



Training of nursing technicians/assistants in mobile pre-hospital healthcare: results from nursing records*

Capacitação de técnicos/auxiliares de enfermagem: repercussão nos registros de enfermagem relacionados ao atendimento pré-hospitalar móvel

Capacitación de técnicos y auxiliares de enfermería en la atención pre-hospitalaria móvil: repercusiones en los registros de enfermería

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ABSTRACT

Objective: To evaluate the impact of a program for capacitation of associate degree nurses and licensed practical nurses in improving the documentation of respiratory care for children less than 5 years old in pre-hospital mobile units. **Methods:** A quasi-experimental, prospective, and comparative one-group before and after design was used to conduct the study. The study was conducted in the Pre-Hospital Mobile Units of Recife. The sample consisted of 148 children's records in 2006 before the initiation of the program of capacitation and 113 children's records in 2007 and 2008 after the implementation of the program. **Results:** There was a statistical significant change after the implementation of the program regarding to quality documentation and the frequency of respiratory system assessment, such as the use of the accessory respiratory muscle, nose flaring, agitation, xiphoid process retraction, and wheezes ($p < .01$). **Conclusions:** The implementation of the program of capacitation of associate degree nurses and licensed practical nurses improved communication, nursing care, documentation, and respiratory assessment of children in pre-hospital mobile units. **Keywords:** Nursing records; Emergency medical services; Nurse's aides; Professional qualification; Health human resource training; Child health

RESUMO

Objetivo: Avaliar o impacto de um curso de capacitação na melhoria dos registros realizados por técnicos/auxiliares de enfermagem no atendimento pré-hospitalar a crianças menores de cinco anos com dificuldade respiratória. **Métodos:** Estudo prospectivo exploratório, realizado no Serviço de Atendimento Móvel de Urgências - Recife. Foram incluídas as fichas de atendimentos realizados por Unidades de Suporte Básico a crianças menores de cinco anos com quadro de dificuldade respiratória, totalizando 148 ocorrências em 2006, antes do curso de capacitação e 113 em 2007/2008 após a capacitação de técnicos/auxiliares de enfermagem. **Resultados:** Observou-se mudança significativa na qualidade da informação registrada, passando os sinais de gravidade respiratória a serem avaliados com maior frequência, como o uso da musculatura acessória, batimento de asa de nariz, agitação, retração xifóide e sibilos expiratórios ($p < 0,01$). **Conclusão:** O curso de capacitação implementado proporcionou melhor comunicação com a central médica de regulação no repasse objetivo dos sinais de dificuldade respiratória, favorecendo a adoção de condutas apropriadas.

Descritores: Registros de enfermagem; Serviços médicos de emergência; Auxiliares de enfermagem; Capacitação profissional; Capacitação de recursos humanos em saúde; Saúde da criança

RESUMEN

Objetivo: Evaluar el impacto de un curso de capacitación para la mejoría de los registros realizados por técnicos/auxiliares de enfermería en la atención pre hospitalaria a niños menores de cinco años con dificultad respiratoria. **Métodos:** Se trata de un estudio prospectivo exploratorio, realizado en el Servicio de Atención Móvil de Urgencias - Recife. Fueron incluídas las fichas de atención realizadas por Unidades de Soporte Básico a niños menores de cinco años con cuadro de dificultad respiratoria, con un total de 148 ocurrencias en el 2006, antes del curso de capacitación y 113 en 2007/2008 después de la capacitación de técnicos/auxiliares de enfermería. **Resultados:** Se observó un cambio significativo en la calidad de la información registrada, pasando las señales de gravedad respiratoria a ser evaluados con mayor frecuencia, como el uso de la musculatura accesoria, aleteo nasal, agitación, retracción xifoide y sibilancias expiratorias ($p < 0,01$). **Conclusión:** El curso de capacitación implementado proporcionó mejor comunicación con la central médica de regulación en el repaso objetivo de las señales de dificultad respiratoria, favoreciendo la adopción de conductas apropiadas.

Descriptores: Registros de enfermería; Servicios médicos de urgencia; Auxiliares de enfermería; Capacitación profesional; Capacitación de recursos humanos en salud; Salud del niño

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INTRODUCTION

Basic Support Units (USB) are ambulances with a nurse technician/assistant and a driver which perform about 90% of the care provided by *Serviço de Atendimento Móvel às Urgências* (Emergency Mobile Healthcare Service – SAMU) - Recife, according to statistical data from this institution⁽¹⁾. Nurse technicians/assistants are responsible for gathering patients' clinical information and give it to the coordinating physician⁽²⁾.

