

# Educational intervention regarding hypothermia: a teaching strategy for education in the Surgery Department\*

INTERVENÇÃO EDUCATIVA SOBRE HIPOTERMIA: UMA ESTRATÉGIA DE ENSINO PARA APRENDIZAGEM EM CENTRO CIRÚRGICO

INTERVENCIÓN EDUCATIVA SOBRE HIPOTERMIA: UNA ESTRATEGIA DE ENSEÑANZA PARA APRENDIZAJE EN QUIRÓFANOS

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## ABSTRACT

This is a quasi-experimental study performed using a short-term educational intervention involving nursing aides working in a Surgery Department, with the objective to identify the social and professional characteristics of the nursing aides, identify the differences in their knowledge regarding hypothermia following the educational intervention, and relate the nursing actions to the studied variables. It was found that the educational intervention was effective, considering that the difference in the mean nursing actions was 5.35 following the intervention. However, no significant difference was found regarding the nursing actions related to the studied variables. Further studies should be performed to investigate the education of nursing professionals considering their significant learning requirements in different units.

## DESCRIPTORS

Nurses/Aides  
Learning  
Hypothermia  
Perioperative nursing

## RESUMO

Este trabalho trata-se de um estudo quase experimental aplicado em uma intervenção educativa de curta duração aos auxiliares de enfermagem do Centro Cirúrgico, cujos objetivos foram conhecer as características sociais e de formação dos auxiliares de enfermagem; identificar a diferença no conhecimento sobre hipotermia no auxiliar de enfermagem após a intervenção educativa e relacionar as ações de enfermagem às variáveis estudadas. A intervenção educativa foi efetiva, uma vez que a diferença na média das ações de enfermagem foi de 5,35 após a intervenção educativa. Entretanto, não se verificou diferença significativa das ações de enfermagem quando relacionadas às variáveis estudadas. Recomenda-se realizar estudos sobre educação nos profissionais de Enfermagem, baseado na aprendizagem significativa nas diferentes unidades.

## DESCRITORES

Auxiliares de Enfermagem  
Aprendizagem  
Hipotermia  
Enfermagem perioperatória

## RESUMEN

Se trata de un estudio experimental aplicado en una intervención educativa de corta duración a los auxiliares de enfermería de quirófanos, cuyos objetivos fueron: conocer las características sociales y de formación de los auxiliares de enfermería, identificar la diferencia en el conocimiento sobre hipotermia por parte del auxiliar de enfermería luego de la intervención educativa y relacionar las acciones de enfermería con las variables estudiadas. La intervención educativa fue efectiva, toda vez que la diferencia promedio de las acciones de enfermería fue de (5,35) luego de la intervención educativa. Sin embargo, no se verificó diferencia significativa en las acciones de enfermería en cuanto a lo relativo a las variables estudiadas. Se recomienda realizar estudios sobre educación en los profesionales de Enfermería, basado en el aprendizaje significativo en las diferentes unidades.

## DESCRIPTORES

Auxiliares de Enfermería  
Aprendizaje  
Hipotermia  
Enfermería perioperatoria

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## INTRODUCTION

Education is an instrument by which we create knowledge and information, a wealth of irrefutable importance that enhances the vision about the world within<sup>(1)</sup>.

Education is currently in search of a teaching axis that allows individuals to attain knowledge based on constructing content regarding what must be learned, It involves considering the person who is already experienced and already has knowledge about certain content, in addition to establishing targets that will result in the enhancement of the initial knowledge state. Therefore, education has been reorganizing itself to substitute the traditional model with a transforming, decentralized and integrated model in which the teacher's role is as a change agent to stimulate different potentialities and help others to understand their limitations<sup>(2)</sup>.

Thus, technology progress has been demonstrated to help health professionals in general. In nursing, there is a fundamental point that makes this profession special: human relations, In order not to damage this relationship due to technologic progress, a specific educational processes are needed so that health professionals can improve the care delivery quality while maintaining the important and needed human relationship<sup>(3)</sup>.

Therefore, creating educational programs in the Surgery Center sector, appropriately servicing workers needs, may lead to changes in the activities developed, relating theory and practice for the benefit of the delivery of provided care<sup>(4)</sup>.

