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Knowledge Level in Revival Cardiopulmonary Basic and Advanced of the Staff Nursing, Zamora Chinchipe

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Abstract:- Cardiorespiratory arrest occupies one of the main causes of mortality, the knowledge of the nursing staff plays an essential role to perform an optimal cardiopulmonary resuscitation. A quantitative descriptive study was carried out with the aim of demonstrating the knowledge of cardiopulmonary resuscitation in the nurses of a hospital in Zamora Chinchipe. An anonymous survey was applied via Google Forms to 40 operating nurses, the data were tabulated in SPSS 20 and Excel. It was found that 27.5% were male personnel, the most notable age group was between 31 and 40 years (60%), the area where there are more personnel was in the emergency room and obstetric center (35%), 50% had experience less than 5 years of work, only 1 in 4 has taken a CPR course, and 72.5% have participated in CPR in their area. The knowledge regarding recognition and definitions of cardiorespiratory arrest and CPR were correct in 80%, 70% and 47.5% respectively; knowledge regarding the causes of CRP and frequent complications of CPR were between 67.5% and 87.5%. Only 50% knew the correct sequence of CPR, only 30% knew the relationship between compression and ventilation cycles. Airway patency maneuvers and AED patching were correctly indicated between 37.5% and 47.5%. It is concluded that the knowledge of recognition and definition are good, but those of actions and maneuvers to be carried out in CPR are low.

Keywords:- *Cardiopulmonary Resuscitation, American Heart Association, Cardiac Arrest, Knowledge.*

I. INTRODUCTION

Cardiorespiratory arrest (CRA) is the sudden cessation of cardiac output and effective spontaneous ventilation, and constitutes a public health problem with high mortality and lethality rates (1). Currently, worldwide, 12% of natural deaths are sudden and of these, 88% are caused by cardiac arrest (2). In the West, between 450 to 500 thousand deaths occur per year, representing one event every minute (3), in the American continent with 1.7 million deaths (20% of the total) per year (4).

In Ecuador, according to the National Institute of Statistics and Census (INEC), cardio respiratory arrest is considered the eighth leading cause of death, showing a percentage of 2.13% of deaths due to this cause per year. (5) Approximately 35% of the country's total population is at risk of suffering a cardiorespiratory arrest, due to the quality of life and diseases such as hypertension and overweight. This same institution reports that in 2012 there were 11992 deaths due to heart disease, of which 51.68% were men and 48.32% were women (5).

Cardiovascular risk

Cardiovascular risk is defined as the probability of suffering a cardiovascular event in a given period, usually established as 5 or 10 years, and its stratification and quantification by the family physician (13).

Cardiovascular diseases, including ischemic heart disease and cerebrovascular diseases, are a major cause of morbidity and mortality worldwide, increasingly affecting working-age populations and contributing disproportionately to the loss of potential years of healthy life and economic productivity, a situation that is recognized as a public health problem (13).

Cardiovascular diseases

Cardiovascular diseases are among the leading causes of death worldwide, they are a group of disorders of the heart and blood vessels, (11) which according to the World Health Organization (WHO) are responsible for 17 million deaths in the world, and it is estimated that by the year 2020, deaths from these diseases will increase from 15% to 20% (11).

In Latin America and the Caribbean, the number of deaths is around 150,000 per year (14). In Cuba, heart diseases have been established for more than 4 decades as the leading cause of death in men and women, with a mortality rate of 148.2 in 1970 and an increase of 211.8 in 2010 (14).

In Ecuador for the year 2019, ischemic heart disease in people aged 30 to 40 years represented one of the leading causes of death with 11.8%, and in older adults caused 6,783 deaths (15).

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Cardiorespiratory arrest, action in the in-hospital setting

Cardio-respiratory arrest (CRP) is defined as the sudden and unexpected cessation of heart activity confirmed by the absence of detectable pulses, unconsciousness or cessation of breathing in a person who immediately beforehand appeared to be completely healthy. (16) The Spanish Heart Foundation defines cardio respiratory arrest (CRA) as "a sudden loss of pulse and consciousness caused by an unexpected failure of the heart's ability to pump blood to the brain and throughout the body. It is usually caused by life-threatening arrhythmias and abnormalities in the heart's electrical system"(17).

