

Competences, Tasks and Functions for the Care of the Very Low Birth Weight Newborn in Ventilation with CPAP, Hospital “Eusebio Hernández Pérez”. 2020

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Abstract

Introduction: Since the mid-twentieth century, studies on competencies have been developed internationally. The Pan American Health Organization promoted its evaluation in the American Continent in the late 1980s. In Cuba, Nursing has been a pioneer in the evaluation of competencies.

Objective: To identify the specific nursing competencies for the care of the very low birth weight newborn in ventilation with CPAP.

Methods: Technological development research with a qualitative-quantitative study at the Eusebio Hernández Gyneco-Obstetric Hospital in Havana during 2020. The universe was made up of 62 nursing professionals who work in the neonatology service, the sample was 50 nurses, taking into account the inclusion criteria. For the development of the research, the DACUM method (development of the work curriculum) was used, qualitative-quantitative techniques were applied, the functions and tasks were prepared, with the participation of experts, the DACUM map was constructed.

Results: 6 specific competences were identified in relation to 6 functions and their tasks, in which all the experts agreed due to having a high scientific level.

Conclusion: Specific nursing competencies for the care of very low-weight neonates in ventilation with CPAP were designed to improve the quality of care for these newborns and the improvement of professionals.

Keywords: Competition; Nursing; CPAP; Ventilation

Introduction

CPAP is a non-invasive ventilation system (endotracheal tube is not used), its acronym from English, stands for Continuous Positive Airway Pressure. Its application began in the 1930s, but its use in clinical practice was in the 1950s and its treatment in newborns began in 1960 [1].

CPAP favors spontaneous breathing, since a positive pressure is maintained throughout the respiratory cycle of a patient, thus helping the newborn to breathe.

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The use of Continuous Positive Airway Pressure, CPAP, has spread globally in all Neonatal Units. Through this ventilatory therapy, an optimal supply of oxygen is provided to neonates, maintaining a continuous opening of the alveoli in order to promote spontaneous breathing in children. Thanks to advances and practical experience, it has been possible to improve over the years, from its first use until now, the device itself and its characteristics, the result of treatment, reducing neonatal mortality, its various benefits and avoiding in its possible complications to a greater extent [1].

In newborn care in neonatology services, the nurse has acquired relevance since she must provide interactive care applying knowledge and specific techniques of the profession in the specialty. That is why, in response to the need for continuous training of the nursing team to work in neonatology services, the need to develop all their potentialities is proposed to be able to provide nursing care with excellence. An intelligent system in the training of competencies that encourages the integral development of the person taking into account the problems posed by reality and aimed at achieving the desired performance profile in the profession. For this reason, with the objective of identifying the specific nursing competencies for the care of the very low birth weight newborn in ventilation with CPAP, the present investigation is carried out.

It is about providing knowledge to achieve a better performance of nursing professionals in the specialty.

Methods

A qualitative investigation of technological development was carried out for the elaboration of the Dacum Map based on the competencies identified in the neonatology service of the “Eusebio Hernández Pérez” Gyneco-Obstetric University Hospital. The work universe was made up of 62 nursing professionals directly linked to the Neonatology specialty.

Participant characteristics: For the selection of the participating professionals, the inclusion criterion was that they were licensed nurses with 3 or more years of experience in the specialty of neonatology and that they were recognized within medical and nursing professionals as high-level professionals. level of service provision.

Group of experts: It was taken into account that they were Nursing and Medicine professionals with Master’s degrees, Specialists with 10 or more years of experience in the activity and directly linked to work in the specialty.

Investigation procedure

The authors assume in the research, the method known as DACUM, a qualitative work analysis methodology that follows the logic of the occupational analysis of tasks. It was originally developed in Canada in order to collect information on the requirements for the performance of specific jobs. It has been used to analyze occupations at the professional, managerial and technical levels, allowing the selection of functions and tasks to be carried out in order to reach the curricular networks, on the one hand, and the list of competencies on the other. Its use is particularly promoted to guide the development of training programs and to dissolve the gap between the content of training programs and what actually happens at work. DACUM is also useful for training institutions that want to implement competency-based programs that require careful identification of tasks, which in turn are directly related to the competencies to be obtained. It is a widely used tool in the preparation of curricula for technical level programs and in the elaboration of job analysis in the United States of America and Canada.

It is known as an effective occupational analysis method. It allows that any job can be described in terms of tasks and functions and that skilled worker are able to describe and define their occupation in the best way. For this reason, the people who perform their work best are selected from the profession in question and, based on the identification of the specific competencies to carry out the activity, the proposed functions and tasks are established for each of the competencies that professionals must develop.

The DACUM method is based on the following principles:

- Skilled workers can describe their work more appropriately than anyone else.

- An effective way to define an occupation is to describe tasks that skilled workers perform.
- All the tasks to be properly developed demand the application of knowledge, behaviors, skills, as well as the use of different equipment and tools.

