive study without educational intervention conducted in Minas Gerais compared CPA theoretical knowledge presented by nurses of different in-hospital assistance units⁽¹⁵⁾. In the study, the average number of correct answers for clinical signals to recognize CPA was higher from professionals of emergency units (surgical center, adult intensive care unit and emergency room), compared to nurses from hospitalization units (medical clinic and surgical units). This can be explained because they work more directly with individuals in unstable health situations. However, it is important for professionals to keep themselves updated, as the profile of the patient admitted in the units of our study has unstable characteristics and a higher number of IH CRA than the expected.

On the other hand, a study carried out in Campinas (SP) to identify the knowledge of nursing professionals in urgency/emergency hospital units about PCA, identified that most of half the participants did not answer the question about CPA detection correctly⁽²³⁾.

Therefore, strengthening the idea of educational interventions collaborating to the improvement of theoretical knowledge of professionals, nurses (p -value=0.018), technicians and, assistants (p -value<0.0001), there was a significant increase in the mean score for the question about this topic at the post-intervention moment, corroborating with other studies⁽¹³⁻¹⁴⁾.

Additionally, educational interventions also produced positive knowledge effects about the first attitude after identifying PCA and about the BLS correct sequence for adults. Among technicians and assistants, the intervention resulted in a mean improvement of scores for all questions of the BLS group. In similar studies⁽¹³⁻¹⁴⁾, educational interventions also corroborated for the improvement of results by professionals at post-test, compared to the subjects mentioned above.

Following, we observed that in ACLS questions, the critical point of knowledge permeated on the subject “drug administration pathways” (a question with the higher statistical difference between pre/post-test mean scores). Although nurses also presented significant results (p -value = 0.008), post-test mean score was especially significant for technicians and assistants (p -value <0.0001). In studies conducted in Recife (PE)⁽¹⁴⁾ and in Campinas (SP)⁽¹³⁾, questions related to the administration of drugs were also among those with a higher difference of correct answers during the post-test, after nursing professionals participated in the training.

The global assessment of the effectiveness of actions revealed that all professionals had significant improvement in performance after taking part in the training, corroborating with other studies⁽¹³⁻¹⁴⁾. Notwithstanding, it is important to highlight that methodological studies as ours are considered scarce in the literature⁽²³⁾, which impairs a broader comparative analysis.

In the in-hospital universe, members of the nursing team are frequently the ones who deal with a PCA

situation⁽²⁴⁻²⁵⁾. Thus, training focused on updates and rescuing of the professional knowledge can improve the IHCRAs outcome^(3,5,25). Besides, based on the available scientific evidence, the current AHA guidelines⁽¹⁰⁾ for cardiopulmonary arrest and resuscitation points the need to give particular attention to IHCRAs, strengthening the qualification of in-hospital professionals, so they improve the outcomes of events in their working scenario.

As perspectives for future studies, we comprehend the need for deeper assessments. For example, with the insertion of a theoretical model to base the construction of an educational program; data collection in different time points, in the post-test, expanding the time in comparison to what we used in our study and, not only right after the training.

Besides, in another phase of the study, we intend to verify possible correlations between participant's characteristics (such as education, working time and professional training) and their respective performances in theoretical tests, and if there is another option to be considered in future studies.

CONCLUSION

Educational intervention positively collaborated in the theoretical knowledge of nursing professionals about the cardiorespiratory arrest, in the studied group.

Besides, it is important to highlight that it is necessary to develop more studies about the studied theme, as these can subsidize management strategies aiming to qualify care, propitiating the appropriation of substantial technical-scientific knowledge for professionals. Thus, it is important to comprehend what is the influence of educational interventions (and associated factors) not only for theoretical knowledge of Nursing professionals but also at their work practices, when dealing with IHCRAs situations.

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