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Knowledge of resident nurses about airway management with laryngeal mask insertion

Conocimiento de las enfermeras residentes sobre el manejo de la vía aérea con inserción de mascarilla laríngea

Conhecimento de enfermeiros residentes sobre manejo de via aérea com inserção de máscara laríngea

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Abstract

The aim was to assess the knowledge of resident nurses about the use of laryngeal masks before and after health education activities. Cross-sectional, qualitative, descriptive study with eight nursing residents, based on teaching strategies with expository-dialoged classes and realistic low-fidelity simulation. Data were collected through pre-test and post-test written learning tests. 62.5% (n=5) of participants over 25 years old, 37.5% (n=3) graduated in Nursing for more than one year and without professional experience in the area. There was a lack of knowledge about the indications for using the laryngeal mask, the necessary supplies for insertion and choosing the appropriate size. All participants answered 100% of the questions correctly in the post-test learning instrument after the applied teaching strategies. Teaching strategies with expository-dialoged classes, followed by realistic simulation of low fidelity for health education proved to be useful for theoretical learning and development of skills for using a laryngeal mask.

Descriptors: Laryngeal Masks; Airway Management; Students, Nursing; Education, Continuing; Simulation Training.

Resumén

El objetivo fue evaluar el conocimiento de las enfermeras residentes sobre el uso de mascarillas laríngeas antes y después de las actividades de educación para la salud. Estudio transversal, cualitativo, descriptivo con ocho residentes de enfermería, basado en estrategias de enseñanza con clases expositivas-dialogadas y simulación realista de baja fidelidad. Los datos se recopilaron mediante pruebas de aprendizaje escritas previas y posteriores a la prueba. El 62,5% (n = 5) de los participantes mayores de 25 años, el 37,5% (n = 3) se graduó en Enfermería por más de un año y sin experiencia profesional en el área. Se desconocía las indicaciones de uso de la máscara laríngea, los insumos necesarios para su inserción y la elección del tamaño adecuado. Todos los participantes respondieron correctamente el 100% de las preguntas en el instrumento de aprendizaje post-test luego de las estrategias de enseñanza aplicadas. Las estrategias de enseñanza con clases de diálogo expositivo, seguidas de simulación realista de baja fidelidad para la educación en salud, demostraron ser útiles para el aprendizaje teórico y el desarrollo de habilidades para el uso de una máscara laríngea.

Descriptores: Máscaras Laríngeas; Manejo de la Vía Aérea; Estudiantes de Enfermería; Educación Contínua; Entrenamiento Simulado.

Resumo

Objetivou-se avaliar o conhecimento de enfermeiros residentes sobre a utilização de máscara laríngea antes e após atividade de educação em saúde. Estudo transversal, qualitativo, descritivo, com oito residentes de enfermagem, a partir de estratégias de ensino com aula expositiva-dialogada e simulação realística de baixa fidelidade. Coletaram-se dados através de testes escritos de aprendizagem pré-teste e pós-teste. 62,5% (n=5) dos participantes com mais de 25 anos, 37,5% (n=3) graduados em Enfermagem há mais de um ano e sem experiência profissional na área. Observou-se desconhecimento sobre as indicações para uso da máscara laríngea, insumos necessários para a inserção e escolha do tamanho adequado. Todos os participantes acertaram 100% das questões no instrumento de aprendizagem pós-teste após as estratégias de ensino aplicadas. Estratégias de ensino com aula expositiva-dialogada, seguida de simulação realística de baixa fidelidade para educação em saúde mostraram-se profícuas à aprendizagem teórica e desenvolvimento de habilidades para utilização de máscara laríngea.

Descritores: Máscaras Laríngeas; Manuseio das Vias Aéreas; Enfermeiros Estudantes; Educação Permanente; Treinamento por Simulação.