Basic cardiopulmonary resuscitation (CPR) is the attempt to restore effective circulation using external chest compressions and insufflation of the lungs with exhaled air or some source of oxygen (via a manual respirator) (16). Among the strategies developed in all care settings is the application of CPR techniques by health care professionals (18). It has been proven that immediate care by trained personnel improves survival in the event of in-hospital CPR by 7-24%; these personnel should have been trained for at least two years (18). The key members of the resuscitation team are nurses, who should have the cognitive, procedural and attitudinal skills that allow them to act in medical emergencies with independent actions or as part of the medical team in an in-hospital context (18).

In-hospital cardiopulmonary resuscitation from the American Heart Association (AHA) learning program.

The first recommendations for cardiopulmonary resuscitation were established by the American Heart Association in 1974 and have been updated in 1980, 1986, 1992, 1992, 2000, 2005, and 2010. Recommendations for basic life support (BLS) and advanced cardiovascular life support (ACLS) for adults are combined in the 2020 Guidelines. Major changes to the American Heart Association guidelines include the following: (19).

-Improved visual aids and algorithms provide easy-to-remember guidance for BLS and ACLS resuscitation situations (19).

-The importance of early initiation of CPR by lay rescuers has been reemphasized.

-Previous recommendations on adrenaline administration have been reaffirmed, with emphasis on early administration of adrenaline (19).

The use of real-time audiovisual feedback is suggested as a means of maintaining CPR quality (19).

-Continuously measuring blood pressure and end-expiratory carbon dioxide (ETCO2) during advanced resuscitation may be helpful in improving the quality of CPR (19).

-According to the most recent evidence, routine use of dual sequential defibrillation is not recommended (19).

-Intravenous (IV) access is the preferred route for drug administration during advanced resuscitation. Intraosseous (IO) access is acceptable if IV access is not available (19).

-Patient care after return of spontaneous circulation requires special attention to oxygenation, blood pressure control, evaluation of percutaneous coronary intervention, specific temperature management, and multimodal neuroprognostication (19).

-Because recovery from cardiac arrest continues long after initial hospitalization, patients should have formal assessment and support to address their physical, cognitive, and psychosocial needs (19).

-After a resuscitation, a debriefing can be beneficial to the mental health and well-being of lay rescuers, EMS providers, and hospital health care workers (19).

-The approach to cardiac arrest in pregnancy focuses on maternal resuscitation, with preparation for perimortem cesarean section, if necessary, to save the child and improve the chances of successful resuscitation of the mother (19).

High quality cardiopulmonary resuscitation:

As characteristics are mentioned:

Start compressions within 10 seconds of identified cardiac arrest.

-Compress hard and fast

-Frequency of 100 to 120.

-Thoracic depth of 5 to 6 cm.

-Allow full thoracic expansion between each compression.

-Minimize interruptions to less than 10 seconds.

-Effective ventilation.

-Avoid excessive ventilation (20).

Nursing practice is based on relational and care theory, survival of cardio respiratory arrest depends on early recognition of the situation and with the activation of the emergency system and a precisely performed cardio pulmonary resuscitation, these actions guide nurses to recognize the needs in order to ensure holistic care of a user (21).

The success of cardiopulmonary arrest care, translated into a decrease in morbidity and mortality, is directly related to the time, manner and order in which resuscitation maneuvers are initiated (22). In a witnessed arrest, the mortality rate increases in direct proportion to the time in which cardiopulmonary resuscitation is delayed; this is particularly true in the case of cardiopulmonary arrest due to an arrhythmia requiring ventricular defibrillation (22).

Cardiorespiratory arrest is a major public health problem that requires the attention of health administrations (23).

Early neurological recovery in patients is possible in only 11-48% of resuscitated persons; the rest die during hospitalization or remain alive, but with severe neurological deficits (24).

Studies published in 2002 identified that there was an improvement in survival and neurological outcome in hospitalized persons who survived out-of-hospital ventricular fibrillation and were managed with induced therapeutic hypothermia (24).

