



ASSESSMENT OF NURSING RECORDS ON CARDIOPULMONARY RESUSCITATION BASED ON THE UTSTEIN MODEL

AVALIAÇÃO DOS REGISTROS DE ENFERMAGEM SOBRE RESSUSCITAÇÃO CARDIOPULMONAR BASEADA NO MODELO UTSTEIN

EVALUACIÓN DE LOS REGISTROS DE ENFERMERÍA ACERCA DE LA REANIMACIÓN CARDIOPULMONAR BASADA EN EL MODELO UTSTEIN

Daiane Lopes Grisante¹, Andréa Braz Vendramini Silva¹, Andréa Cotait Ayoub², Renata Guzzo Souza Belinelo³, Priscila Sete de Carvalho Onofre³, Camila Takáo Lopes⁴

Cross-sectional study that assessed the quality of nursing records on cardiopulmonary resuscitation. Forty-two patients' charts were reviewed in an intensive care unit, using the Utstein protocol. There was a predominance of men (54.8%), aged from 21-70 years old (38.1%), correction of acquired heart diseases (42.7%), with more than one pre-existing device (147). As immediate cause of cardiac arrest, hypotension predominated (48.3%) and as the initial rhythm, bradycardia (37.5%). Only the time of death and time of arrest were recorded in 100% of the sample. Professional training in Advanced Life Support was not recorded. The causes of arrest and initial rhythm were recorded in 69% and 76.2% of the sample. Chest compressions, patent airway obtainment and defibrillation were recorded in less than 16%. Records were considered of low quality and may cause legal sanctions to professionals and do not allow the comparison of the effectiveness of the maneuvers with other centers.

Descriptors: Nursing Care; Nursing assessment; Nursing Evaluation Research; Cardiac arrest; Nursing Records.

Estudo transversal que avaliou a qualidade dos registros de enfermagem sobre ressuscitação cardiopulmonar. Foram revisados 42 prontuários de pacientes em uma unidade de terapia intensiva, utilizando o protocolo Utstein. Houve predomínio de homens (54,8%), idade de 21 a 70 anos (38,1%), correção de cardiopatias adquiridas (42,7%), com mais de um dispositivo pré-existente (147). Como causa imediata de parada cardiorrespiratória, predominou hipotensão (48,3%) e como ritmo inicial, bradicardia (37,5%). Apenas a hora do óbito e hora da parada foram registradas em 100% da amostra. Não foi registrado treinamento dos profissionais em Suporte Avançado de Vida. As causas da parada e ritmo inicial foram registrados em 69% e 76,2% da amostra. Compressões torácicas, obtenção de vias aéreas pérvias e desfibrilação foram registradas em menos de 16%. Os registros foram considerados de baixa qualidade, podendo incorrer em sanções legais aos profissionais e não permitindo a comparação da efetividade das manobras com outros centros.

Descritores: Cuidados de Enfermagem; Avaliação em Enfermagem; Pesquisa em Avaliação de Enfermagem; Parada Cardíaca; Registros de Enfermagem.

Este estudio transversal que evaluó la calidad de registros de enfermería acerca de la reanimación cardiopulmonar. Fueron evaluados 42 registros de pacientes en unidad de cuidados intensivos utilizando el protocolo Utstein. Hubo predominio de hombres (54,8%), entre 21-70 años (38,1%), corrección de cardiopatías adquiridas (42,7%), con más de un dispositivo pre-existente (147). Como causa inmediata de parada cardiorrespiratoria, predominó hipotensión (48,3%) y como ritmo inicial, bradicardia (37,5%). Sólo en el momento de la muerte y de la parada cardiorrespiratoria fueron registradas en 100%. No fue registrada capacitación en Soporte Avanzado de Vida. Causas inmediatas de parada y ritmo inicial se registraron en 69 y 76,2% de la amuestra. Compresiones torácicas, obtención de vías respiratorias y desfibrilación se registraron en menos de 16%. Los registros se consideraron de baja calidad, pudiendo conducir a sanciones legales a los profesionales y no permitiendo comparación de la efectividad de reanimación con otros centros.

Desciutores: Atención de Enfermería; Evaluación en Enfermería; Investigación en Evaluación de Enfermería; Paro Cardíaco; Registros de Enfermería.