Choosing the theme of hypothermia occurred after the conclusion of the master's degree essay in which the most frequent complications in the post- anesthesia recovery room were evaluated for the elderly surgical patient. Results demonstrate hypothermia to be the most frequent complication, with a 55% occurrence rate<sup>(5)</sup>, based on specific literature, and it can be demonstrated to be present in the majority of patients who undergo a surgical procedure with anesthesia. Its presence is related to complications such as surgical site infections, higher oxygen consumption, alterations in platelet function, higher blood loss and a consequently higher need for blood transfusions, and longer stay in the post-anesthesia recovery room (PAR)<sup>(6)</sup>.

Therefore, implementing technical-scientific training programs in the surgery center is needed in order to systematize the working process, since it requires profound and updated knowledge and specific abilities from professionals to promote, prevent, diagnose, treat and evaluate hypothermia within the surgical and postoperative period<sup>(7)</sup>.

This research is concerned with demonstrating the benefits that education on hypothermia brings to the surgery context, bringing it closer to reality and to the nursing professionals' interest.

In this present study, the conceptual basis of education is based on Ausubel's significant learning perspective, allied to the construction of Novak's concept map and case study with a view to presenting a new alternative to education practice for care delivery, facilitating the understanding of hypothermia-related contents.

Ausubel's theory, from 1978, proposes a model for the assimilation process of new information in the cognitive structure<sup>(a)</sup> of the apprentice<sup>(8)</sup>. Therefore, learning comprises the enhancement of the cognitive structure by incorporating new ideas into it. Depending on the type of relationship among existing ideas in this structure and the new ideas being internalized, a process of learning can vary from being mechanic to being very meaningful.

Thus, meaningful learning takes place when new ideas are related in a non- arbitrary mode, adding substance to the existing ideas. Non-arbitrary is understood here as a logical and explicit relationship between the new idea and the other existing idea(s) in the individual's cognitive structure. On the opposing end, learning must be filled with substance; in other words, once certain contents are learned, the person can explain it with his own words. Therefore the same concept can be expressed in synonymous language and will transmit the same meaning<sup>(5)</sup>.

Therefore, this present study has the following objectives: to learn about the social and educational characteristics of the nurses' aides; and identify the difference in knowledge regarding hypothermia in the nurses' aide after the educational intervention has been completed and relate this knowledge to social variables and the studied content.

## METHOD

This present study is a semi-experimental study applied during a short period in an educational intervention provided to nurses' aides of the Surgery Center in the researched institution. This project was submitted to and approved by the Ethics Committee of the institution in February of 2009: Process No 030/09 with front page No 264414, All participants signed the Free and Informed Consent Form (FICF) prior to the beginning of the study.

(a) Cognitive structure – is the total and organized content of ideas of a certain individual, or it regards the organized content of ideas in the individual's particular brain area of knowledge (Moreira, 2006).

An observation script was elaborated for use with the nurses' aides during the intra-surgery period and was submitted to validation using the Delphi technique. This technique allows users to obtain a consensus of opinions from an expert group regarding future events and is based on the structured use of knowledge, experience and creativity by the experts' panel, assuming that collective judgment is better than the opinion of a sole individual, where the evolution of an agreement represents the consolidation of the experts' judgment regarding the theme<sup>(9)</sup>.

The validation process was performed by seven experts, selected as judges based on the following criteria: surgery center specialist nurse, experienced in teaching or practicing nursing in the surgical center; and agreeing to participate in the study by signing a Free and Informed Consent Form.

In the first round, judges received a list of nursing interventions specific to the intra-surgery period and non-intentional hypothermia. They were then required to judge each item as to its content property and clarity of instruction, it is important to point out that all predicted items in the initial version were kept in the instrument until the end of the process, since none were excluded by the judges. The items that were not approved due to lack of clear instruction were reformulated, presented again and judged once more in the second round, they were approved in the third round as the technique previews.

Establishing the instrument punctuation was performed by the researcher, listed as sub items (20) and composing a total of 20 points.

Once the final validation product of the instrument was obtained (checklist), data collection was performed, divided into three phases. In the first phase, all nurses' aides were invited to the surgery center, composing a total sample of 60, of which 40 met the criteria of working in the institution for at least one year starting from the first contact with the researcher. Of these nurses' aides, five chose not to participate in the study, therefore 35 signed the Free and Informed Consent Form.

Afterwards, the nurses' aides were evaluated regarding nursing interventions performed during the intra-surgery period for non-intentional hypothermia, using the checklist. Each nurses' aide was evaluated 12 times; in other words, while providing care to twelve patients in the surgical suite. This phase lasted four months. There were five evaluations per day, from Monday through Friday or Saturday in some cases; medium-sized surgeries were considered, lasting less than 2 hours and on patients who fell between the age parameters of 18 to 60 years of age.

