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ORIGINAL ARTICLE

Comparison of participative educative strategy versus traditional educative strategy in health personnel

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Abstract

Objective: *To compare the clinical aptitude in neonatal resuscitation with participative educative strategy versus traditional educative strategy in health personnel.* **Material and Methods:** *Quasi-experimental study design including physicians and nurses distributed in two groups: (i) participative educative strategies n = 156, and (ii) traditional n = 158, were imparted in 12 sessions. Evaluation of clinical aptitude evaluated with validated questionnaire. Descriptive and interferential statistical inter- and intragroup.* **Results:** *Clinical aptitude median score before/after: participative educative strategy 25.0/36.5 (p = 0.000) and traditional 24.5/31.0 (p = 0.000); differences between intergroup p = 0.040. Changes to higher category according to the score before/after in participative 114 (73%) vs. traditional 65 (41%); p = 0.010. There were no significant differences in the intergroup results in the category of evaluation of clinical aptitude, but there were differences in the intragroup when we evaluated median before and after with both strategies.* **Conclusions:** *Increase of clinical aptitude in neonatal resuscitation in health personnel, with both educative strategies being higher with participative strategy.* (Gac Med Mex. 2015;151:344-50)

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Introduction

Neonatal resuscitation is the set of maneuvers that allows for the neonate with cardiorespiratory arrest to be identified, for medical emergency systems to be alerted and for respiratory and circulatory function substitution to be implemented[1].

Of all newborns, approximately 5-10% require some type of maneuvers or assistance to breathe at the moment of birth and 1% require advanced resuscitation measures to survive; this figure rises by up to 80% in the case of premature newborns[2,3].

An average of 55% in-hospital cardiorespiratory arrests is satisfactorily resuscitated, out of which 15-25% are discharged alive from the hospital, with 4-20% surviving for long time[4]. Twenty-fiye percent of newborns who survive neonatal hypoxia have neurological deficit[5].

Deaths during the neonatal period represent 41% of total deaths in children younger than 5 years, and asphyxia is currently one of the leading causes of neonatal death, being responsible for 23%[6].

Several educational programs have been developed with different strategies aiming to favor the acquisition of these skills for the care of depressed newborns by healthcare personnel.

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Neonatal cardiopulmonary resuscitation (CPR) traditional strategy is taught using a basic CPR guideline for physicians and nurses in a course of 16 effective hours, after study of the procedures brochure, which is delivered one month prior to the course. The course comprises two sections: the theoretical dimension uses a traditional approach with explanations using slide presentations, and the practical training is carried out with activities in simulators or mannequins reproducing real-life scenarios in neonatal care. This approach involves scarce participation of the student, who is simply a passive receptor of explanations given by an expert. In this strategy, there is the tendency to believe that anyone who has reached a higher academic degree is better suited for learning[7].

Participatory educational strategy promotes active collaboration by participants and aims for skills to understand topics, deduct information and arrive to relevant conclusions to be acquired by means of their comprehension, which will help to make better decisions and solve problems more efficiently. The student controls the construction of his own learning, attained through a more critical attitude, where the teacher acts as a facilitator of this process[8].

Currently, traditional edicational strategy has not been able to develop clinical skills in physicians and nurses who work in high-risk departments, whereas through participation-promoting educational strategy, excellent results have been observed in different studies[9-11].

Current proposal is to modify actions carried out in educational strategy, making the student more participatory and collaborative in this process of new concepts and knowledge attainment and, this way, to foster a change of attitudes, and thus developing real clinical skills to modify the evolution of a patient who suffers perinatal asphyxia at birth or within the neonatal period.

The purpose of the present study is to evaluate the development of clinical skills with an active participatory educational strategy and to compare it with the traditional strategy in medical and nursing personnel from a tertiary care hospital in situations of apnea or cardiopulmonary arrest of the newborn.