¹RN, Instituto Dante Pazzanese de Cardiologia. São Paulo, SP, Brasil. E-mail: daianelopesgrisante@gmail.com, andreabvsilva@uol.com.br

²RN, PhD, Director of the Division of Nursing, Instituto Dante Pazzanese de Cardiologia. São Paulo, SP, Brazil. E-mail: acotait@ig.com.br

³RN, MSc, Associate professor, Universidade Paulista. São Paulo, SP, Brazil. E-mail: renata.guzzo@gmail.com, enfermagemcidunivers@unip.br

⁴RN, Doctoral Student, Universidade Federal de São Paulo. São Paulo, SP, Brazil. E-mail: camilatakao@hotmail.com

Corresponding author: Andréa Cotait Ayoub

Director of the Division of Nursing, Dante Pazzanese Cardiology Institute. Av Dr Dante Pazzanese, 500, CEP: 04012-180, São Paulo, SP, Brazil. E-mail: acotait@ig.com.br

INTRODUCTION

The indication for cardiopulmonary resuscitation (CPR) should take into consideration the prognostic criteria of the procedure. In the in-hospital environment, characterized by multiple diseases, its indiscriminate use can bring little or no benefit to the patient, as well as cause larger financial and emotional costs⁽¹⁾.

In-hospital patient surveillance is a primary nursing responsibility. Thereby, this team plays a vital role in identifying the cardiopulmonary arrest (CPA) and in starting CPR maneuvers⁽²⁾. However, the scientific production of nursing about CPA in adult patients in-hospital is numerically small in relation to the medical field, as seen in the SciELO, Lilacs and Medline databases. Out of 48 articles published on this subject, less than 10% had nurses as authors⁽³⁾.

Knowing the predictors of CPA survival is essential for the decision of providing CPR or not, so that there are no financial and emotional expenditures without significant benefit to the patient and so that actions are implemented in order to improve the quality of care. For that purpose, there should be a proper record of the sequence of events and behaviors in CPR, so that the outcomes of care and epidemiological profile of patients can be compared within a service or among services⁽⁴⁻⁷⁾.

Thus, in the 90s, a standardized model of data collection and recording of CPR maneuvers was created to allow single aggregation and analysis of data, called *Utstein*. The protocol suggests the collection of data about the patient, event, results of in and out-of-hospital follow-up and information about the care team⁽⁸⁾.

The CPR records according to the *Utstein* protocol allow the comparison of the epidemiological profile of CPAs among services and countries. The subsequent analysis of records provides knowledge about the quality of in-hospital care⁽⁴⁻⁷⁾. Such analysis has proven useful for worldwide assessment of prognostic factors and survival of patients who underwent CPR maneuvers⁽⁴⁻⁷⁾.

A study developed by Australian nurses showed that the *Utstein* protocol was a useful tool for collecting data regarding CPR in a hospital. Using this protocol, the authors found that the rates of return of spontaneous circulation (ROSC) and of post-discharge survival were considerably higher compared to those of other hospitals. Furthermore, it was verified that a shockable initial rhythm (ventricular fibrillation - VF - or ventricular tachycardia - VT) was independently associated to ROSC and to post-discharge survival. Successful outcomes were attributed to the nursing staff as the first to identify CPA rhythm and to use semiautomatic external defibrillators and to the permanent education of medical and nursing teams. In this context, the authors suggested that the use of semi-automatic external defibrillators could be encouraged⁽⁴⁾.

In a Spanish hospital, CPA data were collected, using the *Utstein* protocol, in order to identify the survival rate of patients, the predictors of mortality and the protective factors against mortality. The survival rate was similar or slightly higher than that found in other services; the predictors of mortality were the administration of any dose of epinephrine during CPR and the total duration of CPR; the protective factors were shockable initial rhythms and CPA witnessed by a physician. The CPR record using the *Utstein* protocol provided relevant information regarding the effectiveness with which the patients were treated and suggested that professional qualification should be strengthened, since it can influence in one of the protective factors against mortality⁽⁵⁾.

In Taiwan, the chance of survival from cardiac arrest in the ICU and the predicting variables of ROSC and of post-discharge survival were investigated in a longitudinal study. The authors verified that the survival rate in the ICU was lower than that observed in other units of the same institution. Independent predictors of

survival after discharge were VF and VT as initial CPA rhythms, APACHE score and shorter duration of CPR⁽⁶⁾.

An audit of all CPAs from 2004 to 2006 using the *Utstein* protocol in the city of Auckland, New Zealand, identified that the survival to discharge (27.2%) was similar or greater than that found in other centers, as well as the neurological status of patients after 12 months. Furthermore, it was found that shockable initial rhythms of CPA, CPA during the period with maximum number of physicians on call and lower age of patients were independent predictors of survival⁽⁷⁾.

Given the context, it is questioned whether the nursing records about CPR in an intensive care unit are compatible with the information required by the *Utstein* model. Because this information can be used to assess the CPR effectiveness⁽⁴⁻⁷⁾, this compatibility can be considered as an indicator of quality of the nursing records⁽⁹⁾.