In the second phase, the researcher presented the educational intervention proposal regarding non-intentional hypothermia to nurses' aides from the studied location. The nurses from the surgery center booked the days, the

time and the number of workers who would attend the educational intervention, with a view to not interfering in working activities. Three groups were formed of 10-12 nurses' aides, (A, B and C) and the days established for the intervention were Monday, Wednesday and Friday after their shifts were completed.

The educational intervention was administered by the researcher and the following concepts were approached: definition of hypothermia, hypothermia physiopathology, temperature control, heat loss mechanisms, passive and active heating mechanisms, hypothermia consequences, and medical file information recording.

The concept map was used as a teaching strategy with a view to presenting a diagram showing the hierarchical relationships among the concepts pertinent to the content structure. The average time for the strategy to take place was 50 minutes. The case study was used as another teaching strategy since it allows for a detailed and objective analysis of a real situation in need of investigation. Data from fictional patients who underwent surgery were used in the teaching process. Using this strategy, the researcher randomly divided the groups (A, B and C) into subgroups (A1, A2, B1, B2, C1, and C2) and presented two different case studies to each subgroup, which were based on the items to be analyzed. Later, the main topics were reviewed, solutions were proposed and analyzed by participants and the best conclusions were agreed upon, allowing for improvement through the researchers' and participants' contributions. The average time for analysis and discussion was 25 minutes for each group.

At the end of the teaching strategy, participants were offered a coffee break with a view to creating an interactive moment and as a way to evaluate the educational intervention. Following, comments regarding continuing education for nurses' aides were made in addition to the importance of the proposed theme in the surgery context.

In the third and last phase, two months after the educational intervention with a view to evaluating the nurses' aides' educational intervention, they were evaluated regarding nursing interventions during the intra-surgery period for non-intentional hypothermia, using the checklist.

Data are described utilizing absolute and relative frequency, mean and standard deviation. Statistics analysis was performed using the paired t-test to compare means before and after the intervention. The adopted significance level was 0,05. The Statistical Package for Social Sciences (SPSS, version 15,0 for Windows) software was used.

Tables 1, 2, 3 and 4 present data regarding nursing professionals from the Surgery Center who participated in the educational intervention on intra-surgery period non-intentional hypothermia.

## RESULTS

**Table 1** – Nurses' aide participants in the intervention characteristics - São Paulo, Brazil, 2010

Variables	N	%	Mean (SD)
<b>Gender</b>			
Male	03	8.6	
Female	32	91.4	
<b>Education Institution</b>			
Public	12	34.3	
Private	23	65.7	
<b>Age Group</b>			
20   30	16	45.7	32.74 (8.04)
30   40	13	37.1	
40   50	04	11.4	
50   60	02	5.7	
<b>Graduation Time</b>			
1   5	17	48.6	6.97 (4.61)
5   10	10	28.6	
10   15	07	20.0	
15   20	01	2.9	
<b>Working Time</b>			
1   5	32	91.4	2.86 (2.09)
5   10	03	8.6	

Nurses' aides' characterization regarding social and educational variables demonstrated a female prevalence (91,4%), most of whom (65,7%) graduated from private institutions. Participants ages varied from 20 to 60 years, with an average time since graduation time of 6,97 years (sd=4,61) and an average working time of 2,86 years (sd=2,09).

**Table 2** - Descriptive statistics of the nurses' aides' action variables before and after the educational intervention regarding non-intentional hypothermia - São Paulo, Brazil, 2010

	Minimum	Maximum	Mean (SD)	p
Nursing actions before intervention	6.67	9.58	8.09(0.72)	<b>0.00*</b>
Nursing actions after intervention	11.42	14.67	13.44(0.88)	

\*p < 0,05

As identified in Table 2 there was an increase in the mean number of nursing interventions following the educational intervention.

In Table 3 there is no significant statistical association between nursing actions and social and educational variables. It is important to point out that the means obtained after the educational intervention are higher than those obtained before the educational intervention for all studied variables.