Occurrences dealt by USBs are less severe with no risk to patients. Children from zero to five years old with respiratory distress without apparent severity are among these occurrences. They are assessed by the coordinating physician during the phone request⁽²⁻³⁾.

In 2006, the total number of healthcare provided to children younger than 5 with respiratory distress was 148 cases at SAMU Recife. This data corresponded to approximately 38% compared to the total number of pediatric care provided in the same period due to other causes, demonstrating the magnitude of the problem especially because respiratory distress can rapidly evolve to muscular fatigue and consequently to respiratory failure, therefore, these occurrences should be addressed^(1,4-5).

The evaluation performed by nurse technicians/assistants should provide the necessary information to support adequate management: the need for immediate drug therapy, transference to a healthcare unit or give important information to parents⁽²⁻³⁾.

Nurse technicians/assistants should recognize the signs and symptoms of respiratory distress; they should be also trained to identify evolvement to more severe forms.

In our experience in this service, we have observed the difficulty of nurse assistants/technicians in recognizing and naming findings of respiratory distress, hindering communication with the coordinating central. Information record did not show real respiratory conditions of children, and many times, respiratory discomfort was more severe.

The aim of the present study was to assess the impact of a training program geared to nurse technicians/assistants through the records performed at pre-hospital healthcare to children under five with respiratory distress.

METHODS

This prospective, quasi-experimental, before and after study was performed at SAMU-Recife, a mobile pre-hospital healthcare service for emergencies and urgencies. The project was approved by the Human Research Ethics Committee of the Universidade Federal de Pernambuco under # 266/06.

Medical records of children under five with respiratory distress performed by UBS have been included, totaling 148 occurrences in 2006 before nursing technicians/assistants training, and 113 in 2007/2008 after the training.

Information has been gathered from patients' medical records by the researchers and by a Research Initiation Fellowship Holder. Data included: children's identification, gender and age, date and time of occurrence, and case distribution according to the political division of the city into health districts. As for healthcare clinical information, the record of signs of respiratory distress and its severity was observed.

Assessment of these variables refers only if they have been observed and recorded on the medical record rather than if they were present or absent in patients.

In February and March 2007, a course was offered to train nursing technicians/assistants so that they were able to identify respiratory distress and recognize severity signs in children. To that end, we have designed an instrument adapted to the attributions/skills of these professionals, describing signs of respiratory distress and their severity. This instrument has been used in the training course and made available in the routine of the service for reference. The instrument used to assess respiratory distress had findings from general aspects of children, mental state, dyspnea, inability to speak, extra muscle retraction, flaring of the nostrils, expiratory wheezing, respiratory frequency, pulse, xiphoid retraction, grunting/stridor, according to the intensity and classified as very severe, severe, and moderate/mild (Picture 1).

Eighty-eight nursing technicians/assistants took part in the training, representing 95% of the total population of healthcare professionals.

Training was given by the researcher and performed at the auditorium of a public hospital which is a reference in Advanced Cardiac Life Support (ACLS) training, they were divided into groups of 20 participants, and the training lasted five hours. We have used participative techniques, forming small groups to review case studies, to have explanatory classes, using data-show to present pictures, photographs and videos showing children with respiratory distress. The instrument proposed to be reproduced in healthcare activities was presented and discussed with all participants.

Data collected have been typed on a data base developed in EPI-INFO software, version 6.0, with distinct double entries, their consistency was verified using the VALIDATE command. For association between variables, Chi-square test has been used with Yates correction and Fisher's exact test when indicated, with a 5% significance level.

Picture 1- Instrument to assess respiratory distress in children aged 0 to 5 years old filled in by nursing technicians/assistants

Intensity of Findings	Very severe	Severe	Moderate/mild
General aspect	Cyanosis, sweating, exhaustion	No changes	No changes
Mental state	Agitation, confusion, drowsiness	Normal	Normal
Dyspnea	Severe	Moderate	Absent/mild
Inability to speak	Short sentences Infants: feeding difficulties	Incomplete sentences Infants: weak cry, feeding difficulties	Complete Sentences
Extra muscle retraction	Stressed retraction Or declining retraction (exhaustion)	Marked subcostal and/or suprasternal retraction	Mild or absent intercostal retraction
Flaring of the nostrils	Intense	Moderate	Absent
Expiratory wheezing	Marked	Moderate	None
Respiratory frequency	Increased	Increased	Normal or increased
Pulse	> 140 or bradycardia	110 to 140	Below 110
Xiphoid retraction	Intense	Moderate	Absent
Grunting/stridor	Present	Absent	Absent

Adapted from the Classification of asthma intensity in adults and children (*III Consenso de Asma* -3rd Asthma Consensus); Silverman Anderson Scale; modified Wood-Downes Asthma Scale; Westley score to assess upper airways obstruction.