Material and methods

Quasi-experimental study with courses given in 24 hours of lessons during the period encompassed from January 1 to December 31 at the Hospital Materno Infantil Esperanza López Mateos, Jalisco Ministry of Health, in Guadalajara, Mexico.

Selection criteria

Pediatricians or neonatologists and general or specialist nurses assigned to the nursery and neonatal intensive care unit, with permanent or temporary contract but working in the neonatal department for more than 1 year and who completed the neonatal resuscitation program were included. Official instructors of the program or those who did not complete the course were excluded.

Sample size

Sample size calculation was performed using the two proportion formula[12], where the first proportion refers to the possibility for the event to occur with an educational strategy (50%) and the proportion for the event not to occur (50%). A possible error of 0.05 was considered, as well as a score corresponding to the β risk fixed at 5% (1.96), yielding a total of 150 participants per group. Non-probabilistic convenience sampling was used.

To structure the clinical skills concept, the general definition referred in the bibliography was considered[13], and it only was adapted to neonatal resuscitation. This was defined as the capability to confront and solve clinical problems involving skills such as reflection and generation of personal criteria, thus integrating theory and practice, using indicators referring to analysis, reflection, synthesis and critical thought capabilities applied to real clinical situations of neonatal apnea.

Measuring instrument

- Construction: An assessment instrument was created using clinical cases, initially constituted by 120 items. Each case was structured by 5 questions. Possible answers for each item were “false”, “true” and “don’t know”.
- Validation: Once developed, the instrument was turned to be reviewed by a panel of 5 experts, 3 of them neonatologists and official instructors in the neonatal resuscitation program and 2 experts on educational assessment instruments. An instrument with 77 valid items was finished.
- Reliability: Once the assessment questionnaire was developed, a pilot test was run with 25 participants. To determine internal reliability of the instrument, it was confirmed with the Keder-Richardson formula, which yielded a 0.86 score.

– Method to calculate random answers: For the final score, each correct answer added one point, each error and/or lack of answer subtracted one point and each option answered as "don't know" did not add or subtract points. Maximum score was 77 points and was categorized as follows: random (0-12 points), very low (13-25 points), low (26-38 points), intermediate (39-51 points) high (52-64 points) and very high (65-77 points).

Assessment procedure

Development of the study: Two independent study groups were formed. In the first group, the study group, an active participatory educational intervention was applied. In the second group, the traditional neonatal resuscitation educational scheme was applied. In both groups, the longitudinal course methodology was used with twice-weekly 2-hour sessions for 6 weeks. The clinical skills assessment instrument was applied in both groups at the beginning of the program. At the end of the program, this assessment instrument was applied again in both groups.

The contents of the course were in compliance with the program established by the Ministry of Health, with 9 theoretical units being studied:

– Introduction to the program and physiological aspects.
– Initial steps of resuscitation.
– Application of ventilatory devices.
– Cardiac massage.
– Endothtacheal intubation.
– Medication use in resuscitation.
– Resuscitation in premature infants.
– Special considerations in resuscitation.
– Ethical considerations and end-of-life care.

The course was complemented with practical activity: Resuscitation stages (initial steps, ventilation, cardiac massage, endotracheal intubation and medications). Final practice with neonatal resuscitation integral practice. These contents were applied in both group's courses.

Active particpatory educational strategy

Two sessions were held every week, each one of 2 hours. The week prior to the session, the corresponding unit of the neonatal resuscitation brochure was studied and additional recommended reference material was distributed as a reading guide. The day of the session started with reunions of subgroups to comment on the content of the reviewed literature. The established time was 1 hour. The instructor acted only as moderator of the discussion by guiding this process and by maintaining a guideline of the most important points to be discussed. Once the subgroup was reviewed, a plenary session was held, where each subgroup briefly presented the results of its discussion. The time established for this process was 1 hour, and the general instructor moderated this plenary session. At the end, the instructor presented to the participants the most relevant aspects discussed in the plenary session; this was carried out in half an hour. The instructors of this modality were pediatricians or neonatologists that had completed teaching professionalization studies and in addition were official instructors of the program according to criteria of the Ministry of Health, which is the instance coordinating this top priority program at the national level.