Introduction

The description of the first prototype of the Laryngeal Mask (LM), a supraglottic device, dates to 1983, in a pilot study carried out with 23 patients[1]. It consists of a tube with an inflatable mask in the distal portion that adapts to the posterior pharynx[2], no need for visualization of the vocal cords and laryngoscope, with different sizes ranging from infants to adults[3-4].

It is a resource used in situations of difficult tracheal intubation, surgeries, and urgent and emergency care, with positive results in the first insertion attempt[5-8], requiring personal protective equipment, lubricant, syringe, stethoscope, bag-valve-mask and the appropriately sized supraglottic device. The insertion technique includes cuff leak testing, full cuff deflation, lubrication of the LM posterior wall, insertion of the LM into the oral cavity along the hard palate, soft palate, and pharyngeal wall until resistance[7].

The LM is widely popular as an effective replacement for the orotracheal tube, offering greater hemodynamic stability, quick and easy insertion, less neuromuscular block, lower incidence of postoperative morbidity, in addition to being associated with a lower incidence of intraoperative complications such as laryngospasm, cough, laryngeal edema, soft tissue trauma and sore throat. However, adverse situations related to failure to protect the airways with risks of bronchoaspiration, increased length of stay and care/hospital costs are described[8].

In Brazil, regarding the nursing team, the insertion of LM is exclusive to nurses, in patients at imminent risk of death, in the intra- or pre-hospital environment, for maintenance of a patent airway, if they are properly trained in a theoretical-practical course[9]. An Australian study supports that supraglottic devices should be operated by professionals after theoretical training, practical instruction until mastery of the technique and successful insertions under supervision[10].

Reiterating the latent need for meaningful learning and transformation of professional practices involving the care of critically ill patients, Permanent Health Education (EPS) aims to qualify and improve the work process with a view to promoting change and improvements in this context[11]. Thought out and adapted to health needs, it becomes an enabling instrument for the acquisition of knowledge, in the case of this study, on advanced airway management by nursing residents.

Considering that the nurse is often the first professional to assist the critically ill patient[12], EPS actions contemplating nursing residents, a population mostly with little professional experience[13], they favor the development of new skills, critical thinking and assertive decision-making, essential aspects to the advanced airway approach and quality of health care. Thus, this study presents the following guiding questions: do nursing residents have theoretical-practical knowledge for the use of LM? Can health education actions with nursing residents contribute with specific knowledge for the use of LM in emergency? And as objective to assess the knowledge of resident nurses about the use of laryngeal masks before and after health education activities.

Methodology

This research followed the principles of Resolution No. 466/2012 of the National Health Council, being approved by the Research Ethics Committee, as per opinion No. 4,767,994.

This is a cross-sectional, descriptive, and qualitative study, guided by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) tool. The target population consisted of nursing residents in the first year of the Postgraduate course at the specialization level, in the manner of medical-surgical residency. As exclusion criteria, the following were considered: not performing the practical and theoretical activities of the program, absence due to vacation or sick leave.

The study sample was by convenience, composed of eight nursing residents. The study setting was a medium-sized public hospital, located in the city of Rio de Janeiro (RJ), Brazil.

For the development of the study, expository-dialoged class and realistic simulation were carried out, lasting three hours, in March 2020. In the expository-dialoged class, the theoretical content (history, insertion technique, specific care, advantages, indications, and restrictions the use of LM) was addressed with the aid of a PowerPoint presentation, and instructional video demonstrating the LM insertion technique. Afterwards, a discussion of the topics was conducted from the field of ideas or experienced reality.

The practical content was explored and implemented through realistic simulation[14]. Participants were divided into two groups, directing them to two training stations (A and B). Training station A consisted of a cardiopulmonary resuscitation manikin for basic life support and a bag-valve-mask device for non-invasive ventilation; and training station B, consisted of an intubation mannequin, a bag-valve-mask device, oropharyngeal cannulas, first and second-generation LM numbers 3, 4 and 5, water-soluble jelly, 20 ml syringes and stethoscope. The dummies used were of low fidelity. Each participant performed the non-invasive ventilation technique and LM insertion, as many times as necessary, always accompanied by the facilitators, until the procedure was successful, and skills developed.