RESULTS

Results are presented on tables reporting findings before and after training nursing technicians/assistants in the care of children under five years old with respiratory distress.

Distribution of occurrences in the relevant epidemiological characteristics is presented on Table 1.

Frequency of occurrences among children between 12 and 35 months was 45.3% in 2006 and 49.5% in 2007/2008, those under one year old presented in 2006 a 25.7% frequency and of 31% in 2007/2008.

As for gender, there was a small predominance of males, with 58.8% in 2006 and 50.4% in 2007/2008.

Sample distribution according to time healthcare was provided found a greater frequency of late-night occurrence (00:01 to 06:00 o'clock). In 2006 it was 52% and in 2007/2008, it accounted for 48.7% of cases.

Signs of respiratory distress assessed in the care records corresponded to those stressed during the training program for nursing technicians /assistants that should be recognized as signs of respiratory distress in children. (Table 2)

The variables cyanosis, sweating, confusion, dyspnea, inability to speak, extra muscle use, flaring of the nostrils, expiratory wheezing, respiratory frequency, pulse, xiphoid retraction were more frequently recorded after training, except for drowsiness and grunting/stridor.

Signs of respiratory severity are highlighted on table 3, and there are more records in the health care form, especially when the sign was not observed.

The eleven cases de extra muscle use recorded in 2006 corresponded to the presence of this sign, and after intervention there was a greater number of records (89 cases), in 38 cases they were present (42.7%) and in 51 they were absent (57.3%).

Table 1 – Occurrence in children under five according to age, gender and time healthcare was provided by SAMU Recife, before and after education intervention. Recife 2008

Variables	Intervention				P value
	Before		After		
	(n= 148)		(n= 113)		
	n	%	n	%	
Age (months)					
< 12	38	25.7	35	31.0	0.20
12 to 35	67	45.3	56	49.5	
36 to 60	43	29.0	22	19.5	
Gender					
Male	87	58.8	57	50.4	0.22
Female	61	41.2	56	49.6	
Time of care					
06:01 to 12:00	10	6.8	13	11.5	0.42
12:01 to 18:00	11	7.4	05	4.4	
18:01 to 00:00	50	33.8	40	35.4	
00:01 to 06:00	77	52.0	55	48.7	

Table 2 – Signs of respiratory distress in children under five according to records in healthcare forms from SAMU, before and after education intervention. Recife, 2008

Signs	Record in the form	Intervention				P Value
		Before (n= 148)		After (n= 113)		
		n	%	n	%	
Cyanoses	Yes	116	78.4	94	83.2	0.42
	No	32	21.6	19	16.8	
Sweating	Yes	116	78.4	101	89.4	0.02
	No	32	21.6	12	10.6	
Agitation	Yes	121	81.8	102	90.3	0.07
	No	27	18.2	11	9.7	
Confusion	Yes	2	1.4	85	75.2	<0.01
	No	146	98.6	28	24.8	
Drowsiness	Yes	128	86.5	81	71.7	<0.01
	No	20	13.5	32	28.3	
Dyspnea	Yes	127	85.8	110	97.3	<0.01
	No	21	14.2	03	2.7	
Inability to speak	Yes	1	0.7	89	78.8	<0.01
	No	147	99.3	24	21.2	
Extra muscle use	Yes	11	7.4	88	77.9	<0.01
	No	137	92.6	25	22.1	
Flaring of the nostrils	Yes	5	3.4	79	69.9	<0.01
	No	143	96.6	34	30.1	
Expiratory wheezing	Yes	32	21.6	97	85.8	<0.01
	No	116	78.4	16	14.2	
Respiratory frequency	Yes	25	16.9	69	61.1	<0.01
	No	123	83.1	44	38.9	
Pulse	Yes	36	24.3	36	31.9	0.22
	No	112	75.7	77	68.1	
Xiphoid retraction	Yes	1	0.7	85	75.2	<0.01
	No	147	99.3	28	24.8	
Grunting/stridor *	Yes	128	86.5	93	82.3	0.44
	No	20	13.5	20	17.7	

* This variable in the first sample in 2006 was considered as SAMU printed document called: abnormal sound emission and noisy breathing. In the 2007 sample, it was considered as described on the table above.