Traditional educational strategy

Two sessions were held every week, each one lasting 2 hours. One month before, the neonatal resuscitation official text was distributed for complete reading by all participants of the course. Evaluation was performed before and after each study unit and conventional assessment of the program was carried out. The assessment instrument was applied at the beginning and at the end of the course to evaluate changes in the clinical skills acquired with this educational strategy. Instructors for this modality were pediatrician or neonatogist instructors certified on the program but had no studies on teaching professionalization.

In both groups, practical work was subsequently performed by using mannequins, with independent assessments on the program carried out at the end of each unit, as well as practical activity evaluation.

Indicators description

– Risk factors recognition: Ability to recognize important medical history data, including maternal prior history or previous conditions of the newborn that, without being part of the current condition, make its occurrence more likely.
– Seriousness data recognition: Ability to recognize signs, symptoms and laboratory findings contributing to facilitate identification of a state of seriousness that puts the patient's life at risk.
– Diagnostic integration: Ability to, based on reflection, with data obtained by history and physical examination and laboratory and imaging studies,

generate consistent syndromic and nosologic hypotheses.
- Selection of diagnostic resources: Ability to select relevant laboratory or imaging studies for rapid emergency assessment that serves as a basis to take actions consistent with the diagnostic integration to solve the problems.
- Selection of therapeutic resources: Ability to implement pharmacological and non-pharmacological actions, with the latter including technical skills and abilities aiming to solve emergency problems that put the life of the newborn in danger, regardless of the condition originating them.

Measurements

Statistical analysis

Qualitative variables were analyzed with frequencies and percentages; quantitative variables, with medians and ranges. The chi-square test was used to assess proportion differences and the Mann Whitney U-test, to compare median differences in the scores of the educational intervention groups. Wilconson's test was used find out inter-group baseline and final median differences in the assessment instrument scores. McNemar's test was used to compare the proportion of students who shifted to a better category after the intervention. A p-value ≤ 0.05 was considered to be statistically significant. The SPSS, version 20.0 for Windows statistical package (Chicago, Ill.) was used. The risk of random answer was calculated with the Pérez Padilla and Viniegra's formula. Consistency of the instrument was assessed with Kuder-Richardson's test.

Ethics

This was a risk category I study (no risk) according to the classification of the General Statute of Health issued in 1990 (article 17), which specifies that no written informed consent is required; however, since personal confidential information was required, participants were asked for authorization. The study is supported by the premises contained in the Declaration of Helsinki of the World Medical Association. Confidentiality of information was preserved, and it was only used for scientific and statistical purposes. The right to refuse to participate in the study was respected without participation in the program being affected. The work was accepted by the Teaching, Research, Training and Ethics Committee with registration number 363/12.

Results

The staff of the Hospital Materno Infantil Esperanza López Mateos of the Jalisco Ministry of Health is comprised by 500 employees belonging to the medical and nursing categories. Of them, and according to the calculated sample, only 314 persons were studied, which accounts for 62%. Of this sample, 216 belong to the nursing category (69%) and 98 of them are physicians (31%). Once the sample was obtained, the courses for either strategy were randomly assigned, and each course had a maximum capacity of 20 participants.

Table 1 shows the characteristics of the studied physicians and nurses, where similar groups are observed in terms of age, with intermediate age between 25 and 35 years being predominant; predominant gender is female because most are nurses and most subjects have a superior education degree, either as physicians or nurses. With regard to category, predominance of permanent contracts was observed and with performance areas in intensive therapy. Only a minority of trained personnel had taken previously a course on neonatal resuscitation.

Table 2 shows the scores obtained by each group with the participatory and traditional strategies, and both intra-group and inter-group statistical significance is analyzed.