**Table 3** – General characteristics of Surgery Center nurses' aides before and after the educational intervention regarding non-intentional hypothermia - São Paulo, Brazil, 2010

Variables	Nursing Actions			p
	Before Mean (SD)	After Mean (SD)	Difference	
<b>Education Institution</b>				
Public	8.36(0.58)	13.39(0.67)	5.03	0.32
Private	7.96(0.76)	13.47(0.99)	5.51	
<b>Age group</b>				
20   30	7.91(0.72)	13.53(1.12)	5.62	0.38
30   40	8.35(0.78)	13.18(0.60)	4.83	
40   50	8.08(0.55)	13.79(0.50)	5.71	
50   60	7.96(0.53)	13.83(1.06)	5.87	
<b>Graduation time</b>				
1   5	7.92(0.70)	13.52(1.08)	5.60	0.34
5   10	8.29(0.85)	13.19(0.61)	4.90	
10   15	8.33(0.53)	13.45(0.66)	5.12	
5   20	7.58 (-)	14.58 (-)	7.00	
<b>Working time</b>				
1   5	8.10(0.75)	13.41(0.90)	5.31	0.55
5   10	8.03(0.46)	13.83(0.75)	5.80	

\*p < 0,05

Data demonstrate in Table 4 that the nursing intervention evaluation items were statistically significant following the educational intervention.

**Table 4** – Comparison between evaluation items and the descriptive statistics before and after the educational intervention regarding non-intentional hypothermia for nurses' aides - São Paulo, Brazil, 2010

Variáveis	Nursing Actions			p
	Before Mean (SD)	After Mean (SD)	Difference	
Risk factors	2.07(0.28)	4.26(0.31)	2.19	0.00*
Temperature control	0.56(0.26)	1.59(0.30)	1.03	0.00*
Prevention measures	2.94(0.28)	4.16(0.31)	1.22	0.00*
Heating methods	1.14(0.26)	1.67(0.28)	0.53	0.00*
Medical file recording	1.38(0.19)	1.79(0.47)	0.41	0.00*

\*p < 0,05

## DISCUSSION

Nursing has been historically featured as a typically female profession, although the male nursing population has tripled in the last decade, going from 86,5% in 1991 to 90% in 2010. Men represent only 7,6% of the total number of nurses<sup>(10)</sup>. Studies demonstrate a wide disparity in the percentage of male nurses, ranging from 4,5% to 30%, although females still prevail in 100% of the educational programs studies<sup>(11-12)</sup>. Regarding age, one other study also presents ages between 27 and 39 years<sup>(10)</sup>.

According to the 2010 Federal Nursing Committee (COFEN in Brazilian acronyms) survey, there are around

1,480,653 active nursing professionals in the country; among those, 556,779 are nurses' aides (NAs), totaling 37,6% of the nursing workforce in the national territory. The Southeast region contains the highest number of nurses' aides (207,305)<sup>(13)</sup>.

Support and education for these workers, from the 1890s to the present, were a consequence of the predominant health practice influenced, at the time, mainly by socio-politic and economic factors. Under this context, efforts to train mid-level workers in nursing has become a priority for the Nursing Brazilian Association (ABEn in Brazilian acronyms) and for public policies, especially those regarding health and education<sup>(14)</sup>.

Therefore, the national Education Guidelines and Basis Law (LDB in Brazilian acronyms) No. 9,394/96<sup>(15)</sup>, introduces changes to professional education regarding the basic, technological and technical levels that affect the nursing technician and nurses' aide, with a view to promoting the transition between school and the workplace, including qualifications and updating, training young adults and adults with general and specific knowledge and abilities to perform productive activities.

As of 2000, the Nursing Sector Workers Training Project (PROFAE in Brazilian acronyms) was presented as a political initiative originating from a pedagogical nature with a view to enhance mid-level professional education, which represented the best way to face the incorporation of new technologies and changes in the technical division field, since up until 1999, according to estimates, there were 250,000 workers providing care delivery with no formal training<sup>(12)</sup>.

Currently, technical education institutions represent the highest concentration of schools in the private sector within all regions of the country. These institutions should be endeavoring to improve the educational processes needed to perform actions required by schools and health services.

In regards to graduation and length of working time in the Surgery Center, most nurses' aides had 1 to 5 years in the workplace since graduation. These results allow for the inference that the Surgery Center was the first place of employment for these professionals, a non-favoring factor since a short period of time since graduation combined with a short working experience in the field may lead to a higher possibility of adverse events occurring. Therefore, it is not recommended that nurses' aides be specifically educated to provide care to critical patients through updating courses.

Table 2 demonstrates that there was a significant statistical difference after the educational intervention regarding intra-surgery non-intentional hypothermia. Similar results were found while evaluating the effectiveness of educational programs, both in change of knowledge levels and in the improvement of nursing practices<sup>(16)</sup>.