The aim of this study was to assess the quality of nursing records on cardiopulmonary resuscitation.

METHOD

This is a descriptive, cross-sectional, retrospective study with information from patients records in a postoperative cardiac surgery intensive care unit (ICU) at a public hospital, reference in cardiology, in São Paulo-SP, where CPR is registered without a previously standardized protocol. At the time of data collection, the ICU had 40 active beds. The average number of admissions per month is 196.

The study population consisted of charts of individuals admitted to the ICU from January 1 to May 31, 2012, an average of 980 patients. Inclusion criteria for the study were: records of subjects of both sexes and all ages who died (n=60). Exclusion criteria were records of subjects with brain death (n=2) or without CPR records (n=16).

The exclusive inclusion of charts of subjects who died was due to the impossibility of reviewing the

records of all patients admitted to the ICU in the period mentioned (an average of 980 records). Through the computerized system of the institution, it is possible to know which subjects had died during the period, and whose records would therefore have registers on CPR or non-resuscitation order, excluding those with brain death. Once aware of which patients had evolved to death, the researchers required their charts to the Medical File Service for review.

In order to check the quality of Nursing records on CPR, the frequency with which the variables required by the *Utstein* model were recorded was investigated. For that purpose, a data collection instrument based on the *Utstein* protocol⁽⁸⁾ was used, with information regarding:

(1) Patient's variables (age, gender, date of admission, admission diagnosis and inpatient procedure, pre-existing devices: presence of peripheral venous catheter, central venous catheter, arterial catheter, pacemaker, pulmonary artery catheter, intra-aortic balloon, use of vasoactive and/or antiarrhythmic drugs and mechanical ventilation).

(2) Event's variables (immediate causes - arrhythmia, hypotension, respiratory, metabolic, acute myocardial infarction or ischemia, unknown; initial rhythm - ventricular fibrillation, ventricular tachycardia, pulseless electric activity, bradycardia, asystole, Interventions in CPR - airway, chest compressions, defibrillation, time of events - arrest detected, arrest confirmed, CPR initiated, airway obtainment, first defibrillation, first dose of adrenaline, first dose of atropine, CPR completed; Drugs and doses used - Adrenaline, Atropine Amiodarone, Lidocaine, Procainamide, Sodium bicarbonate, Magnesium Sulfate, Calcium gluconate).

(3) Additional information (record of professionals involved in CPR - physician, nurse, Nursing auxiliary/technician, others; number of physicians trained in Advanced Cardiovascular Life Support (ACLS)

involved in the assistance, number of nurses trained in ACLS involved in the assistance).

The presence of record of these variables in the CPA assistance was used as a quality indicator of the annotation. The results will present the frequencies of these variables in the Nursing records.

Data collection was performed by a student in the last semester of the Nursing undergraduate course appropriately trained in September 2012, under the supervision of a nurse with a Master's degree of the institution. After checking on the computerized system who were the subjects that died from January 1 to May 31, 2012, the student requested their charts to the Medical File System and collected the data using the instrument previously described.

Data were typed and analyzed using descriptive statistics (absolute numbers and percentage) in the Microsoft Office Excel[®] software 2007. The research protocol was approved by the Institutional Ethics Committee under N. 4248/2012.

RESULTS

Sixty charts of patients who died in the ICU were analyzed, out of which 18 were excluded due to the diagnosis of brain death (2) or did not have CPA record (16). The sample was composed of 42 Nursing records. The information on gender and age are shown in Table 1. Most of the patients were male (54.8%) and aged from 21 to 70 years old (38.1%).

Table 1 - Gender and age of individuals who suffered cardiac arrest. Postoperative cardiac surgery ICU. São Paulo, SP, Brazil 2012

Variables	n	%
Gender		
Male	23	54.8
Female	19	45.2
Age (years)		
0-20	11	26.2
21-70	16	38.1
71-100	15	35.7

The diagnoses and procedures of hospitalization are shown in Table 2. There was a prevalence of the diagnosis of congenital heart disease (23.8%) and of prosthetic valve implantation (28.5%).

Table 2 - Diagnoses and procedures of admission of individuals who suffered cardiac arrest. Postoperative cardiac surgery ICU. São Paulo, SP, Brazil 2012

Variables	n	%
Admission diagnosis		
Congenital heart disease	10	23.8
Coronary insufficiency	7	16.7
Aortic stenosis	6	14.3
Acute myocardial infarction	6	14.3
Others	13	30.9
Procedure of admission		
Prosthetic valve implantation	12	28.6
Treatment of congenital malformations	10	23.8
Myocardial revascularization	6	14.3
Others	14	33.3

The data related to the variable "pre-existing devices" are presented in Table 3. One hundred forty-seven were quantified, the venous catheter (38) and endotracheal tube (38) being more frequent, which shows that the same patient had more than one device at the moment of PCA.