Pre-interventional score in the participatory group was observed to have a median of 25 with a range of 8 to 62, compared with the traditional strategy group, which had a median of 24.5 with a range of 7 to 55. This did not have a statistically significant difference, with a p-value of 0.400.

In the post-intervention assessment, a median of 36.5 points with a range of 11 to 66 was found in the participatory intervention group, with 31 points median and a range of 10 to 58 found in the traditional intervention group. The difference between both is significant, with a p-value of 0.040.

When intra-group differences were analyzed, statistically significant differences were found ($p = 0.000$) in both groups.

Table 3 shows the levels of clinical skills in neonatal resuscitation. When scores were analyzed stratifying them into 6 groups, from very low to very high, most were found to remain in the very-low and low level in both the participatory strategy and traditional strategy groups; however, in the post-intervention assessment, levels were found to be low and intermediate in both the participatory and traditional strategy groups, although in the latter, more students were found to

Table 1. Profile of physicians and nurses included in the study of educational strategies in the neonatal resuscitation program

	Participatory (n = 156)	Traditional (n = 158)	p-value
Age in years, median (range)	31 (22-42)	32 (24-45)	0.846
< 25 years, n (%)	16 (10)	21 (13)	
25-35 years, n (%)	108 (69)	97 (62)	
> 35 years, n (%)	32 (21)	40 (25)	
Gender			
Male, n (%)	42 (27)	45 (28)	0.874
Female, n (%)	114 (73)	113 (72)	
Education			
Technician, n (%)	30 (20)	34 (22)	0.768
Superior education degree, n (%)	78 (50)	81 (51)	
Specialist, n (%)	46 (29)	42 (27)	
Master's degree, n (%)	2 (1)	1 (1)	
Category			
Physician, n (%)	46 (29)	52 (33)	0.540
Nurse, n (%)	110 (71)	106 (67)	
Type of contract			
Permanent, n (%)	128 (82)	132 (84)	0.706
Temporary, n (%)	28 (18)	26 (16)	
Area of performance			
Neonatal intensive care, n (%)	81 (52)	96 (61)	0.169
Nursery, n (%)	38 (24)	27 (17)	
Pediatric emergencies, n (%)	33 (21)	28 (18)	
Other, n (%)	4 (3)	7 (4)	
Previous neonatal CPR course, n (%)	21 (15)	19 (12)	0.523

Median comparisons with Mann Whitney's U-test; proportions comparison with the chi-square test. n: number; %: percentage

Table 2. Scores in the assessment instrument on neonatal resuscitation according to educational strategy

	Participatory (n = 156)	Traditional (n = 158)	p-value
Pre- score, Md (range)	25 (8 - 62)	24.5 (7 - 55)	0.400
Post- score, MD (range)	36.5 (11 - 66)	31 (10 - 58)	0.040
p-value	0.000	0.000	

Inter-group medians comparison with Mann Whitney's U-test; intra-group with Wilcoxon.
n: number; Md: median.

Table 3. Level of clinical skills on neonatal resuscitation by educational strategy in medical and nursing personnel

	Score	Participatory (n = 156) Pre/Post (n %)	Value (p)	Traditional (n = 158) Pre/Post (n %)	Value (p)
Random	0-12	22 (14)/11 (7)	0.064	18 (11)/12 (8)	0.337
Very low	13-25	57 (36)/12 (7)	0.000	65 (41)/39 (24)	0.002
Low	26-38	45 (28)/50 (32)	0.622	36 (22/61 (38)	0.003
Intermediate	39-51	24 (15)/53 (33)	0.000	33 (20)/42 (26)	0.290
High	52-64	6 (3)/21 (13)	0.004	6 (3)/12 (7)	0.224
Very high	65-77	2 (1)/9 (5)	0.060	0 (0)/2 (1)	0.498

n: number; %: percentage. Difference of proportions with chi-square.