It is important to point out that, in this present study, the nurses' aides' cognitive structure already contained information regarding intra-surgery hypothermia since these professionals had already, at some point, been faced with a hypothermic patient. In addition, most professionals between 20 and 30 years of age are studying to become nurses and have had the content approached in the Surgery Center nursing subject.

Therefore, when we applied the questionnaire before the educational intervention took place, basic acquisition of previous knowledge was sought. Thus, we were able to determine from the professionals their knowledge regarding the basic elements of hypothermia. These elements are important to know so that the new concepts can anchor and change in such a way as to enhance the cognitive structure by incorporating new ideas<sup>(17)</sup>.

Another favoring point was the availability of the nurses' aides in composing the study group. The apprentice availability is considered as an internal factor in which the individual leaves his passive condition and becomes active, it is inherent in each individual<sup>(7)</sup>.

This present study used the following as teaching strategies: the conceptual map, in which critical thinking is required to select key concepts and relate the new information to previous known concepts. Case studies were also used with the objective to illuminate the significant aspects of the presented content<sup>(15)</sup>.

Results in Table 3 demonstrate that social and educational variables exercise no influence on the evaluation results of nursing interventions for intra-surgery hypothermia.

However, an increase in the means is observed after the educational intervention, mainly in professionals with higher graduation and working time. This can be attributed to the acquisition of knowledge through experiences which, allied to their theoretical knowledge, allows the professional to develop the needed skills to efficiently perform the required activities in this work sector. This development is also related to experiencing adverse situations and social relations in the groups in which they have formed acquaintances throughout their professional lives<sup>(18)</sup>.

One of the relevant aspects in this discussion is that the nursing team as a whole is responsible for the direct care of patients, providing for basic needs and promoting welfare, hygiene and comfort. In light of these professional responsibilities, the need for courses taught by technically competent nurses who dominate the content and knowledge of the pedagogical-didactic practice<sup>(19)</sup> was perceived.

However, graduate courses in nursing present deficiencies in the education of nursing professionals in terms of teaching activities, since education is still aimed

at recovery and fragmented care delivery interventions, opposing current guidelines and favoring a collective health-centered focus resulting from governmental public health strategies. The initial nursing education in itself is no guarantee of good performance in teaching interventions. It requires permanent education in care delivery and the possibility of enhancing teaching strategies supported mainly by specific technical professional experience<sup>(20)</sup>.

Since 2000, after PROFAE, the teaching field was enhanced by arriving professionals, a fact that is evidenced by the increase in the number of private nursing schools of a technical level in Brazil. As a result, nurses are concluding their programs and teaching in public and private institutions, providing classes with no specific and deep knowledge of educational practices. Very few have a degree in education, pedagogical education or teaching education for professional education at the technical level required in health care<sup>(18)</sup>.

Data demonstrated in Table 4 leads us to deduce that the nursing intervention evaluation items were statistically significant ( $p < 0,005$ ) following the educational intervention, suggesting that there was the acquisition of new meanings regarding intra-surgery hypothermia in the cognitive structure of nurses' aides, based on the presented teaching strategies.

However, these results are also connected to the personal and implicit nature of nurses' aides, since nursing is a personal, contextual action produced through experience reflecting over and about the action itself. The knowledge attained in the classroom holds an instrumental value, as it is internalized by the subject in his field of reference as another element in his practice knowledge<sup>(21)</sup>.

Therefore, it is important to say that the knowledge of the items mentioned here is important since non-intentional hypothermia during surgery is frequent, constituting an important cause of the increase in anesthesia recovery room complications, not only putting the health of the patient in danger, but also increasing the costs of the institution due to the need for more nursing hours, consequently increasing the time of stay in the anesthesia recovery room.

## CONCLUSION

Intra-surgery non-intentional hypothermia is mentioned as one of the main complications in the peri-surgical period. Hence, nursing professionals require training that will enable them to handle this complication. Attaining knowledge is a fundamental way to diminish these index complications in the surgery context. In this present study, the educational intervention was effective, since the difference in the means for the nursing interventions was higher (5,35) following the educational intervention. However, a significant difference in nursing interventions was not demonstrated when related to the studied social and educational variables. Results suggest that the concepts regarding the theme were meaningful for nursing professionals; in other words, information was anchored, modified and enhanced in the cognitive structure of the subjects in the study. On the other hand, the teaching strategies used in the study were also believed to contribute in attaining the results seen in this study.

Although this was not a probability sample, results corroborate those already identified in international and national studies. Therefore, new investigations regarding nursing professionals' education based on meaningful learning in other hospital units must be performed.

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