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Early recognition, as well as rapid action with adequate knowledge and application of useful maneuvers are essential for the medical team facing a case of cardiopulmonary arrest. In this context and based on the methodology and updates of the AHA, the objective of this study is to measure the knowledge of basic and advanced cardiopulmonary resuscitation of the nursing staff of a hospital in Zamora Chinchipe, based on these specific objectives were: 1) To characterize the sociodemographic variables. 2) To determine the degree of work experience and the degree of CPR experience. 3) To determine the level of knowledge in the initial recognition of cardiorespiratory arrest. 4) To quantify the knowledge of appropriate maneuvers in relation to cardiopulmonary resuscitation.

II. METHODOLOGY

Type of research: a descriptive quantitative research was carried out.
Population: 48 nursing graduates from a Basic Hospital in the Province of Zamora Chinchipe, between 18 and 65 years of age, from the emergency and obstetric center 16, hospitalization 17, operating room 8 and covid 7.
Sample: a convenience sampling was carried out. Only 40 direct patient care nurses were taken into account for the research.
Inclusion criteria: direct patient care nurses who agreed to fill out the survey form.
Exclusion criteria: nurses in administrative positions.
Instruments: a questionnaire was prepared with multiple choice questions for data collection, which included sociodemographic characteristics, experience and training in CPR (6 items), as well as 20 questions on specific knowledge, recognition, definition and maneuvers of cardiopulmonary resuscitation.
Procedure: The procedure was carried out and had the respective authorizations from the educational unit and the hospital institution where the nursing staff works. Due to the situation of restriction of meetings in large groups, the form was uploaded in the Google Forms application for the participants to fill it out with the respective login link.
Ethical considerations: by conducting a virtual survey and not requesting names, surnames, identification numbers or e-mail addresses, the confidentiality of the participants was protected.
Statistical analysis: descriptive analysis was performed using frequencies and percentages, which were presented in tables. IBM SPSS version 20 and Microsoft Excel 2013 statistical programs were used, while Microsoft Word 2013 was used for the presentation of the report.

III. RESULTS

Table 1. Distribution of 40 nurses according to age, sex, area of work, and work and CPR experience.

Variable	Indicator	f	%
Age	20 to 30 years old	12	30
	31 to 40 years old	24	60
	41 years old or older	4	10
Sex	Male	11	27,5
	Female	29	72,5
Area of work	Emergency and obstetric center	14	35
	Hospitalization	12	30
	Operating room	4	10
	Covid-19 Area	10	25
Work experience	Less than 5 years	20	50
	From 5 to 10 years	16	40
	11 to 15 years	1	2,5
	16 years or more	3	7,5
CPR course	Yes	10	25
Participation in CPR at work	Yes	29	72,5

Nowadays, nursing work is no longer seen only as a profession for women; thus, in the present study it was found that 27.5% of the 40 participants were male. Personnel under 30 years of age accounted for 30%, while nurses over 41 years of age accounted for only 10%. As for the areas where they work, 35% work in the emergency and obstetric center, the lowest percentage being in the operating room. Work experience is an important factor in obtaining knowledge, so in this hospital half of the staff has less than 5 years of experience, on the other hand, 40% have between 5 and 10 years of experience. Updating with courses is scarce, only 1 out of 4 have done so. The fact of having actively participated in CPR in a hospital context was 72.5%.

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Table 2. Knowledge of PCR definition and recognition.

Variable	Indicator	f	%
How to recognize cardiorespiratory arrest	No breathing, gasping or wheezing	5	12,5
	No response to any stimulus	1	2,5
	No pulse taken in 10 seconds or less	2	5
	All are correct	32	80
Cardio-respiratory arrest is defined as	Cessation of spontaneous breathing, causing a defect in oxygenation.	4	10
	Abrupt and unexpected interruption of circulation, consciousness and potentially reversible respiration	28	70
	Irreversible, abrupt and unexpected interruption of circulation and respiration.	8	20
Artery indicated to determine the pulse in an adult in cardiorespiratory arrest.	The femoral artery	2	5
	Carotid artery	33	82,5
	Brachial artery	5	12,5
The complete absence of electrical activity in the myocardium is called cardiopulmonary resuscitation.	Ventricular fibrillation	10	25
	Flutter	1	2,5
	Asystole	26	65
	Pulseless electrical activity	3	7,5
Cardiopulmonary resuscitation, is defined as	A set of life-saving emergency procedures used when the person has stopped breathing or the heart has stopped beating.	19	47,5
	A set of maneuvers that we do with our hands, in other words: mouth-to-mouth and external cardiac massage.	1	2,5
	A set of temporary and internationally standardized maneuvers intended when a person's blood circulation suddenly stops.	13	32,5
	A set of maneuvers that ensure the supply of oxygenated blood to the brain and heart.	7	17,5