Table 4. Change of category to a superior level in neonatal resuscitation by educational strategy in trained healthcare personnel

	Participatory (n = 156)	Traditional (n = 158)	p-value
Without change, n (%)	42 (27)	93 (59)	0.001
With change, n (%)	114 (73)	65 (41)	0.010

Comparison of changes with McNemer. n: number; %: percentage.

remain in the very-low range. In the participatory strategy group, a larger number of students were able to reach the very-high level in comparison with the traditional strategy group, where no students reached this level; however, this did not reflect on statistical difference between both groups.

Table 4 shows the numbers of students who were able to change the category level in the results of the assessment scores. There, we can observe that 114 participants (73%) changed to a higher category in the participatory strategy group, compared with only 65 participants (41%) of those in the traditional strategy group.

Discussion

Based on the results obtained in this study we can conclude that both the partcipatory strategy and the traditional strategy promoted an adequate development of clinical skills; however, the strategy that includes more participation of the student was observed to provide a learning improvement, with an important level of significance in the proportion of students with low and very low levels in the scores obtained with both strategies.

Good results had previously been reported after educational intervention with participatory technique, as in the study by Betancourt in the city of León, Mexico, which assessed a participation-promoting educational strategy constituted by clinical cases discussed in a 40-hour period using a guide delivered and answered at home in 9 specialized nurses from a neonatal intensive care unit. Here, all students were shown to increase their score after the intervention according to a validated instrument, with statistically significant differences in clinical skills before and after the intervention[13].

In a Cuban study where neonatal resuscitation skills were assessed in healthcare personnel divided into categories, specialist physicians were found to have better clinical skills with higher numbers of satisfactory answers in their evaluation, followed by residents and then by registerd nurses, nurses with post-basic course and finally, by nurses with a basic course showing the lowest percentage of satisfactory responses. Conclusion was that, in the setting the study was conducted, the level of knowledge on neonatal resuscitation is to be considered poor. However, in that study, evaluation was made only of clinical skills, without taking into account educational strategies, as we present in our study[2].

In a study by Lara et al., knowledge, skills and attitude were assessed before and after an educational process using a quasi-experimental design in Veracruz, Mexico, with 40 nurses receiving a basic CPR course and workshop. A theoretical component and a practical component were formulated using mannequins. No student reached sufficient level in the initial assessment, unlike final assessment, where it was reached by 92% of the students; the educational process generated an 85% gain[5]. There are other studies where learning has been assessed using mannequins, arguing that simulation increases not only the level of learning, but also self-confidence, skills and performance[14,15]. Other studies have compared low-fidelity with high-fidelity simulators, referring significant improvement in the level of knowledge in medicine students with the high-level approaches, as well as documenting better satisfaction, trust and team-work by the students[16]. There are even models of courses combining practices on mannequins and in real-life situations, in a program referred to as Neo-SIM (Halamek 2013)[17].

There were two large limitations in our study, such as the lack of analyses of results by categories in order to determine the behavior of each one of them and to know which category achieved the largest change in clinical skills, and the lack of clinical skills verification over time, in order to observe the way this knowledge endures over time or if the type of educational modality influences to better preserve these concepts.

In the medical area, it is important to modify the paradigm of traditional education, and modifying the educational structure in general since the early stages in medical training is proposed. More participation and critical activity is required from the student in his/her

own process of education. Participatory education must be promoted, where students analyze, criticize, construct, debate and complement their own knowledge. In addition to this, team-work strategies should be implemented in the group, which some authors have established through specific learning strategies that achieve significant results in the neonatal resuscitation group members[18]. Additionally, standardization of processes is also reflected in neonatal resuscitation outcomes[19].

One limitation of our study is, with no doubt, the impossibility to isolate only the effect of the educational strategy on the attainment of clinical skills, since there are different factors that can influence on this, such as the educational training that is recommended for the teachers of the courses, which is referred by Halameck as one of the important factors for the success of neonatal resuscitation programs and warrants the conduction of studies to analize this and other factors that influence on learning[20].

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