DACUM workshop planning (Development of the labor curriculum)

Panels of workers who directly carried out the practical activity were formed, forming 4 work groups with 10 participants in each one, carrying out 3 rounds. The facilitator and recorder of the panel of workers was selected and the objectives to be achieved with the execution of the workshop were explained.

Execution of the workshop

An analysis was carried out to identify whether within the functions and tasks described for the nursing staff in the neonatology service it was necessary to add functions of the nurses who work in these services. From this analysis it was also derived, what competencies, functions and tasks nurses should perform when caring for the newborn on ventilation with CPAP.

To establish the competencies, it was taken into account what the nursing staff should know (theoretical knowledge) what they do (Performance in their job position).

To establish the functions, several rounds were carried out and the functions were established, understood as a broad area of responsibilities that is made up of several tasks. A function can be broken down into between six and nine tasks.

Criteria for identifying a task

It implies an action that modifies an object observing the given conditions. While the function focuses on what is done, the task usually refers to how it is done. It is made up of a set of steps, it is developed by a worker as part of an area of his work (of a function), it is observable, verifiable, repeatable and measurable over time.

Shaping the DACUM map

After defining in the consensus workshops, the knowledge, functions and tasks of the nursing staff working in the neonatology service with the neonate in nutritional recovery and the criteria of the experts in rounds, a proposal of competencies and the DACUM map which was submitted to the criteria of experts in three rounds, until the specific nursing competencies were conformed with the tasks and functions for the nurse who works with the very low-weight newborn in ventilation with CPAP.

In the development of the DACUM map, the authors of the research established a system of numerical codes for the association of the competence with their functions and tasks.

Ethical aspects

During the development of the research, the established ethical aspects were complied with: anonymity, confidentiality, consent and voluntariness of the people who participated.

For the Nursing profession, work competencies are of vital importance, given its mission related, among other aspects, with the care to maintain or recover health, prevent diseases and rehabilitate people with sequelae and given the actions carried out by this professional in health services, makes it necessary to develop attitudes and values consistent with its mission. That is why the specific action of nursing professionals in the specialty based on competencies will allow to direct the care of the very low birth weight newborn in ventilation with CPAP.

The importance of this ventilatory device (CPAP) not only lies in the efficacy of the treatment, it has the advantages that it is an economical ventilatory support, with multiple benefits for both children and adults, with different modalities and interfaces, thus adapting to the needs of the patient, improving spontaneous breathing and alveolar opening [2].

Therefore, over the years, since CPAP was used for the first time until now, several studies have been carried out, seeking improvements in order to reduce neonatal mortality and increase the benefits in the usefulness of this ventilatory therapy and use it as weaning support therapy from intubation or combined with other treatments.

According to numerous studies and articles, it can be mentioned that CPAP currently has multiple uses in clinical practice as a non-invasive ventilatory mode, for the treatment of various disorders of both pulmonary and non-pulmonary origin. One of the most common uses, such as non-invasive mechanical ventilation, is for the treatment of respiratory distress syndrome, prematurity and apnea of the newborn among others.

CPAP has many benefits as ventilatory therapy in neonates and it is important that the nursing staff know what these benefits are, so that the positive effects of the ventilator are those that are expected: It increases the functional residual capacity (FRC) and helps the increase of lung volumes. Reducing work of breathing. It stabilizes the activity of the chest wall and reduces the total resistance of the airway, allowing the respiratory muscles to rest. Increases lung compliance avoiding alveolar collapse. Increases gas exchange, improving oxygenation, respiratory rate, tidal volume and minute volume, thus reducing CO₂ levels, improving alveolar ventilation and increasing the volume in each breath. It serves to prevent extubation failure in premature newborns [3].

It is also necessary to mention some of the complications that may be present in the newborn on CPAP ventilation to avoid or reduce the appearance of them through specific nursing care.

Eye problems: High oxygen levels can cause damage to the retina of the eye and consequently blindness.

Local problems related to the lack of humidification of the gas that is administered, with the formation of erosions or ulcers, necrosis of the nasal columella, increased secretions in the upper airways that favor obstructive apneas and the exit of the nasal part.

Digestive complications are caused by gastric insufflation and abdominal distension, which lead to the appearance of food tolerance problems. Another digestive problem can be gastric perforation, which is more common at high pressures.

Respiratory: There may be pulmonary overdilatation, barotrauma, carbonic retention that can cause hemodynamic compromise due to the increase in pulmonary pressure, which will hinder venous return and decrease cardiac output.

In addition, oxygen or very high pressures can cause pneumothorax, tears in the lung tissue causing a lung collapse. Another problem can be hypercapnia if treatment is not carried out correctly [3].

Thanks to nasal CPAP plus the early administration of surfactant, the use of invasive mechanical ventilation can be reduced. In hyaline membrane disease in preterm newborns, the appearance of obstructive apneas is reduced. Since CPAP is not invasive, it has a lower risk of infection and reduces neonatal mortality. It is a low-cost device, achieving 80% success as a treatment in neonates [3].

That is why the specific action of nursing professionals in the specialty based on competencies will allow directing the care of the nurse who works in the care of the very low birth weight newborn in ventilation with CPAP.