The indicators that a patient is in CRP (all three correct) were recognized by 80%. The adequate definition of CRP was indicated by 7 out of 10 professionals. Using the carotid artery to determine the pulse in a CRP was indicated by 82.5%. Asystole was correctly defined by 65% of nurses. Finally, the ability to correctly define CPR was found in 47.5%.

Table 3. Other PCR and CPR knowledge

Variable	Indicator	f	%
The main cause of Cardio-respiratory Arrest is	Airway obstruction	30	75
	Head, neck and thorax trauma.	8	20
	Asthmatic crisis	2	5
Cardiac massage in the adult is performed with	Two hands on the lower half of the sternum	35	87,5
	One hand on the lower half of the sternum	1	2,5
	Two fingers in the center of the thorax	1	2,5
	Two fingers on the lower half of the sternum	3	7,5
The most frequent complication of chest compression is	Pneumothorax	9	22,5
	Hepatic tear	1	2,5
	Rib fracture	30	75
The leading cause of airway obstruction in the unconscious patient is	Presence of dentures	1	2,5
	Accumulation of secretions	12	30
	Tongue dropping backwards	27	67,5
	Presence of food	0	0
Defibrillable rhythms are	Ventricular fibrillation and flutter	8	20
	Supraventricular tachycardia and asystole	4	10
	Ventricular fibrillation and pulseless ventricular tachycardia	24	60
	Ventricular tachycardia and pulseless electrical activity	4	10

Knowing the main cause of CRA was correctly indicated by three quarters of the participants, as well as knowing that cardiac massage in adults is performed with two hands was correctly identified by 87.5%. Recognizing that rib fracture is the most frequent complication of chest compression was shown by three out of four nurses. In an unconscious patient, the main cause of airway obstruction is the tongue falling backwards, this was correctly stated by 67.5%. A condition that can be vital at the time of CPR is the recognition of a shockable rhythm, in this study 6 out of 10 knew that these are ventricular fibrillation and pulseless electrical activity.

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Table 4. Knowledge of AHA CPR recommendations

Variable	Indicator	f	%
The basic CPR sequence, according to the AHA Guidelines.	A-B-C (airway, breathing, chest compressions)	13	32,5
	C-A-B-D (chest compressions, airway, respiration, defibrillation)	5	12,5
	C-A-B (chest compressions, airway, ventilation)	12	30
	A-C-B (airway, chest compressions, breathing)	10	25
The minimum number of compressions in one minute in an adult patient, according to the AHA guidelines.	80 - 90 compressions per minute	9	22,5
	70 - 100 compressions per minute	4	10
	At least 100 compressions per minute	7	17,5
	100 - 120 compressions per minute	20	50
Chest compressions in an adult patient should be with a depression of	4 - 5 cm	14	35
	3 - 5 cm	7	17,5
	5 cm	11	27,5
	5 - 6 cm	8	20
Compression-to-ventilation ratio and number of cycles to be performed in CPR according to the AHA guidelines.	15:2 - 5 cycles	6	15
	30:2 - 4 cycles	15	37,5
	30: 2 - 5 cycles	12	30
	30: 2 - 3 cycles	7	17,5
The maximum time given for each ventilation according to the AHA guidelines is	2 seconds	15	37,5
	3 seconds	12	30
	1 second	7	17,5
	5 seconds	6	15

As well as knowing how to recognize and define CPR, it is important to know how to perform CPR. Regarding this and in relation to the AHA recommendations, the results obtained indicate that only 3 out of 10 knew the correct sequence (C-A-B), 50% knew that compressions should be between 100 and 120 per minute. Seventy percent did not know that the compression-ventilation ratio and adequate number of cycles before reevaluation is 30:2 - 5. As for the adequate ventilation to be given (1 ventilation in 1 second), only 37.5% indicated it correctly.