Table 3 - Pre-existing devices at the time of the cardiac arrest. Postoperative cardiac surgery ICU. São Paulo, SP, Brazil, 2012

Device	n	%
Central venous catheter	38	90.5
Endotracheal tube	38	90.5
Arterial catheter	27	64.3
Peripheral venous catheter	21	50.0
Transvenous pacemaker wire	18	42.9
Intra-aortic balloon	4	9.5
Pulmonary artery catheter	1	2.3

*The percentages refer to 42 patients

The immediate causes of CPA are presented in Table 4. Hypotension predominated (48.2%).

Table 4 - Immediate causes of cardiac arrest registered. Postoperative cardiac surgery ICU. São Paulo, SP, Brazil, 2012

Variables	n	%
Immediate cause		
Hypotension	14	48.3
Arrhythmia	7	24.2
Respiratory	6	20.7
Arrhythmia/hypotension	1	3.4
Arrhythmia/respiratory	1	3.4

*Thirteen Nursing records did not show the immediate cause

The initial rhythms are shown in Table 5. There was a predominance of bradycardia (37.5%), followed by asystole (28.1%).

Table 5 - Initial rhythms of cardiac arrest recorded. Postoperative cardiac surgery ICU. São Paulo, SP, Brazil, 2012

Variables	n	%
Rhythm		
Bradycardia	12	37.5
Asystole	9	28.1
Pulseless electrical activity	6	18.7
Bradycardia followed by pulseless electrical activity	2	6.2
Ventricular fibrillation	1	3.1
Pulseless electrical activity followed by asystole	1	3.1
Ventricular tachycardia followed by asystole	1	3.1

*Ten Nursing records did not show the initial rhythm

Although 90.9% of the individuals used vasoactive/antiarrhythmic drugs, this finding was not reported at the moment of CPR. The variables "use of drugs at the time of the event" and "doses used" were registered in 69% and 57.1% of the charts, respectively.

The variable "airway obtainment" was reported in only 7.1% of the records. The variables "chest compression" and "defibrillation" were registered only in 4.7% and 16.6% of the cases, respectively.

About the "additional information", there was approximately 15% of records of physician's participation only, without mentioning the number of Nursing professionals, and there was no record about the ACLS training of the professionals involved in the assistance.

DISCUSSION

The results of this study are limited by the inclusion only of records of individuals who died. This inclusion criterion prevents the researchers from knowing whether the records of CPR in charts of individuals who survived CPA contain information consistent with those required by the *Utstein* protocol. However, the results have implications for the Nursing practice, since they identify documentation gaps and, therefore, highlight the need for improved attendance records.

The exclusion of 16 charts without records regarding CPR was worrying because it was unclear whether the patients did not have the indication of CPR (non-resuscitation order) or if the procedures were performed and not recorded. This and other inconsistencies hinder the assessment of the quality of the procedures, devalue the time spent and the work spent by the nursing staff and put the professional at risk from the legal point of view⁽¹⁰⁾.

The gender of the patients was recorded in all the charts, which allowed the identification of the male predominance. This profile was observed in another postoperative cardiac surgery ICU⁽¹¹⁾, but it is not considered relevant as to the impact on post-PCR survival⁽¹²⁾.

The fact that there are records of all the patients' ages is important because knowing the impact of this

variable on the outcomes of CPR is essential for the discussion about initiating and/or maintaining CPR. The age appeared as an independent prognostic factor of cardiac arrest survival (average age of 59.4 compared to 69.1 years old) in a New Zealand study⁽⁷⁾.

The predominance of the extremes of age in the population is associated with findings of previous epidemiological studies⁽¹³⁻¹⁴⁾. Hospital mortality in septuagenarians or older people in coronary revascularization and valvular operations is higher than in younger patients⁽¹³⁾. Between 1980 and 2006 there was a significant growth of the group of individuals over 75 years old in Brazil, especially those over 80⁽¹⁴⁾.

Individuals between the ages of 0 and 10 years old underwent surgical correction of congenital heart diseases, situation when there is a high incidence of complications, and up to 14% of incidence of CPA during the postoperative in-hospital period⁽¹⁵⁾.

