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Knowledge of nursing professionals about prevention of venous catheter-related bloodstream infection in a pediatric and neonatal intensive care unit

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ABSTRACT

OBJECTIVE

To identify the nursing staff knowledge on venous catheters-related bloodstream infection prevention in pediatric and neonatal intensive care unit.

METHODS

Quantitative and analytical field research, using a questionnaire with 50 nursing professionals working in the neonatal and pediatric intensive care unit of a hospital in the south zone of São Paulo for at least three months.

RESULTS

Although all participants answered more than 50% of the questions about infection prevention measures, a vulnerability in the professionals' knowledge was identified, so that no matter how difficult it may be, it can cause harm to the patient.

CONCLUSION

This study made it possible to identify gaps in the knowledge of nursing professionals about the proposed theme, requiring educational measures, which justifies the importance of this research.

DESCRIPTORS

Blood Stream, Blood-borne Infections, Catheters, Neonatology, Pediatrics.

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INTRODUCTION

Healthcare-Related Infections (HAIs) are caused by infectious agents contracted after the patient's admission to the health service and are very common in hospital settings, which can bring about several complications for the hospitalized patient, especially when the patient is a child or a newborn in an Intensive Care Unit (ICU), and can aggregate to the patient's underlying diseases, prolonging the hospital stay, besides increasing the costs of care[1,2].

Among the main HAIs, venous catheter-related bloodstream infection stands out, considering that intravascular devices are routinely used in the hospital environment, such as central venous catheters (CVC), peripherally inserted central catheters (PICC), and peripherally inserted venous catheters (PVC)[1,2,3].

Bloodstream infection occurs when bacteria come into contact with the bloodstream by forming a biofilm on the outside of the device, bypassing the skin, which is the major defence mechanism in our body. Considering that venous catheters damage the integrity of the skin, they can be considered as a gateway for infections. In studies carried out in Brazil *Klebsiella pneumoniae* and *Acinetobacter* spp stand out as the main microorganisms causing these infections.

In studies carried out in the USA, it is estimated that 1.7 million patients are infected by SAIs per year, and 99,000 deaths per year are related to these infections; 31,000 of these deaths are due to Bloodstream Infections (BSI) related to the use of some vascular device[5].

In Brazil, a study conducted by the Brazilian Surveillance and Control of Pathogens of Epidemiological Importance (SCOPE), showed that 40% corresponds to the mortality rate in cases of bloodstream infection[4]. About 70% of the cases of bloodstream infection could be prevented with appropriate measures such as the use of bundles as recommended by the Institute of Healthcare Improvement (IHI), the implementation of standard operating procedures (SOPs) in daily practice, and the recommendations of the National Agency for Health Surveillance (ANVISA) are extremely important[5].

Children and neonates are more vulnerable to infections, due to some factors such as the slow maturation of the immune system that increases the risk of acquiring transmissible diseases, the sharing of objects from one patient to another, malnutrition, congenital diseases, use of corticosteroids, hemato-oncological diseases, among others. Therefore, it is important to be extra careful when handling catheters[6].

Besides the factors that are predominant in children and newborns for the occurrence of infections, we can relate these HFIs directly to health care due to inadequate handling of venous catheters, with the low adherence of health professionals to biosafety recommendations, including hand hygiene, disinfection of connectors, and the use of aseptic techniques in the insertion of invasive devices and dressing changes, which can lead to the dissemination of microorganisms. Therefore, it is extremely important that everyone, especially the nursing team, which works directly with patient care, has the appropriate knowledge about infection prevention measures[6].

This study aimed to identify the knowledge of nursing professionals about prevention of bloodstream infection related to venous catheters in pediatric and neonatal intensive care units.

METHODS

This is field research with an analytical and quantitative character through a structured questionnaire with nine questions with alternatives about infection prevention measures, such as: i) hand hygiene, ii) disinfection of connectors, iii) what characterizes an infection and the difference between phlebitis and iv) performance of catheter dressings and maintenance.

Questionnaires were randomly given to 50 professionals of the nursing team (nursing assistants, nursing technicians, nursing residents and nurses who had at least three months working in the institution in the morning, evening, and night shifts, according to their availability and free will to participate in the research), who work in the neonatal and pediatric intensive care units of a hospital in the south zone of São Paulo/SP-Brazil. Professionals who are not part of the nursing team, who were on leave, on vacation and/or who had been working for less than three months in the unit did not participate in this research.

The research was conducted using a questionnaire delivered to the nursing team professionals and with the signature of the Informed Consent Form (ICF) in which the participant was informed about the research objective and a Commitment and Confidentiality Form in accordance with Resolution 466/2012-CNS/CONEP, ensuring the confidentiality of the information collected.

The present study was approved in the Ethics and Research Committee of the Universidade Santo Amaro (UNISA) on 20th September 2022, with CAAE number: 63117122.8.0000.0081 and of opinion: 5.654.823 and approved by the Ethics and Research Committee of the coparticipating institution Instituto de Responsabilidade Social Sírio Libanês on 21st October 2022, with CAAE number: 63117122. 8.3001.5447 and opinion: 5.715.449. The research began only after its approval and signature of the letter of consent by the nursing supervision of neonatology and pediatrics of the hospital.