Knowledge of executable maneuvers in CPR

Variable	Indicator	f	%
Optimal mouth-to-mouth ventilation - manual resuscitator is when	Chest expands	25	62,5
	Adequate air-tight seal is evident before mouth and device	9	22,5
	Gastric distention is evident	2	5
	Time of 3 seconds is given for each ventilation	4	10
How many ventilations are given in one minute in the adult patient who has a pulse and is not breathing.	5 to 6 ventilations	11	27,5
	3 to 5 ventilations	18	45
	0 to 20 ventilations	0	0
	10 to 12 ventilations	11	27,5
Airway patency in an unconscious patient without cervical injury is done by	Mandibular traction maneuver	11	27,5
	Oropharyngeal tube placement	6	15
	Lateralization of the head	4	10
	Forehead - chin maneuver	19	47,5
If cervical injury is suspected in an unconscious patient, airway patency is achieved by	Forehead - chin maneuver	12	30
	Mandibular traction	14	35
	Neck hyperextension	7	17,5
	Release of foreign bodies	7	17,5
The correct placement of the AED patches is	In the lower part of the right clavicular border on the precordium, and on the left side in the left infra scapular region in the mid-axillary line.	15	37,5
	Right over the precordium and on the left side in the infra scapular region	3	7,5
	Right at the infra clavicular level and on the left lateral side Left at the infra clavicular level and on the right side in the mid axillary line of the thorax (cardiac apex)	13	32,5
	Left at infra clavicular level and on the right side in the axillary midline of the thorax (cardiac apex)	9	22,5

In other CPR maneuvers that were taken into account, it was found that: a large majority (62.5%) recognize that an indicator of optimal mouth-to-resuscitator ventilation is chest expansion; only 27.5% correctly indicate that 10 to 12 ventilations should be given in a person who is not breathing but has a pulse. Likewise, in an unconscious patient without cervical injury, 47.5% indicated that the forehead-chin maneuver should be performed for airway patency; on the contrary, in the case of suspected cervical injury, only 35% indicated the correct action, which is jaw traction. Finally, the placement of AED patches was correctly indicated by only 37.5%.

IV. DISCUSSION

The nursing career in our environment has been seen as exclusively for women, however, men are also gradually becoming involved, in this research 27.5% of men were found, on the other hand, age is an important factor in the personnel, in first world countries students in their last years are provided with formal courses in CPR and BLS (25), in this research only a quarter had done it (in a particular way), however, more than 70% had participated in a CPR.

Nurses are in greater contact with the patient in any instance and are usually the ones who detect CPR and activate the corresponding codes (26). Early and timely detection is key to prognosis (25, 27); in this regard, in the present study, 8 out of 10 nurses did so adequately. After identification, the initiation of good quality CPR is essential in terms of compressions and ventilations, however, not always the administrator does it properly, with effectiveness rates ranging from 21% to 90% (26, 28, 29); in the present study, only 3 out of 10 knew the correct sequence and cycles of CPR.

There are basic but vital maneuvers for the patient in CRA, such as permeabilization of the airway, stabilization of the cervical spine and ventilation in patients who have a pulse, these are often poorly detected and executed adequately (28), in the present investigation, these were adequately recognized between 27 and 67%. This has a direct effect on the patient's prognosis, since many of the causes of CRA are due to defibrillable rhythms, the nursing staff should be prepared to use them, but their use is not so frequent (30), in this sense, in this research only 37.5% knew the correct placement of the patches.

The updating of knowledge and skills in CPR and CPR is a favorable predictor and even more so if they are of a formal nature in the last 6 months (26, 31), and it has also been shown that practical models with realistic models and measurements are more effective in terms of effectiveness in the execution of good quality CPR techniques (32-35).

V. CONCLUSIONS

Within the health care team, the nursing staff plays an essential role in the case of rapid recognition and action in the case of CPR and consequent CPR. In the present study, the knowledge of detection and definition is acceptable; however, the knowledge of executable maneuvers in CPR and airway management is deficient, and updating is not part of hospital strategies but an initiative of the professionals themselves. International evidence indicates that constant and standardized training programs are necessary to improve the diagnosis, management and prognosis of patients who suffer cardiorespiratory arrest.

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