The pre-existence of other devices was described in Nursing records, not at the moment of CPR. The same situation was verified in a previous study⁽⁹⁾ and it harms the understanding of the sequence of events/behaviors during CPR, e.g. , the lack of establishment of definitive airway due to its pre-existence or due to the verification of the adequacy of ventilation with temporary airway. Monitored patients, with pre-existing devices, facilitate the detection of CPA, as well as the assistance⁽⁶⁾.

The records of the immediate cause and initial CPA rhythm is important to enable analysis of post-CPA survival prediction⁽¹⁾. As presented in the introduction of this study, VF and VT as initial rhythms were identified as independent predictors of ROSC and post-hospital discharge survival and protection against mortality in different settings⁽⁴⁻⁷⁾.

However, there was absence of records on the immediate causes (31%) and on the initial rhythm (23.8%). In a previous Brazilian study, these variables were not registered in more than 92% of the medical records⁽¹⁶⁾. It was observed, in a previous study, that

there were not enough records that made it clear what interventions were conducted, the initial CPA rhythm, what time the event happened and its duration, as well as the drugs used⁽⁹⁾. In the UK, it was also verified that the documentation of CPAs did not follow the recommendations of *Utstein*, so that the information was insufficient to enable the audit procedures⁽¹⁾. Besides impeding analysis of survival prediction, the lack of records on the immediate cause, initial CPA rhythm, interventions conducted and time of CPA verified in our study preclude the audit procedures and the comparison of outcomes with those from other services⁽¹⁾.

The time when observations are made and the procedures are conducted are important to ensure the accuracy of the data recorded, since the clinical status of the patient varies with time⁽¹⁰⁾. The ICU environment has professionals with patients full time, who maintain continuous clinical monitoring, so all the events are witnessed when they occur. However, the time of CPA was not recorded in 2.3% of the medical charts reviewed. Thus, the chronology of events, a legal precept of nursing, was also not shown.

In our population, drug use was recorded in 69% of the cases, but only 57.1% of the charts contained records of doses. The high prevalence of vasoactive/antiarrhythmic drugs increases the severity of patients. However, this feature must be reported at time of CPR, as the prolonged use of epinephrine increases oxygen consumption by the myocardium and may induce arrhythmias and ischemia⁽¹⁶⁾, events that may influence the prognosis of the patient.

The paucity of records concerning the drug doses, ventilation with bag-valve-mask, chest compressions and defibrillation does not clarify if the procedures were performed and not recorded or if the procedures were not performed. These failures, associated to the lack of identification of the professionals who participated in the service, may incur losses in case of a lawsuit⁽¹⁷⁾. Another Brazilian study, conducted at a public teaching hospital,

verified devaluation of Nursing records in general, and states that this fact contributes to its own invisibility⁽¹⁸⁾.

It is important that there is a record on the presence of physicians and nurses trained in ACLS and/or BLS in the assistance staff, since the presence of at least one member of the staff with this training in intra-hospital CPR is associated with survival in the long and medium term⁽¹⁹⁾.

According to the Code of Ethics for Nursing Professionals⁽²⁰⁾, it is the responsibility and duty of professionals to encourage and create conditions for the record of the inherent and essential information to the care process, as well as to perform these records. Because CPA is an event whose attendance requires discipline, coordination, agility and efficiency, it is believed that the use of the *Utstein* protocol is an alternative that can be used by the Nursing staff to encourage and facilitate the systematic recording of CPR and to avoid legal sanctions.

CONCLUSION

The individuals of the sample, who underwent correction of congenital or acquired heart diseases, had CPA followed by death mainly due to hypotension. They were predominantly male, in extremes of age, using multiple invasive devices.

Most aspects of CPA assistance required by the *Utstein* protocol were not recorded in all the charts, such as "chest compression", "defibrillation", "use of drugs at the time of the event" and "doses used." Nursing records regarding CPR therefore were considered of low quality. Such failure may incur legal sanctions for professionals and does not allow the comparison of appropriateness/effectiveness of these maneuvers with other centers.

This study leaves a knowledge gap regarding the records in CPR of individuals who suffered CPA and did not progress to death. However, given the positive results of using the *Utstein* protocol in other scenarios

and the fact that the records in the sector studied did not follow a previously standardized protocol, the results of this study may suggest investment in professional training to include its use in the working process.

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COLLABORATIONS

Grisante DL contributed to the development, field data collection, analysis, interpretation of data and writing of the article. Silva ABV and Ayoub AC contributed to the development and the final approval of the version to be published. Belinelo RGS and Onofre PSC contributed to the development, analysis and interpretation of data. Lopes CT contributed to the development, analysis, interpretation of data, drafting of the article and the final approval of the version to be published.

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