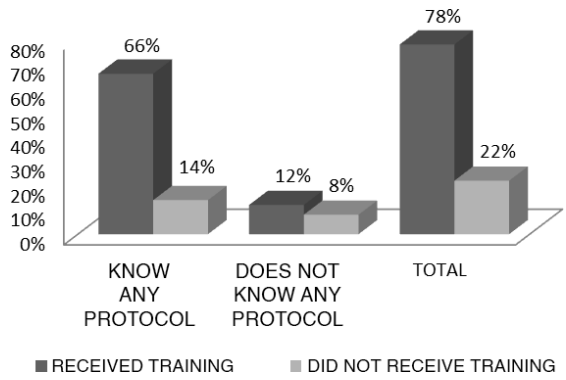
RESULTS

Responses were obtained from 50 professionals of the nursing team. In total there were 9 nurses (18%), 17 nursing technicians (34%), 18 nursing assistants (36%) and 6 nursing residents (12%), 30 employees of the neonatal ICU, 14 employees of the pediatric ICU and 6 nursing residents who worked in both sectors.

Of the 50 research participants, 39 said they had training on the approached theme. From these 39, 12 answered that they had had great training (31%), 24 had had good training (62%), and only 3 had regular training (8%). Eleven participants answered that they had had no training whatsoever on the approached theme during their time working in the institution. The participants' time in the institution ranged from 3 months to more than 10 years.

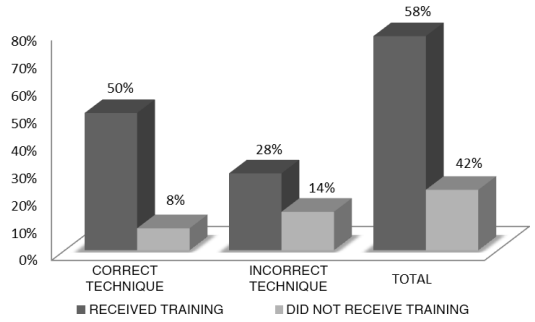
Figure 1 represents the percentage of health care professionals who did or did not receive training related to knowledge of institutional protocols on bloodstream infection prevention. Of the 39 participants who received some type of training (78%), 33 (66%) answered that they knew some hospital protocol on the subject and the other 6 (12%) when asked answered that they did not know institutional protocols on the subject. Of the 11 (22%) participants who did not receive training, 7 (14%) are aware of some protocol and the other 4 participants (8%) do not know any protocol on the subject.

Figure 1. Percentage of health professionals who received training related to knowledge of institutional protocols.



When asked about the correct hand washing technique (Figure 2) 29 participants (corresponding to 58%) correctly answered the question that described the correct technique according to the WHO (World Health Organization), so 42% of the participants did not correctly answer the question that correctly described the hand washing technique, but when we compared to the number of people who received training this number equals 28%.

Figure 2. Percentage of health care workers who received training related to knowledge of proper hand washing technique.



Regarding the questions on infection prevention measures, 25 participants, i.e., 50% identified the incorrect statement in the first question. In the second question, 37 participants were able to answer correctly, which is 74%.

Although phlebitis and bloodstream infection are distinct from each other, 17 participants believed that the phrase that best described bloodstream infection was the one that described the phlebitis process, thus 34% of the participants did not know how to describe how an infectious process occurs.

Only 3 people answered all the questions correctly, and only two questions were answered correctly by 100% of the participants.

Thirty-six participants (72%) responded that they felt refresher training on bloodstream infection prevention measures was needed, and the remaining 14 participants (28%) did not feel refresher training was needed.

DISCUSSION

This study, although all participants got more than 50% of the questions right, showed vulnerability in the professionals' knowledge, indicating the need for new educational actions, strengthening concepts on the subject, especially when because children and neonates admitted to an intensive care unit are more susceptible to acquiring infections due to their clinical conditions.

Among these vulnerabilities, it is noteworthy that 20% of the total participants answered that they did not know the institutional protocols, but had received some training, which is contradictory, knowing that the training in the institutions is performed according to the institutional protocols based on updated scientific studies and their lack of knowledge leads to questioning whether they really received adequate training.

Hand washing, with soap and water or 70% alcohol, is one of the most effective methods of infection prevention, because if done correctly it avoids the dissemination of pathogens that are on the skin[9]. When questioned about the correct technique, described step by step in the questionnaire, 42% of the participants did not know how to answer the question correctly, that is, the professionals who did not answer correctly do not know how to perform hand hygiene effectively, which can lead to the occurrence of an infection in the patient.

A bloodstream infection occurs when bacteria that are located on the outside of a catheter, by the formation of a biofilm, meet the bloodstream by incorrect handling due to lack of hand hygiene or inadequate hygiene, by not disinfecting connectors, contamination during dressing changes or even contamination when administering some medication. When questioned, 34% of the participants could not identify how this infectious process occurs, confusing it with the phlebitis process. It is necessary that the team knows how this process occurs so that effective preventive measures can be applied.

The performance of the PICC dressing (24 hours for the first dressing, 48 hours when performed with sterile gauze, and 7 days with sterile film)[10], even though it is performed by a nurse, it is important that the entire team be aware to avoid changing it after the indicated date, thus avoiding contamination. Even with the presence of protocols, 50% of the participants could not identify the incorrect question on the subject.

This study showed the vulnerability of health professionals' knowledge about measures to prevent bloodstream infections (hand washing, disinfection of connectors, maintenance and exchange of dressings, use of bundles, among others), directly implying in patient care.

CONCLUSION

This study identified gaps in the knowledge of nursing professionals about measures to prevent bloodstream infection, even with several recent studies, the presence of continuing education and frequent updates on the subject, which is quite worrying.

It was evidenced the need for training, information, and other continuing education measures, so that the rates of bloodstream infections can decrease, especially in the most vulnerable population of neonates and children admitted to intensive care units.

Besides a well-trained team, it is essential to maintain the routine of multidisciplinary visits, doctors, and nurses of the Hospital Infection Control Service (SCIH) with the participation of professionals directly involved in the care of patients admitted to the neonatal and pediatric ICU. These bedside visits provide the identification of non-conformities in care processes, assist in the management of prevention measures, and facilitate the relationship between professionals.

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