An instrument developed by the nurses of the Multidisciplinary Continuing Education Service was applied, containing pre-test and post-test sections with four identical objective questions, to assess the previously known content and what was learned after the health education action. The participants, before the beginning of the class, were instructed on how to fill out the instrument in the pre-test section, and at the end of the practical activity on how to fill in the post-test section.

Data analysis was performed using descriptive statistics, without identifying the research participants.

Results

It was found that 62.5% (n=5) of the participants were over 25 years old, 100% (n=8) female, 37.5% (n=3) graduated in Nursing for more than a year, none with professional experience in the area and all students in the first year of the Postgraduate course at a specialization level, like medical-surgical residency.

Tables 1 and 2 show the frequencies of correct and incorrect answers indicated by the study participants in the pre-test instrument.

Table 1. Frequency of correct and incorrect answers marked by study participants in the pre-test instrument. Rio de Janeiro, RJ, Brazil, 2020 (n=8)

	Right answer		Incorrect answer	
Questions	**n**	**%**	**n**	**%**
It is an indication for the insertion of a laryngeal mask	2	25	6	75
About the insertion of the laryngeal mask, they are among the necessary items	3	37,5	5	62,5
The choice of the size of the laryngeal mask to be used should consider	1	12,5	7	87,5
Are restrictions on the use of laryngeal mask	6	75	2	25

Table 2. Incorrect answers marked by study participants in the pre-test instrument. Rio de Janeiro, RJ, Brazil, 2020 (n=8)

Questions	**Incorrect answer**	**n**	**%**
It is an indication for the insertion of a laryngeal mask	Patient with ventilatory obstruction below the larynx	6	75
About the insertion of the laryngeal mask, they are among the necessary items	Goggles, surgical mask, and laryngoscope	3	37,5
	Surgical mask, laryngoscope, and oropharyngeal cannula	2	25
The choice of the size of the laryngeal mask to be used should consider	Type of patient's dentition (fixed or mobile)	4	50
	Clinical picture presented by the patient	3	37,5
Are restrictions on the use of laryngeal mask	Difficult airway	2	25

About the post-test instrument, applied soon after the end of the health education action, it was found assertive in all answers by 100% of the participants.

Discussion

From the results, a female population was identified, graduated in Nursing for more than a year, without professional experience, with ignorance about the indications for using LM, inputs necessary for insertion and choosing the appropriate size.

It is known that the Nursing Graduation does not exhaust the comprehensive theoretical content related to health care and does not cover the necessary practice for the development of care skills. In addition, the Nursing Residency course links theory to professional practice, encouraging the research and extension process. It allows the professional, even as a student, to acquire broad knowledge through continuous exchanges with more experienced professors and professionals, remedying deficiencies arising from graduation and preparing nurses for the job market[15].

Most nursing residents are young graduates with little or no familiarity with the work process inherent to the profession[13], especially regarding the urgent and emergency scenario and basic and advanced life support[16]. It should be noted that the nurse is responsible for the most technically complex nursing care, which requires scientific knowledge and the ability to make immediate decisions[17].

The LM is widely used by physicians in short- and medium-term surgical procedures, difficult airway algorithms, cardiopulmonary resuscitation, and pre-hospital urgent and emergency care[3,18]. However, still little known by nurses[19], corroborating data from this study, especially in relation to the indication as an alternative to the difficult airway.

The results allowed the identification of satisfactory knowledge of the participants about restrictions on the use of LM, demonstrating that familiarization with supraglottic devices, practice for insertion and proper selection of patients are fundamental criteria for health care and patient safety[7]. Limitations include patients at risk of vomiting and aspiration, low pulmonary compliance or high resistance to ventilation (fibrosis, chronic obstructive pulmonary disease, bronchospasm, pulmonary edema, chest trauma), hiatal hernia, pregnant women older than 14 weeks, restriction of mouth opening with interincisor distance less than two centimeters, pharyngeal pathologies, selective pulmonary ventilation, obstruction below or in the

larynx, intestinal obstruction, decreased gastric emptying due to alcohol or opioid intake and in the presence of blood dyscrasias[4].