Table 3 – Frequency of signs of respiratory severity according to its absence or presence based on the records written on SAMU healthcare forms before and after training. Recife, 2008

Severity signs	Record	Training						P value
		Before (2006)			After (2007/2008)			
		N	%	Total	n	%	Total	
Cyanoses	Present	3	2.6	116	01	1.0	94	0.63
	Absent	113	97.4		93	98.9		
Flaring of the nostrils	Present	5	100.0	5	16	20.2	79	<0.01
	Absent	-	-		63	79.8		
Expiratory wheezing	Present	30	93.7	32	54	55.7	97	<0.01
	Absent	2	6.3		43	44.3		
Extra muscle use	Present	11	100.0	11	38	42.7	89	0.02
	Absent	-	-		51	57.3		
Xiphoid retraction	Present	1	100.0	1	11	13.1	84	0.14
	Absent	-	-	128	73	86.9		
Grunting/stridor *	Present	59	46.0	128	11	11.9	92	<0.01
	Absent	69	54.0		81	88.1		

* This variable in the first sample in 2006 was considered as SAMU printed document called: abnormal sound emission and noisy breathing. In the 2007 sample, it was considered as described on the table above.

DISCUSSION

The number of respiratory distress was distributed according to time healthcare was requested. The period from 6 PM to 06:00 AM accounted for approximately 80% of cases. This was probably because of the difficulty to access health services at this time, both because of the distance and of transport. Waiting to take children to the health care center in a more appropriate time may not have been possible due to worsening of the respiratory pattern. Another factor that should be discussed for asthmatic children which may have influenced the request for pre-hospital healthcare at this time is the presence of night symptoms, and lack of family orientation to evaluate symptoms of severity and an action plan during the crisis⁽⁶⁾.

Regarding the knowledge of nursing technicians / assistants to assess respiratory picture, the education of these professionals includes in the discipline of children health, the clinical assessment of respiratory distress with objective data such as assessment of vital signs and dynamic inspection of the respiratory movement, however, they do not perform complete physical examination, excluding respiratory auscultation with the use of a stethoscope⁽⁷⁻⁸⁾.

Most pictures of respiratory distress are characterized by changes that are easy to see, even by lay people. The *III Consenso Brasileiro do Manejo da Asma* (3rd Brazilian Consensus for Asthma Management), 2002, recommend that parents are oriented to identify signs of severity and the actions that should be taken⁽⁶⁾. Another example is the *Assistência Integrada às Doenças Prevalentes na Infância* (Integrated HealthCare to Childhood Prevalent Diseases), which identify Acute Respiratory Infections, using simple parameters to identify respiratory signs and symptoms presented by children⁽⁹⁾.

In the Professional practice in the hospital environment, when respiratory abnormalities are found in the care provided to children, nursing technicians / assistants work under the supervision of the nurse who takes up the assessment of patients and direct the adequate management of the case. Pre-hospital care, provided by the Sistema Único de Saúde (SUS) with the introduction of SAMU and using telemedicine, brought with it new attributions given to nursing technicians/assistants⁽¹⁰⁾. Regulation # 2048/2002 explains these activities and highlights the importance of evaluation and of sending information to the coordinating department. Therefore communication should be clear and objective; describing correctly clinical finding that will support medical management. Patients' form should be written in scientific terminology⁽²⁾.

In 2006, SAMU Recife used a check-list patient form which was not appropriate to the education of nursing

technicians/assistants group to recognize and pass to the medical coordination the signs and symptoms of the severity of respiratory distress in children. Flaring of the nostrils, extra muscle use and suprasternal retraction, are rarely mentioned. The Record of mental confusion, inability to speak, expiratory wheezing, respiratory rate and pulse, as well as the signs already mentioned appeared in a frequency inferior to 25%, and in some signs it was lower than 1%.

Occurrences sent to the USBs are those assessed by coordinating physicians as not severe. However, sometimes nursing technicians/assistants face a more complicated picture and need to request advanced support (an ambulance with physician and nurse). This is due both to a worsening of the clinical picture from the time the team was called until it arrives, and due to the data collected during screening do not correspond to the signs presented by children, demonstrating that it is difficult sometimes to adjust medical care with consequences in the actions of the service⁽²⁾.

The evolvement of the picture of respiratory distress can occur rapidly, with a real risk for children's lives. This happens in some situations such as in the cases of acute respiratory infections where mortality is high, requiring fast diagnosis. The signs of severity include the presence of a cyanosis and stridor, intense use of extra muscle, flaring of the nostrils and xiphoid retraction⁽⁹⁾.

This possibility for nursing technicians/assistants to assess and initiate treatment of children with acute respiratory distress justifies the importance of training to identify these signs, staging them according to severity.