MAPA DACUM (Map for the development of the labor curriculum) Nursing competencies, functions and specific tasks for the care of very low weight newborns ventilated with CPAP.

001. Develops skills to guide parents in the performance of comprehensive care for the newborn focused on development.

001.1 Encourage the bond of parents - newborn.

Homework

- Propose contact with the mother and father and talk to the newborn.
- Incorporate the progressive participation of the mother and father in care when there is no invasive treatment.
- Guides the parents the skin-to-skin method.

002 Develop organizational skills to promote minimal newborn manipulation.

002.1 Indicate, control and execute nursing actions to favor minimal manipulation of the patient.

Homework

- Avoid excessive sensory stimulation and unnecessary entry to the incubator.
- Handle the newborn slowly and gently only when required.
- Previously prepare the material to be used to reduce the handling time, ensuring that it does not exceed 30 minutes.
- Record skin temperature, monitor constants and respirator parameters on the nursing sheet each time the newborn is handled.
- Place the newborn in a double.
- Walled incubator with a skin temperature sensor, avoiding frequent manipulation for temperature control.

003 Develop skills to promote the comfort of the newborn.

003.1 Carry out, control and execute nursing actions to promote the comfort of the newborn.

Homework

- Place the newborn in a flexed position in order to reduce heat loss (the prone position allows flexion, facilitates sleep, improves oxygenation, ventilation and breathing pattern, and facilitates temperature and respiratory control, digestive tolerance).
- Avoid noise and excessive lighting.
- Reduce the intensity of the alarm sound.
- Keep the newborn in a semi-dark environment facilitating sleep and reducing stress.
- Place blankets over the incubators, which protect from light and muffle noise.
- Place the newborn in a flexion posture.
- Make postural changes every 3 hours and place padded nests that provide limits in their movements in search of contact with stable surfaces.
- Observe the newborn’s response to different stimuli.

004 Develop skills for the care of the newborn during feeding.

004.1 Develops skills to promote neonate feeding and avoid complications with CPAP ventilation.

Homework

- Place an orogastric tube for feeding, the newborn breathes mainly through the nose and the presence of a nasal tube interferes with the passage of air.
- Change the orogastric tube every 12 hours to avoid infection.
- Open the orogastric tube after feeding to promote air outflow and avoid abdominal distention during the time the patient is ventilated by CPAP.
- Evaluate abdominal girth every 12 hours if there is abdominal distention, which can make this ventilatory modality fail in the patient.
- Observe carefully the evolution of the child and make decisions.

005 Develop skills for neonatal skin care during CPAP ventilation.

005.1 Carry out, control and execute nursing actions for the care of the patient’s skin.

Homework

- Maintain the integrity of the patient’s skin.
- Use gloves and sterile material in each manipulation or invasive procedure on the patient’s skin.
- Place tape of the smallest size possible to avoid damaging the skin during the placement of orogastric tubes, fixation of CPAP, use of hypoallergenic tape.
- Avoid using adhesive collection bags that damage the skin.
- Place the oxygen saturation sensor previously protected with gauze, avoiding direct placement of the tape on the skin.
- Give gentle massages on the newborn’s support points to promote circulation. -Avoid very intense heat sources, which could burn the newborn.
- Remove the plasters previously moistened with warm distilled water or oil to avoid damaging the patient’s skin.
- Change the collation site of the servo control to avoid skin injuries.
- Protect the patient’s nose (columella) during CPAP placement to avoid damage.

006 Develop skills for the care of the neonate during CPAP ventilation.

006.1 Manage, evaluate and make decisions in the non-invasive ventilation of the neonate.

Homework

- Make decisions jointly with the doctor.
- Auscultate the thorax.

- Observe the ventilation equipment to detect anomalies and identify alarms.
- Continuously observe oxygen saturation and respiratory rate.
- Change the fan nozzles every 48 hours
- Observe the absence of humidity in the pipes (to avoid infection) and periodically empty the water traps.
- Change the nose every 8 hours or the Benveniste valve every 12 hours.
- Observe the appearance of complications related to nose.
- Instill warm physiological saline solution through the nostrils to avoid obstruction.
- Identify complications related to aspiration during ventilation (Hypoxemia, elevation of intracranial pressure, elevation of blood pressure, apnea, cardiac arrhythmias).
- Observe the correct placement of the nosepiece during ventilation.
- The ventilation system must have the correct humidification.

From the analysis carried out, all the experts agreed that the specific competencies in relation to the functions and their tasks correspond, most of them believed that they had found a high scientific and professional level in the revised document, where the care was clear independent and autonomous of the nursing professionals, to guarantee the success of the care of the very low birth weight newborn in ventilation with CPAP.

Conclusion

In the research carried out, the specific competences were elaborated, the functions and tasks that the nurse must have for the care of the newborn in ventilation with CPAP in the neonatology service of the “Eusebio Hernández Pérez” Gyneco-Obstetric Hospital were developed.

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