Criteria for choosing the appropriate size of the LM were wrongly pointed out by the participants. The selection of LM must be individualized, according to the patient's weight[4] and the product manufacturer's guidelines. In clinical practice, the patient's weight is routinely recorded in the medical records or care forms and the specification of the indicated weight range for each input in the LM tube[20].

Dental characteristics do not interfere with the proper size of the device, but with ease or difficulty in intubation[21], contradicting the statements found in this study. Research indicates risk of accidental fracture and tooth avulsion in patients with compromised dentition, inadvertent pulmonary aspiration, airway obstruction or ingestion of objects during LMA insertion[22].

Regarding the patient's weight, a study states that obesity can influence the structure of the pharynx by increasing the disposition of fat in obese patients, consequently resulting in a reduction in the size of the upper airways. The authors compared the choice of LM according to the actual weight and ideal weight of patients with a body mass index ≥25, concluding that choosing the LM, according to the ideal weight, may be a more assertive alternative for overweight patients[20]. Research shows high success rates in obese patients[23]. However, other older studies highlight morbid obesity as a limitation to the use of LM[4] and others as a significant risk factor for procedure failure[8,24].

Knowledge apprehension by the participants of this study was observed after an expository-dialoged class and realistic simulation, with a percentage of 100% correct answers in the questions applied in the post-test and achievement of the learning objectives. The basic and advanced airway training stations with simulator mannequins allowed the nursing residents to become familiar with the inputs, care setting, technique execution and skill development, which was also observed in a Brazilian study carried out with nursing students[12], and in a Greek study with nurses without experience in managing airways with LM[25].

Factors such as inexperience, inadequate equipment, lack of trained personnel and increased time for maintenance of patent airways are potentiating negative outcomes in emergencies[26]. Integrative research confirms that inadequate airway management results in negative outcomes in the care of patients in intensive care, emergency and undergoing anesthesia, highlighting the importance of training health professionals with high success rates in performing the insertion technique. LM and ventilation when using dummies[2].

Realistic simulation, as an active teaching methodology, contributes to the development of clinical reasoning, critical, ethical and reflective thinking, favoring the active participation of the student in the teaching-learning process and increasing the quality of professional training[14,27]. The relevance of the construction of health simulation scenarios is highlighted, approaching the reality experienced by professionals, enabling experiential learning in a safe and structured environment, error corrections, skills development and adoption of good care practices[28].

Despite the various benefits described in the literature, the application of teaching and simulation technologies in health education training presents challenges from resource availability, planning and implementation in practice. A study pointed out difficulties from the perspective of teachers such as unavailability of high-fidelity simulators, lack of teacher skill with the teaching method, ignorance of new technologies, creativity in the development of clinical situations, constant need for updating and theoretical unpreparedness of the student[14].

Finally, about the approach to airways in emergencies, it is essential for nurses to acquire knowledge and develop clinical skills with the use of supraglottic devices in patients at risk of death. Resource with short learning curve[29], easy to handle, quickly inserted, high success rates, minimizing negative patient outcomes[24].

Conclusion

The study allowed the identification of deficits in knowledge of first-year nursing residents about the indications for using the LM, necessary inputs for insertion and choice of the appropriate size.

The teaching strategies with lecture-dialoged class, followed by realistic simulation of low fidelity for health education on airway management with LM, proved to be fruitful based on the results of the learning instrument in the post-test and skills assessment section. developed in the practical training stations.

The scarcity of studies on LM in Brazil is pointed out, with nurses as the target audience. As a limitation, there is data collection in only one hospital institution, which may not correspond to the reality of first-year nursing residents from other locations, and as a contribution, the reflection on the need to address the issue during the admission of nursing residents in in-service training units and/or educational institutions.

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