Other studies, using training education to change behaviors or professional practices have been used in several health reports⁽¹¹⁻¹²⁾. Pre-hospital healthcare in some studies use a training format for nurses and paramedics directed at the evaluation of the training impact in the quality of care, following the example of studies carried out in the United States⁽¹³⁻¹⁵⁾. In the case of SAMU, professionals should attend education programs or receive permanent education since pre-hospital healthcare is recent and the literature to support its practice is poor.

After training, except for drowsiness and grunting/stridor, all other symptoms presented significant increase in the notes, the same thing occurred for extra muscle use which was 7.4% in 2006 and after intervention it was 77.9% ($p < 0.01$).

Training for nursing technicians/assistants had a positive effect in the signs of respiratory distress evaluation. We have observed that the signs indicate severity of the picture^(9,16-17) such as extra muscle use, flaring of the nostrils, xiphoid retraction and expiratory wheezing as well as drowsiness which increased

significantly ($p < 0.05$).

This improvement in quality of care with results in the information given by nursing technicians/assistants to the medical coordination can be a determining factor in the management of the following: parents/guardians guidance, immediate therapy and/or transference to the hospital.

We have also considered that patients' record used in the post-training assessment (2007/2008), and the instrument to assess respiratory distress, available to nursing technicians/assistants during occurrences may have had a positive impact in the improvement of information recorded⁽¹⁸⁾.

Strategies used during training of nursing technicians/assistants such as the use of audiovisual resources, enabling a better viewing of signs of the severity of respiratory distress may have contributed to identify them.

The presence of flaring of the nostrils found in 3.4 % of the occurrences assessed in 2006, increased to 69.9% in 2007/2008 ($p < 0.01$). A greater record of this sign after training could suggest more severe occurrences in 2007, however, this inference is hindered when we assess the other symptoms of severity, especially cyanosis⁽¹⁷⁾, which is considered a sign of extreme severity, present in approximately 2% of the occurrences in both years ($p = 0.63$). This data may suggest that the quality of training was responsible for a greater number of identification of the signs of severity assessed in 2007.

Another important data was the record of absence of severity signs before training and a significant increase in this record after training, which may be due to assessment of these signs after they became aware of the relevance of this information.

The proposal of a new check-list like patient form for SAMU with reference values that showed the signs of changes in children with respiratory distress may have decreased memory biases in the record of changes. However, some signs such as pulse were little recorded.

A possibility for not writing on patients' form is the little importance given to the record, even though during training the legal and ethical aspects of this action have been discussed. Another reason are care variables themselves (time of call, time-response, severity of the case) that made it impossible for immediate recording and which were not completed afterwards.

The strong presence of grunting/stridor with a high frequency (46.0%) in the presentation of results in 2006 was probably because findings of abnormal sounds and noisy breathing had been included in this sign. After training in 2007, when the concept of grunting/stridor

was explained, its frequency decreased to 11.9 %, with statistical significance ($p < 0.01$). However, both the presence of cyanosis and grunting/stridor characterize severe conditions stressing the need for nursing technicians/assistants to be trained to provide healthcare.

The occurrence report is the only written source of information for care, and it is a patients' chart for SAMU; therefore, it is a legal document requiring information describing the evaluation performed and health care provided. To maintain precise records, data have to be objectively interpreted with accurate measures, correctly written in scientific language. The code of ethics for nurses describe as their responsibility and duty to record information referring patients' health care on patients' charts and other nursing documents⁽¹⁹⁻²⁰⁾.

The study was limited to the evaluation of occurrence records done by nursing technicians /assistants in children under five, therefore, we cannot assess if this improvement in quality of records has had direct results in the quality of care provided to children since care has not been followed up.

CONCLUSIONS

The objective of improving quality of the medical records of children from zero to five with respiratory distress was achieved in the training of nursing technicians/assistants at USB, resulting in better quality of record than that of 2006.

There was a significant change in the quality of information recorded, and the signs of severity have been more commonly assessed, such as extra muscle use, flaring of the nostrils, agitation, xiphoid retraction and expiration wheezing.

Comparison between data obtained before and after education intervention by nursing technicians/assistants had a positive result in nursing records with consequences to the practice, directing action plans and providing sources of statistical information.

The training of nursing technicians/assistants has reflected on a more efficient communication between these professionals and the coordinating physician, favoring the adoption of the appropriate management.

The responsibilities of nursing technicians/assistants required by SAMU encompass training to assess and pass on data found during healthcare, using clear, objective and scientific language.

A check-list like patient form, associated with an appointment model with reference values for normality and severity contributed to a better record, avoiding memory bias.

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